Why managerial practice differs? Firm and country characteristics in understudied regions.*

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Abstract

A large body of research in recent years result in the growth of knowledge about better or worse management practices for manufacturing firms. However, research on comparison using micro level data across countries has been limited by the different styles on management and by the unavailability of homogeneous data sources, especially in former transition and Asian countries. This study aims to fill this gap by using the firm-level survey by EBRD and World Bank (BEEPSV-MENA ES, 2012-2014))to construct a Management quality score (MQS) based on management practices from manufacturing firms in Central Asia, Eastern Europe, Middle East and Northern Africa. We find that both country and firm characteristics matter but the ladder weight differently by level of income or by the degree of institutional upgrading. In all countries, firm size positively impact management performance but managerial practices are contingent upon firms environment because, when countries are considered, managerial practices mirror the relative importance of different determinants. Competition, education and technology are significant for the high income countries only whereas GVC partecipation and some categories of ownership are significant for the low income countries only. These results show that firm's characteristics weight differently across countrys' group, a result coherent with the interaction model reported in Appendix. This suggests a necessary connection between business environment reforms devoted to managerial upgrading and industrial policy devoted to enhance best performing firms'characteristics. Their complementary and targeted use can enhance development opportunities.

Keywords. Managerial quality, firm performance, productivity, management practices, managerial upgrading.

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1 Introduction

The origins of cross-country differences in living standards have captured the attention of economists for years and most researchers agree that at the centre of the variation in output per worker across countries are differences in productivity. But why do countries have different levels of productivity? Economists tend to disregard management-based explanations for productivity differences but productivity differences between countries and firms remain puzzling. The puzzle persists even at industry level. For example, within the average four-digit U.S. manufacturing industries, Syverson (2011) finds that labor productivity for plants at the 90th percentile was four times as high as plants at the 10th percentile. Even after controlling for other factors, Total Factor Productivity (TFP) was almost twice as high, with differences persistent over time and robust to controls for plant-specificities. Why is such TFP heterogeneity evident in U.S. industries as well as in all other countries where data is available? One explanation is that these persistent differences between and within industry productivity are due to hard technological innovations, as embodied in patents or the adoption of advanced equipment. Another explanation is that productivity differences reflect variations in management practices.

Along the ladder explanation, research suggests that differences in managerial practices or 'managerial quality' for short, plays an important role in explaining productivity differences across countries (Bloom et al., 2012). Studies show the strong correlation between the quality of management practices and firms' performance or productivity and this applies not only to advanced countries but also to developing economies. This interest of scholars in the link between managerial quality and performance has surely gained momentum after the seminal contributions by Bloom and Van Reenen (2007) and Bloom et al. (2012), with their general conclusion that there is a set of good managerial practices whose implementation is conducive to higher firm

performance. Managerial practices matter not only at both country and firm level but also at plant level: they varied not just among companies, but also within them. With variations among plants belonging to multi-plant firms due to differences across establishments within the very same firm.

The puzzle is now multifaceted.

First, the TFP spread across countries, industries, firms and plants persist cross section and over time and finds only partial explanations[1]. Resource misallocation across firms within industries is thus important, yet not the main factor that can account for cross-country productivity differentials[2], especially across developing economies[3].

Second, the empirical evaluation shows that differences in management quality could account for significant amount of total factor productivity differences between and within firms and plants (Bloom et al., 2017).

Third, managerial quality is still the missing and relatively unexplored channel. Sometimes, managers and firms seem unaware of their poor management, with significant managerial overconfidence[4] affecting productivity differences at various levels.

Given this premise, if managerial quality plays an increasing role in exploring productivity differentials and we do not shy away from management-based explanations of productivity differences, disentangling managerial quality sources is one step forward to tackle one missing piece of the puzzle: the sources of productivity differences. More specifically, the central question of this paper is about the importance of managerial quality determinants. The focus is on why firms in different countries have very heterogeneous management quality. In other words, why do so many firms exist with apparently inferior management practices, and why does this vary so much across countries and across firms? To do so we have been using BEEPS-MENA ES datasets covering many countries not only European but also Asian and Northern African countries, i. e. relatively understudied regions, or regions for which a scant empirical evidence is available. Anedoctal evidence suggests that in these regions, while there are many well-managed firms, many firms are also operating with extremely old-fashioned management practices. The lack of appropriate managerial skills is a possible explanation for lower productivity found, for instance, among state-owned or formerly state-owned firms of transition countries[5]as well as among less advanced countries, when the impacts of training programmes on improvement of business practices are searched for (McKenzie and Woodruff, 2016). Even corruption plays a very significant role, affecting aggregate productivity and firm performance by deteriorating firm man-

[1]The question on how cross country differences in economic outcomes relate to differences in the within-industry productivity dispersion across firms opens a large literature on the interplay between the heterogeneity in firm-level productivity, the business environment, and aggregate economic performance. Measures of firm heterogeneity detect possible misallocation as for instance by Hsieh and Klenow (2009) and Bartelsman et al. (2013).

[2]In particular Bloom et al. (2017) find that about a quarter of cross-country differences in productivity can be attributed to differences in management practices.

[3]Using World Bank survey data for formal manufacturing firms in 52 low and middle income countries, Inklaar et al. (2017) show that reducing misallocation, manufacturing productivity would increase significantly, but productivity differences remain large. This suggests a role for institutional factors, the speed of technology adoption, the human capital intensity, a better allocation of resources across formal and informal firms, or any of the other factors that have been associated with productivity differences in the literature.

[4]The differences between self-provided scores of managerial quality against actual, objectively measured scores reveal that most managers in many countries are unaware that their own management practices are poor. There are many examples of Managers' surveys using various assessments of overconfidence. This large gap or the cognitive bias is used in the behavioral literature looking at the effects on managerial decision makings, corporate decisions and performance.

[5]Transition regions are examined by EBRD Transition Reports and have been studied by Bloom et al. (2012). How management quality explains Russian firm performance is analyzed by Friebel and Schweiger (2013)

agement practices (Athanasouli and Goujard, 2015). Thus productivity differences might reflect differences in managerial ability, organizational capital, management practices and other intangible factors along with potentially random factors about choosing the right combination of location, products, and processes. The implication is that productivity differences across businesses reflect idiosyncratic factors that are not simply a matter of technologies and that such differences can be pervasive in high tech and low tech sectors and probably more significant in less advanced and emerging economies (Inklaar et al., 2017).

We proceeded along two steps.

The first step is the identification of managerial quality. The second step is the search for firms and country determinants of managerial quality. The empirical approach intertwines firms and country levels. Firm level shows that firms characteristics contribute to managerial quality, so that they surely contribute to understanding why best management practices are not horizontally adopted across countries. In this case managerial quality is certainly driven by differences in firm attributes. But this is not the whole story, it is only one side of the coin. The other side is that even the location of a firm in a specific area (a country) would contribute to explain managerial quality differences: the results show that firm characteristics weight differently in presence of different economic and institutional attributes of the countries.

On the one side, this is not surprising because firm managerial quality depends upon the spatially - constrained availability of resources devoted to improve business climate, targeting managerial quality. In short, the higher the attention devoted to business climate improvements, the greater the benefits for local firms. Afterwards, institutional systems are also international business contexts and with the rise of developing economies throughout the global economy, shedding light on the role of institutional context in understudied regions is crucial for advancing knowledge to international business as argued by Fainshmidt et al. (2018). What is surprising is the identification of different channels through which the country influences managerial quality: through participation in global value chain (GVC)[6] and mixed ownership in less-advanced countries, through competition, education and technology in high-income countries. Even when firm heterogeneity and its many features are accounted for by empirical analysis, some issues remain open and country-specificities entry into play.

This paper relies upon several literatures, organized in three strands: the first considers productivity across countries, between and within firms, the second focuses on the drivers of managerial quality, the third looks at managerial incentives.

First, the empirical literature relates management practices to productivity, across countries, to performance between and within firms: in other words, the starting point is the set of results of the management practice survey programme (Bloom et al., 2017) that has gained greater coverage of business practices across economies. In this programme, the positive correlations between measures of management practices and firm performance are common so that higher management scores are robustly associated with better performance in manufacturing (Bloom and Van Reenen, 2010) and non-manufacturing firms. In short, firms

[6]The case examined by Khan et al. (2018) is an example that highlights the importance of global networks as a balancing strategy in a late liberalizing economy, under weak institutional arrangements.

which scored more highly in management quality index improved firm performance. Bloom and Van Reenen documented[7] that higher quality management practices are correlated with several measures of productivity and firm performance, including labor productivity, TFP, return on capital Tobin's Q, sales growth and the probability of survival. The correlation between a firm's management practice score and its TFP is statistically robust and economically non trivial. Spanning the interquartile range of the management score distribution, for example, corresponds to a productivity change between 3.2 and 7.5 percent. Even estimates of firm performance equations show that the measure of company's management quality is positively related to different measures of firm performance.

Second, the empirical literature search for the determinants of managerial practices and the predictors of the quality of management practice in a firm (Bloom and Van Reenen, 2007). Taking for given the previous result on the positive association between managerial quality and performance, the applied research (Bloom and Van Reenen, 2010) on what causes differences in management practices or the drivers of management practices identified many reasons like product market competition, business environment, learning spillovers from large manufacturing plant entry (primarily belonging to multinational corporations), and education. Of course, some of these reasons may be better suited to explaining differences within countries or across industries, while other reasons may be better-suited to explaining difference between countries[8]. In particular, two factors are important predictors of managerial practice: more intense competition, measured in several ways, is positively correlated with best-practice management as well as specific characteristics of ownership[9]. Factors that account for poor management in many transition countries are specifically investigated showing that factors that matter in non-transition countries matter in transition countries as well (Bloom et al., 2012). Stronger product market competition, higher levels of multinational ownership, and greater employee education are all strongly correlated with better management as well as higher levels of private ownership. More recent empirical research (Bloom et al., 2017) on 32,000 US manufacturing plants finds an enormous dispersion of management practices across plants, with 40% of this variation across plants within the same firm but confirms that plants using more structured management practices have successfull performance results, like greater productivity, profitability, innovation and growth. It pays attention to slightly different drivers of management practices and finds evidence for competition, business environment, learning spillovers and human capital.

Third, the role of managerial incentives as well as of individual characteristics for managerial quality (Guner et al., 2015). In this strand, the incentives to invest in managerial skills are considered. For instance, the incentives of managers to invest in their skills and the resulting endogenous skill distribution of managers are at the centre of income and productivity differences across countries. We do not consider this third strand even though it could be very important for weighting managerial quality differences. We consider what is

[7]For instance un Bloom et al. (2010), Bloom et al. (2013), Bloom et al. (2017). The same message comes from the literature on knowledge management even when Community Innovation Survey is utilized.

[8]Bloom and Van Reenen (2007) showed that although 42% of the overall variation in management practices can be ascribed to country and/or three-digit industry effects, the remaining 56 % is within country and industry.

[9]Bloom and Van Reenen (2007) show that management practice scores are lower when the firm is family-owned and primogeniture determines the current CEO's succession. Family ownership per se is positively correlated with good management.

common to the first and the second strand, that is that firm heterogeneity and the related firm characteristics are the most important explanation of managerial quality and thus of productivity or performance indicators across countries.

We contribute to the literature in looking at the firm and country level determinants of managerial quality. In our case, the explanatory power of the level of development (measured by per capita GDP) as well as of other country characteristics are not dwarfed by firm-specific variables or by the many features of firm heterogeneity in explaining variation in managerial quality. First, the paper measures managerial quality (MQ), calculating management quality scores (MQSs). Second, it shows firm and country determinants of managerial quality or the drivers of MQ. Third, it outlines that MQSs are not fully captured by firm characteristics and the importance of each varies hand by hand with the level of development. Country and country-groups do play a role so that in high and low income countries firm's characteristics matter differently across countries' groups.

The paper is structured as follows. Section 2 describes the stylized facts that motivates the analysis. Section 3 details the data and the identification of MQSs. Section 4 presents the results of the methodology used to identify the drivers of management practices, by looking at the role of firm and country attributes. Finally, in Section 5 we conclude by looking at policy implications. Appendices are devoted to full data description, management score measurement and results related to the interaction model.

2 Stylized facts

We can mix-up a country perspective and a firm perspective in order to show the stylized facts showing the needs for investigating determinants of managerial quality.

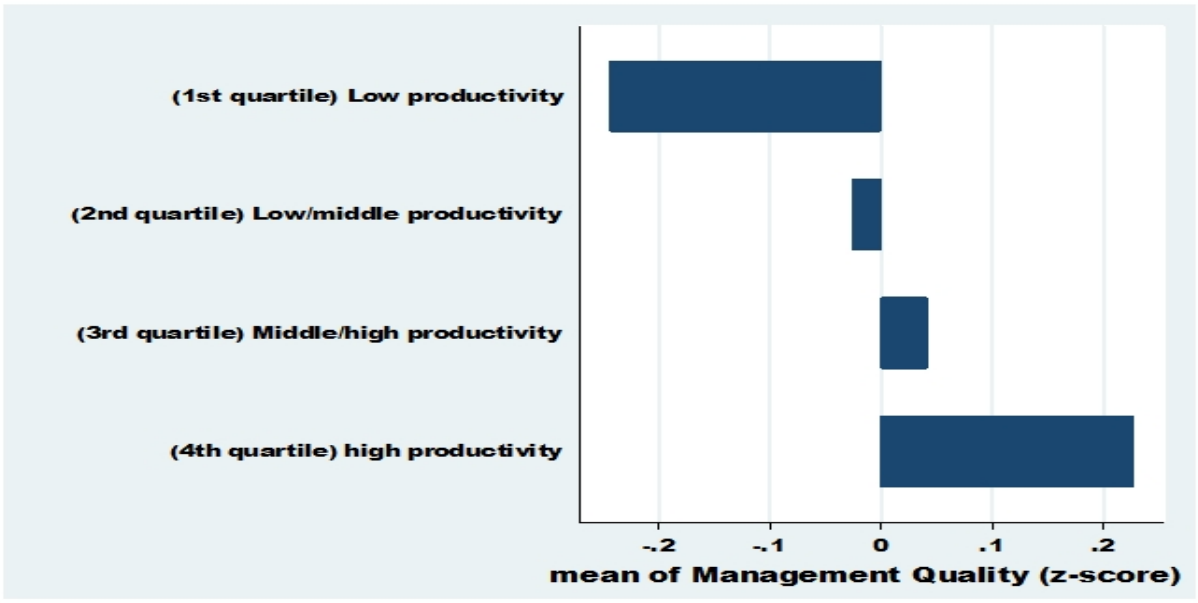
From Fig. 1 and 2, we observe:

- The distribution by quartiles (Fig.1) shows the positive link between MQSs[10] and the quartile distribution of labor productivity at the firm level, across countries[11].
- A positive correlation between MQSs and labor productivity, looking at the mean values by country in Fig. 2. Nvertheless, very close productivity levels are often associated to different MQSs, with an high dispersion.

[10] Details of data in the next section and of the calculations in Appendix B.

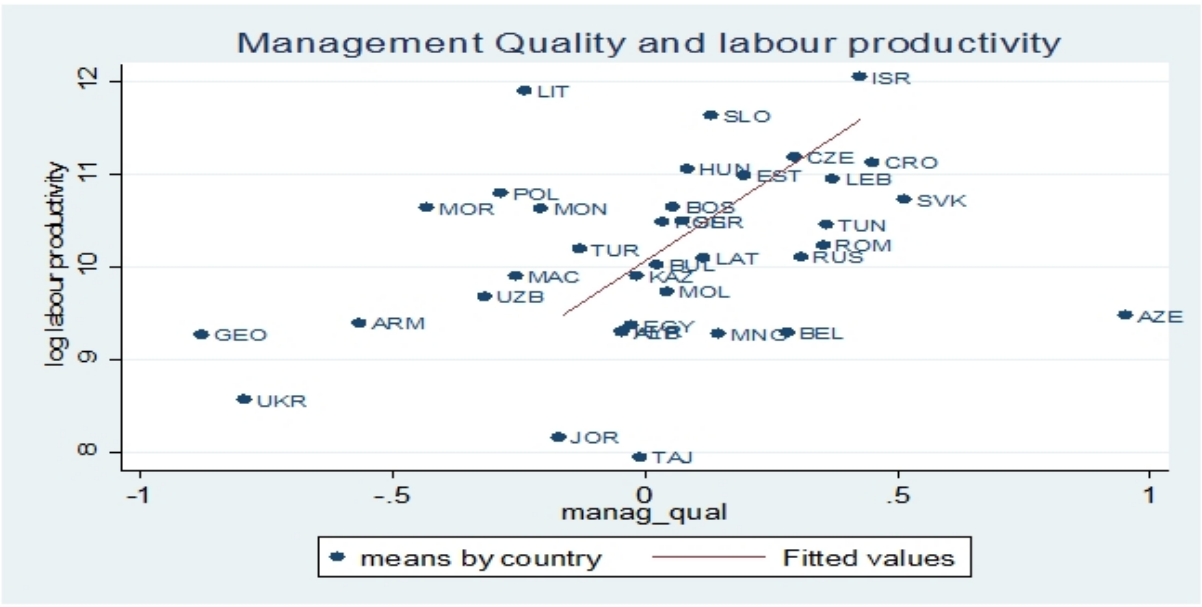
[11] The Pearsons correlation between the management z-score and the log of labour productivity is 0.17, significant at 0.01 level of confidence.

Figure 1: Management quality (MQSs) and quartiles of labour productivity



Source: BEEPSV-MENA ES and authors' calculations.

Figure 2: Management quality scores(MQSs) and Labour productivity



Source: BEEPSV-MENA ES and authors' calculations.

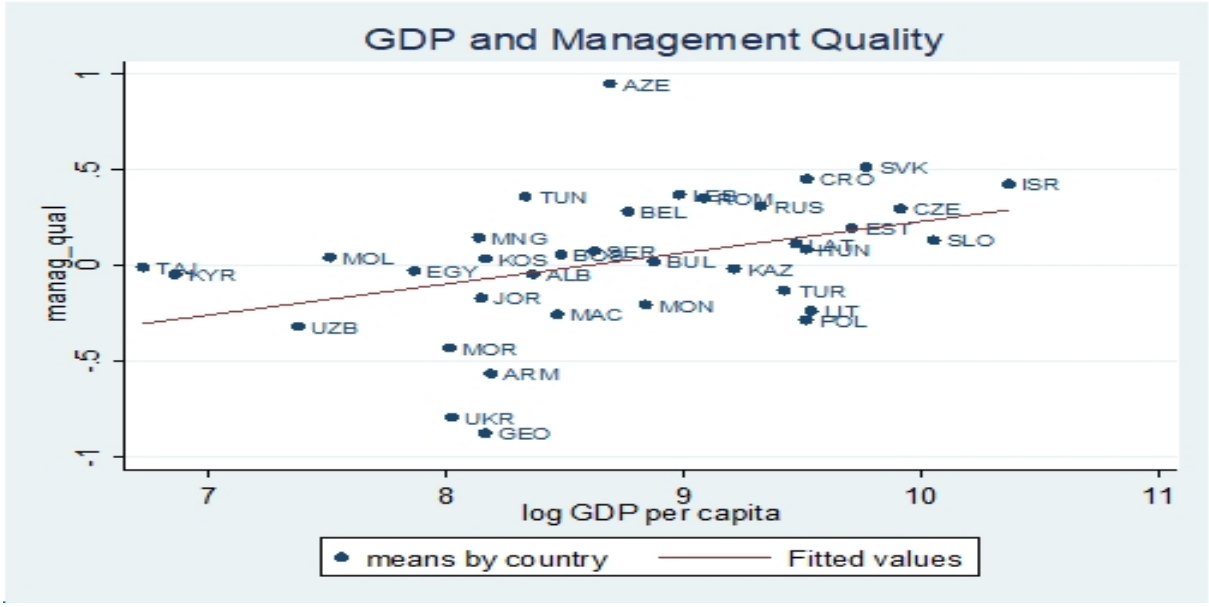
From Fig 3 and 4 we observe:

- A positive correlation between per capita GDP and MQSs, looking at mean values by country (Fig 3.) but for very close GDP level, different MQSs arise.
- At very close per-capita GDP, not only the level but also the distribution of MQSs look very different

(Fig. 4).

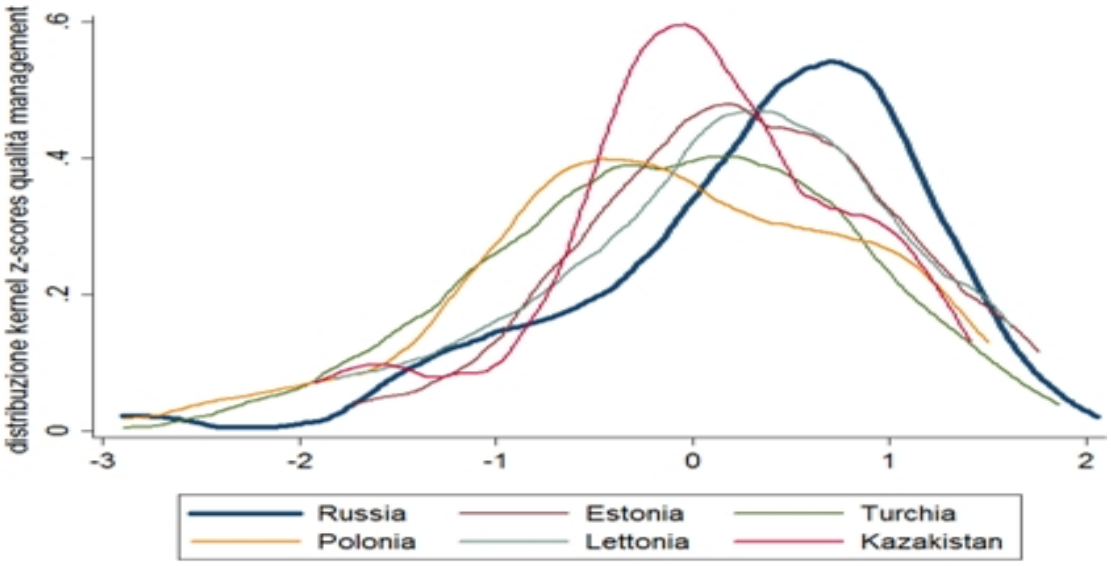
figure[H]

Figure 3: Quality of Management and GDP per capita.



Source: BEEPSV-MENA ES and authors' calculations.

Figure 4: Distributions of MQSs by country. Country with very close per-capita GDP.



Source: BEEPSV-MENA ES and authors' calculations.

MQS varies according to productivity (Fig. 1) but at the same time, taking for given the average values per country, behind very close productivity levels there are very different MQSs. Large differences in productivity

across both firms and countries are well established in the literature, but large differences in managerial quality across both firms (Fig. 1) and countries (Fig. 2) exist and require investigation. Using firm data, results are very clearly cut across countries (Fig. 1) so that countries and regions under our investigation are not an exception with respect to the results well established in the literature, mostly related to more advanced regions. However, when mean values at the country level are considered (Fig. 2) results are less clearly cut and the dispersion across countries becomes more apparent. Country characteristics appear to play a role. There is a a positive correlation between per capita GDP and MQSs (Fig. 3) but in many cases, for very close GDP level, different MQSs levels and distributions characteristics arise (Fig. 4)[12]. Therefore country characteristics are important for MQSs but they are not exaustive. On one side they are crucially affecting MQSs, on the other side even firms characteristics could play a role because they could affect MQSs across countries. Thus looking at country and firm level, determinants of managerial quality can contribute to a check of whether country or firm features are central for any policy devoted to business climate improvement.

3 Dataset and management practices

We describe the datasets (BEEPSV-MENA ES) in more details in Appendix A, but sketch out the important features here. BEEPS is a firm-level survey based on face-to-face interviews with managers which examines the quality of the business environment. Firms in Eastern Europe and Central Asia (including Turkey) were surveyed in order to assess the environment for private enterprise and business development. BEEPSV involved more than 15,500 interviews with firms in 30 different countries. The Middle East and North Africa Enterprise Surveys (MENA ES) is a firm-level survey covering Middle East and North African countries, inclusive of southern and eastern Mediterranean. Both surveys[13] cover the majority of manufacturing sectors (excluding mining), as well as retail and other sectors, including most service sectors (such as wholesaling, hotels, restaurants, transport, storage, communications and IT) and construction. Only official or registered companies with five employees or more are eligible to participate.

3.1 Measuring management practices

The quality of management is inherently difficult to formalise and measure because it requires codifying the concept of good or bad management into a measure applicable to different firms across countries. This is a hard task as good management is difficult to define and is often contingent on a firm's environment[14]. Different indicators of management practices can be thought as indicators of the quality of management, our latent variable. The task of quantifying the quality of management is approached constructing a robust measure of management practices overcoming one hurdle: scoring management practices on the basis of

[12] Ease of Doing Business in Russia reached an all time high of 124 in 2010 and a record low of 31 in 2018. It started decreasing in 2012, the year in which the survey was completed in Russia.

[13] Both have a cross-sectional nature.

[14] Cross-cultural and methodological considerations must be taken into account (Waldman et al., 2012).

the data available in BEEPS and MENA ES dataset from which survey responses to measure management practices were drawn (as for instance in Bloom et al. (2012) and EBRD (2014)). The questions concern four [15] separate aspects of management: operations, monitoring, targets and incentives considered to be essential elements of good management[16]. A standardized score was calculated for each of these aspects on the basis of scores for individual management practices, which were evaluated on the basis of the answers provided to the questions in the survey (details in Appendix B). That is, the average management score across all firms for which the variables are available for all countries is equal to zero. Management quality of individual firms can deviate either left or right from zero, showing below (above) the average managerial practice. While the former indicates below average management practices, obtaining a positive overall z-score refers to a higher quality of management practices. The same applies at country-level or country groupings-level.

Bivariate statistics emphasise the positive link between management quality and productivity as shown by the positive correlation between average labour productivity and the average quality of management practices (Fig. 1). Countries where the average quality of management is lower have a smaller percentage of firms with good management practices than countries where the quality of management practices tends to be higher.

4 Drivers of managerial quality. Results

4.1 Drivers of management practices: The role of firms' characteristics

The identification of the drivers of managerial quality imply that both firm and country factors could be important and firm's features could impact differently in different countries.

To this purpose, as a first step we estimated an OLS linear regression, with robust standard errors because of the presence of heteroskedasticity, having the $z - score$ of management quality as dependent variable and as covariates some firm-level characteristics, identified as affecting managerial quality in the previous literature (Bloom and Van Reenen, 2002; Bloom et al., 2012). The estimated regression equation is as follows:

$$Y = F\beta + M\gamma + \epsilon \tag{1}$$

where F is a matrix of variables of firm characteristics, β is the vector of their coefficients; M is a matrix of variables of manager' s individual characteristics, γ is the vector of coefficients ε the vector of error terms [17]

[15] For the purpose of comparison, the survey used in Bloom et al. (2017) contained 16 management questions in three main sections: monitoring, targets and incentives. In BEEPS-MENA ES surveys, management practices are organized along 12 management questions in four sections.

[16] There is scope for legitimate disagreement over whether all of the measures really constitute good practice in different environments. External test validity are utilized in order to check that the scores are correlated with quantitative measures of firm performance from independent data sources or company accounts, survival rates and market value.

[17] With OLS estimation in a cross-section sample the problem of endogeneity arises, especially for the firm size, the education of the workforce and the number of competitors. We are well aware of this problem and of the constraints about using cross-section data on very understudied regions. Some comments can be added. The aim of the paper is not to quantify the strength of different channels affecting management quality but to focus on whether or not i) the country specificity matters, besides firm characteristics, in explaining management quality; ii) by country-grouping, firm characteristics affect differently managerial quality. The first question is not severely affected by endogeneity: the firm level variables explain in part the variation of firm management, the country dummies significantly increase the ratio of explained variability of the management quality. Even in presence of likely overestimation, the contribution of the country dummies is not substantially affected by the endogeneity

Then, to test whether countries are important in determining management quality, we estimated a second regression, adding to previous models the dummy variables for each of the countries where firms are established. This regression equation is :

$$Y = F\beta + M\gamma + C\delta + \epsilon \tag{2}$$

which adds to equation (1) the matrix C of the dummy variables for the countries of the sample, being δ the vector of their coefficients. The results of these two regressions are shown in Table 1, respectively in Column (1) and (2). The covariates are: firm size, education of the workforce, number of competitors, participation in global value chain (GVC), ownership, technological level of the firms sector, the age of the firm and, as control variables, two individual characteristics of the top manager CEO: his/her gender and the age of experience in that sector [18].

Firm characteristics matter for management quality as Tab. 1 shows. All firm-level covariates examined in previous literature (Bloom and Van Reenen, 2010; Bloom et al., 2012) exert here the expected results on managerial quality. Size, market competition, education, participation in GVC, technology, and ownership, they all show that better management practices are related to larger size, higher competition, significant GVC participation, better sectoral technology and education. In some cases as for size and eduction, effects are positive but non-linear and in others, as for competition, effects show an inverted U-shape. Participation in GVC looks very important especially for direct exporting firms but not for indirect exporting firms. The difference between the positive and the negative effect of the different exposures to GVC is very pronounced. Foreign ownership shows a positive impact on managerial quality. The age of the firm is not significant here despite of its bivariate positive link with managerial quality for which, as cohorts age, MQS increases[19].

In line with the literature, even in the countries under investigation, firms facing greater competition are more likely to have better management practices. Higher levels of competition are strongly associated with better management practices, at least within the interval of 1 to 10 competitors. This competition effect could arise through a number of channels, including the inducement of greater managerial efforts. These findings are consistent with econometric work looking at the link between higher competition in the cross section and panel dimension and significant improvements in management quality as well as at the importance of product market competition in increasing productivity. It has often been speculated that the productivity-enhancing effects of competition work through improving average management practices (Bloom and Van Reenen, 2007), and our study provides support for this view through the effect of competition on managerial quality.

Overall, the results of column (1) show that firm characteristics explain a limited amount of managerial

bias. About the second question, it would be severely biased if we supposed a differential effect of the endogeneity in the two country groups. Thus, the magnitude of the effects of some variables on management quality could be affected by endogeneity, so that it would be more precise to talk about association among variables rather than causality but the more interesting and innovative results of our paper are unlikely to be strongly affected by the endogeneity problem.

[18] In Appendix A, the definition of the variables, the descriptive statistics and the bivariate analysis.

[19] In Appendix A Tables A.5 shows the Pearsons correlations among the z-score of management quality and the continuous variables included in the regressions, showing that the direction and the significance of the relationships are consistent with the results of the multivariate analysis. The only exception is age.

quality, a magnitude which is significantly increased by country effects (column 2). The inclusion of country effects, with country dummy variables, increases significantly: the explanatory power of the model: R^2 increases from 0.07 to 0.18[20]. This implies that firm-level and country-level variables are both needed to detect factors affecting managerial quality. Thus, in order to investigate the role of country attributes, country groupings can be useful and require further investigation.

4.2 Drivers of managerial practices. The role of countries' characteristics

Are management practices contingent on the firms environment? In this case every firm adopts its best practice, given the circumstances. But many aspects of management are not contingent so that contingency is not the whole story.

Table 1 has already shown that country dummies can significantly improve the explanatory power, so that the search for economic determinants of the country' s business environment could be fruitful. The regions considered here are very heterogeneous and country groupings aim to tackle this diversity. Two indicators are selected as criteria to classify countries: first, the per capita income level (Tab. A.1 in Appendix) and second, a proxy for the institutional context, in our case for some of the European countries, the access to European Union. Countries can have an access complete before/after 2007 [21] or be EU candidates [22] or potential EU candidates [23], different status that can characterize firm managerial similarities and differences[24]. The other countries outside EU are grouped according to a geographical criterium, with Russia and Israel not included in any group (Tab. A.2 in Appendix).

The estimated regression equations are now:

$$Y = F\beta + M\gamma + I\zeta + \epsilon \tag{3}$$

and

$$Y = F\beta + M\gamma + G\theta + \epsilon \tag{4}$$

They add to Equation (1) respectively the matrix I of the dummies representing the group of countries by per-capita income, with the vector ζ of coefficients, and the matrix G of the dummies representing the groups of countries by institutional or geographic characteristics, with the vector θ of coefficients.

In Table 2, the presence of both the income (column 1) and the institutional criteria (column 2) have a significant impact and the results show that all firm-level covariates display results very close to what Table 1 has already shown. However, when attention is devoted to country groupings, MQSs increase significantly

[20] The adjusted R^2 of the OLS non-robust estimation of the same model increases from 0.06 to 0.16 with the inclusion of country dummy variables.

[21] Before 2007: Estonia, Latvia, Lithuania, Poland, Czech Rep., Slovak Rep. and Hungary. After 2007: Bulgaria, Croatia and Romania.

[22] FYR Macedonia, Serbia, Turkey, Albania and Montenegro.

[23] Kosovo and Bosnia-Herzegovina.

[24] Our reference was the EU Acquis Communautaire. We are aware that context is not adequately addressed in our proxies for institutional differences. The need to go in depth about the degree of contextualization is well underlined by Fowler et al. (2018) and Teagarden et al. (2018).

Table 1: Firms characteristics and MQS

	(1) MQS	(2) MQS
SIZE	0.157***	0.156***
	(7.43)	(7.42)
EDUCATION	0.0514*	0.0862***
	(2.50)	(4.16)
COMPETITION		
competitors_0	0.0851	0.0793
	(0.83)	(0.91)
competitors_1to5	0.129**	0.144**
	(2.60)	(2.62)
competitors_6to10	0.223***	0.218***
	(3.71)	(3.37)
competitors_11to50	0.200**	0.161*
	(2.94)	(2.29)
competitors_51to300	-0.0172	-0.0356
	(-0.13)	(-0.26)
GVC PARTECIPATION		
directGVC	0.173**	0.148**
	(3.09)	(2.60)
indirectGVC	-0.277*	-0.245*
	(-2.43)	(-2.24)
dirandindirGVC	0.0835	0.0467
	(0.89)	(0.49)
OWNERSHIP		
foreignprivate	0.199*	0.188*
	(2.57)	(2.52)
domesticpublic	-0.0274	0.0746
	(-0.18)	(0.53)
mix_domprivforpriv	0.328	0.621
	(1.27)	(1.95)
mix_domprivdompub	0.731***	0.989**
	(9.00)	(2.61)
TECHNOLOGY		
mediumhighTech	0.154**	0.101*
	(2.97)	(2.00)
AGE	-0.000370	-0.00151
	(-0.28)	(-1.17)
Manager characteristics	YES	YES
COUNTRY dummies	NO	YES
Constant	-1.349***	-1.526***
	(-9.95)	(-6.03)
Observations	2325	2325
R^2	0.0705	0.1825
$(*)Adj.R^2$	0.0632	0.1825
F	F(18,2036)=17.01	F(53,2271)=10.23
Prob.>F	Prob>F=0.000	Prob>F=0.000
VIF	1.07	2.92

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The baseline for categorical variables are: for Competition: 'too many competitors to count', for GVC participation: no participation to GVC; for Ownership: domestic private ownership; for Technology: low technology.
(*)As OLS with robust SE do not provide Adj. R^2, it refers to non-robust OLS of the same model.

with both, income and institutional upgrading. The results show that in the first case (column 1), high income countries show a better managerial quality than the baseline (Upper-middle income countries) whereas the contrary happens for low-middle income. In the second case (column 2), institutional groupings have a significant impact on MQSs. The baseline in this case is the country group entering EU after 2007 (Bulgaria, Croatia and Romania) so that EEC (Eastern European and Caucasian countries), CA (Central Asia) and SEM (Southern and Eastern Mediterranean countries) countries show an impact which is worse than the baseline. Russia and Israel are not significantly different from the baseline. Institutional upgrading seems to matter here. The best performance of MQSs is related to the high income group and to the younger members of the EU or, in the last case, to the the most institutionally upgraded group, countries that are new members (after 2007) of the EU. The worst performance of MQSs is related to EEC countries (Eastern Europe and Caucasus). From the results in Tab. 2, both income and the phases of institutional upgradings matter.

Furthermore, both columns in table 2 show an interesting increasing explanatory power with respect to Tab. 1 (column 1). Overall, both income and institutional settings impact more or less equally on managerial quality. Thus, country groupings have a positive link with MQSs, increasing with the level of income and institutional upgrading. The descriptive statistics are consistent with these conclusions: for instance, the mean of MQSs is increasing with increasing per-capita income: from -0.21, to 0.09 and 0.25.

4.3 Firm characteristics in different country groups

Tab. 2 suggests that the results of management practices display significant cross-grouping differences as per capita income and institutional country groupings affect significantly MQSs. But the underlying assumptions is that firm covariates impact is equal across countries. In search of the country effect, we can relax this assumption, by looking at whether or not the impact of the firm determinants is equal or different in the countries under investigation[25].

We proceed by simplifying the analysis. First, by looking at the income differences only, leaving aside the institutional criterium. Second, by reallocating the countries in two income groups only [26]. Furthermore, in order to evaluate the mean difference, we proceed first by distinct regressions for the two income groups and second with a regression for the whole sample with interactions, in which interaction regression coefficients show the difference between the mean scores for high and low income countries. In other words we estimated the regression equations (1) and (2) among the high income and low income countries [27]. In what follows (Tab. 3) the results without interaction are reported. Columns (1) and (2) show the results of estimation among high income countries respectively without and with country dummies; columns (3) and (4) indicate the results of estimation among low income countries respectively without and with country dummies. The results for the interaction model are reported in Appendix C (Tab. C.1).

[25] Bloom and Van Reenen(2007) showed that U.S. firms on average are better managed than European firms.

[26] See Tab. A1 in the Appendix.

[27] Of course the matrix C is reduced to the dummy representing the countries with high income in the first case and to the countries with low income in the second case.

Table 2: Firm and country characteristics and MQS

	(1) MQS	(2) MQS
SIZE	0.143***	0.137***
	(6.83)	(6.40)
EDUCATION	0.0722***	0.0625**
	(3.58)	(2.94)
COMPETITION		
competitors_0	0.0138	0.105
	(0.14)	(0.98)
competitors_1to5	0.0375	0.132*
	(0.73)	(2.43)
competitors_6to10	0.102	0.186**
	(1.64)	(2.93)
competitors_11to50	0.0859	0.177*
	(1.28)	(2.53)
competitors_51to300	-0.0847	-0.0865
	(-0.65)	(-0.61)
GVC PARTECIPATION		
directGVC	0.133*	0.183**
	(2.34)	(3.21)
indirectGVC	-0.284*	-0.231*
	(-2.52)	(-2.04)
dirandindirGVC	0.00518	0.116
	(0.05)	(1.20)
OWNERSHIP		
foreignprivate	0.236**	0.193*
	(3.16)	(2.52)
domesticpublic	0.0815	0.0875
	(0.57)	(0.60)
mix_domprivforpriv	0.469(*)	0.462 (*)
	(1.75)	(1.65)
mix_domprivdompub	0.727***	0.761***
	(4.05)	(3.35)
TECHNOLOGY		
mediumhighTech	0.0895(*)	0.106*
	(1.77)	(2.05)
AGE	-0.00103	-0.000792
	(-0.80)	(-0.61)
Manager characteristics	YES	YES
COUNTRIESbyincome		
highIncome	0.146**	
	(2.75)	
lowMiddleIncome	-0.290***	
	(-6.16)	
COUNTRIESbyinstitutions		
EUbefore07		-0.257*
		(-2.32)
EUcandidates		-0.440***
		(-4.78)
potentialEU		-0.319*
		(-2.39)
EEC		-0.687***
		(-6.18)
CA		-0.406***
		(-4.00)
SEM		-0.330***
		(-3.66)
Russia		-0.142
		(-1.43)
Israel		0.00823
		(0.06)
Constant	-1.167***	-0.874***
	(-8.70)	(-5.87)
Observations	2325	2325
R^2	0.0993	0.1012
$(*)Adj.R^2$	0.0915	0.0910
F	F(20,2304)=13.59	F(26,2298)=10.11
Prob.>F	Prob>F=0.000	Prob>F=0.000
VIF	1.13	1.86

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The baselines for countries-by income and for countries-by institutions are respectively the upper middle income group and EU after 2007-

(*)As OLS with robust SE do not provide Adj.R^2, it refers to non-robust OLS of the same model.

Tab. 3 shows that specific firm characteristics impact differently on managerial quality by country groups, a result robust to the introduction of country dummies. In all cases size, as well as foreign ownership, are significant at any income level. Comparing columns(1)-(3) and (2)-(4), most variables are significant in only one of the two groups. Competition, education, and technology are significant for the high income countries only. Direct partecipation in GVC and the mixed categories of ownership are significant in the low income countries only[28].

The results show that firm characteristics matter differently across country's groups. In the high income case what matters most is education, technology, competition and foreign ownership. In the low income it is the direct partecipation in GVC and the mixed ownership that impact mostly on MQSs. Different firm attributes play a role by the level of economic development (income)[29]. Only firm size is significant in both groups of countries.

Even the comparison of R^2 in different estimations[30] can add something: in particular, the explanatory power of the firm characteristics is much more important in high income than in low income countries. In the former case, firm characteristics play a bigger role, in the latter case country attributes rather than firm characteristics matter most. What emerges is that not only different firm attributes play a role along the stages of development (proxied by income) but also their weights change alongside, with firm characteristics increasingly important.

These results are coherent with the model with interaction (Appendix C, Tab. C.1). Observing the sign and significance of interaction terms, we can identify an accelerating effect in high income countries for education, competition and technology, whereas in low income the same accelerating effect is played by ownership(mixed) and partecipation in GVC.

5 Conclusion

Researchers have long proposed that managers drive productivity differences[31] but managerial quality as potential driver faced significant measurement problems. Efforts on how to measure MQ are underway and today the reasons behind large heterogeneity in managerial quality across countries, firms and plants can be investigated. This is important for countries we consider in this paper not only because they are part of understudied regions but also because many diverse policy measures have been introduced in order to

[28] Foreign ownership is significant at 0.05 level of confidence only in the model without country dummies for high income countries; in the other three models this variable is significant at 0.10 level of confidence only. In the comment above we did not mention the variable that are significant at 0.10 level in only one of the four models.

[29] In Appendix A, Table A6 and A7 show the Pearsons correlations among the z-score of managerial quality and the continuous variables included in the regressions, in the low and high income countries. Table A8 reports the mean values of the z-score of managerial quality in all countries (column 1), in high income (column 2) and low income countries (column 3). The results are consistent with those emerging from the multivariate analysis. Firm's age is an exception, as in bivariate analysis for high income countries, it is significantly correlated with MQS, while the regression does not significantly confirm such link. It is also remarkable that, in high income countries, firms with public domestic ownership show the highest mean value of MQS, while, according to the results of the regression's result, the firms with private foreign ownership have the best MQSs performance.

[30] We refer here to the adjusted R^2, comparing the results of the four columns in Tab. 3

[31] Syverson quoted Francis A. Walker (1887)[..]managerial ability is the source of differences in surplus across businesses[...].

Table 3: Firm and country characteristics and MQS. Low and high income countries

	(1) MQSHighincome	(2) MQSHighincome	(3) MQSLowincome_qual	(4) MQSLowincome
SIZE	0.131***	0.164***	0.152***	0.147***
	(4.52)	(5.32)	(4.95)	(4.92)
EDUCATION	0.116***	0.131***	0.00389	0.0426
	(4.37)	(4.79)	(0.12)	(1.37)
COMPETITION				
competitors_0	0.263*	0.148	-0.166	0.00523
	(2.20)	(1.47)	(-1.01)	(0.04)
competitors_1to5	0.231***	0.232**	-0.0790	0.0649
	(3.37)	(3.18)	(-1.00)	(0.76)
competitors_6to10	0.268***	0.283***	0.0617	0.195
	(3.53)	(3.64)	(0.54)	(1.65)
competitors_11to50	0.314***	0.353***	-0.102	-0.114
	(3.55)	(3.84)	(-0.98)	(-1.06)
competitors_51to300	0.197	0.229	-0.249	-0.230∘
	(0.89)	(0.96)	(-1.61)	(-1.77)
GVC PARTECIPATION				
directGVC	0.0633	0.107	0.276***	0.214**
	(0.86)	(1.37)	(3.33)	(2.59)
indirectGVC	-0.238∘	-0.215	-0.284	-0.218
	(-1.74)	(-1.53)	(-1.59)	(-1.32)
dirandindirGVC	0.0759	0.112	0.0153	-0.157
	(0.76)	(1.05)	(0.07)	(-0.77)
OWNERSHIP				
foreignprivate	0.238*	0.211∘	0.202∘	0.172∘
	(2.22)	(1.94)	(1.94)	(1.68)
domesticpublic	0.0717	0.0896	0.107	0.147
	(0.38)	(0.46)	(0.53)	(0.75)
mix_domprivforpriv	-0.0439	-0.0704	0.710*	0.968*
	(-0.15)	(-0.26)	(2.03)	(2.52)
mix_domprivdompub	0.254∘	0.164	1.160***	1.597***
	(1.88)	(1.15)	(11.94)	(10.68)
TECHNOLOGY				
mediumhighTech	0.155*	0.140*	-0.0248	0.0327
	(2.46)	(2.20)	(-0.29)	(0.39)
AGE	-0.000446	-0.000811	-0.00198	-0.00282
	(-0.27)	(-0.49)	(-0.94)	(-1.38)
Manager characteristics	YES	YES	YES	YES
COUNTRY dummies	NO	YES	NO	YES
Constant	-0.988***	-0.735*	-1.524***	-1.624***
	(-5.62)	(-2.58)	(-7.27)	(-5.53)
Observations	1173	1173	1152	1152
R^2	0.0960	0.1775	0.0771	0.1657
$(*)Adj.R^2$	0.0819	0.1485	0.0624	0.1434
F	F(18,1154)=16.29	F(40,1132)=11.63	F(18,1133)=44.28	F(30,1121)=36.65
Prob.>F	Prob>F=0.000	Prob>F=0.000		
VIF	1.12	2.51	1.07	2.34

t statistics in parentheses
∘(p¡0.10), * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Note: Baselines are the same as in tab. 1 and 2.
(*)As OLS with robust SE do not provide Adj.R^2, it refers to non-robust OLS of the same model.

improve the business environment, with mixed effects in multiple cases[32].

Unlike most of the previous research, the present paper concentrates on factors that affect managerial quality (somehow similar to the the soft knowledge) and pays special attention to the effectiveness of country-firm interactions. An empirical approach is adopted here that simultaneously considers both country factors (i. e. per capita income or institutional settings), and firm factors (i.e. firms' characteristics). The latter are captured by firms' structural variables or firms attributes, while the former are captured by characteristics of national systems. Such an approach leads to a comprehensive analysis of the topic and is particularly useful to highlight cross-national and cross-firm disparities in the MQSs. The econometric analysis is conducted on a large sample of manufacturing and service firms derived from BEEPSV-MENA ES and on a large set of countries of rather understudied regions.

In line with previous studies, the research confirms the important role of firms structural characteristics on managerial quality. Overall, firms operating with larger size and better educated labour force display better managerial practices but this relationship appears more complex than typically shown. With the increase of firm size and education, the value of managerial quality scores increases together with the strength of competition, GVC participation and technology. In light of these findings, micro differences display their role for explaining the cross-country differences of firms' managerial quality.

In addition to previously studied firms' features, this paper shows that even the characteristics of national systems play an important role in determining managerial quality. Countries differences are captured by both institutional upgrading and per capita income and in particular the econometric analysis suggests that the effectiveness of countries characteristics in supporting firms' managerial practices act differently in high and low income countries with significant cross-country disparities. Size and foreign ownership play across all countries, partecipation in GVC and mixed ownership are significant for low income countries only, whereas education and competition are significant for high income countries only. Furthermore, the weights of these firms' features on MQSs vary with the level of development.

This implies that governments may need to act differently in order to improve business environment, stimulate managerial upgrading and encourage the determinants of its upgrading by reckoning the complementarities between national policies and targeted firm policies. As this study shows, the upgrading of managerial quality require an improvement of the entrepreneurial climate and of the legal framework, usually in line with higher per capita income. In the low-income country case, targeted policies at the firm level must be devoted to increasing GVC participation and the mixing-up of ownership. In the case of high income countries, competition, education and technology are the most important vehicles for managerial quality. This has important implications for policy makers because of the two building blocks: first, the cross-country firms' characteristics and second the specific countries' characteristics.

[32]In 2005-2007 period 62 countries undertook reforms to cut the administrative costs of starting a business and getting a license (World Bank, 2006). Business regulations are often used as a proxy of institutional quality in order to establish the relationship between the burden of business regulations and growth. As documented in various Subnational Doing Business Reports, there is evidence of great variability of regulatory burdens within some advancing and advanced countries so that, despite national efforts to simplify and reduce red tape, regulation remains particularly burdensome in many regional areas and exerts significant differential effects on local market competition and ultimately local development. The effects of the many reforms have been mixed in multiple cases (Yakovlev and Zhuravskaya, 2007).

In light of the increasing number of economists arguing that a passive industrial policy is not today the best policy option for growth (Aghion et al., 2011), our results suggest that any kind of non-passive industrial policy has to deal with the two interactive building blocks, at the country and firm level. This suggest the need for an holistic approach addressing the issues of performance and competitiveness along with improving regulatory frameworks and the business environment and reinforcing institutional capacities of technical and business support[33]. In line with the first block, the reliance solely upon national industrial policies is not desirable, as there are important cross-country spillovers suggested by cross-country firms micro characteristics and their interactions. In line with the second block, micro characteristics are affected differently by the country groupings, at different stages of development, so that interventions at the enterprise level alone do not produce optimal results without addressing the issues related to the overall business environment.

In developing countries and economies in transition, especially industrial small and medium enterprises often lack managerial capacities and have insufficient knowledge of business processes, organisational innovations as well as of operational and production cycles. Managerial and organizational practices are weak, especially those required to pursue innovation and take it to market successfully (Cirera and Maloney, 2017). Management matters even in micro and small firms, where the majority of the labor force in developing countries works because variation in business practices explains as much of the variation in outcomes sales, profits and labor productivity and TFP in microenterprises as in larger enterprises (McKenzie and Woodruff, 2016). Evidence from several training programmes in microenterprises in some developing countries (McKenzie and Woodruff, 2014) concludes that most of the training programmes have insignificant impacts on outcomes due to the missing impacts on improvement of business practices.

Capability failures can be one of the most serious justification for industrial policy and a serious source of the "middle-income trap" (Stiglitz et al., 2013) as managerial and organizational practices are important predictors of productivity differences at firm and country level.

Within any country, there is big scope for productivity improvement simply by closing the gap between best practices and average practices of managerial quality. But it is the complementarity between business environment reforms devoted to managerial upgrading and industrial policy targeted to enhance firms best performing characteristics that can enhance development opportunities.

[33] UNIDO' s Industrial Upgrading and Modernization Programme, applied to developing countries and economies in transition.

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6 Appendices

Appendix A. Data, variables and descriptive statistics

The BEEPS-MENA ES Datasets
The Business Environment and Enterprise Performance Survey (BEEPS) is a joint initiative conducted by the EBRD and the World Bank. BEEPS is a firm-level survey based on face-to-face interviews with managers which examines the quality of the business environment. It was first undertaken in 1999-2000, when approximately 4,100 firms in 25 countries in eastern Europe and Central Asia (including Turkey) were surveyed in order to assess the environment for private enterprise and business development. It has since been conducted every three to four years or so. The recent fifth round of the survey (BEEPS V) was completed in 2012 in Russia and 2014 in all other countries. BEEPS V involved more than 15,500 interviews with firms in 30 different countries. The Middle East and North Africa Enterprise Surveys (MENA ES) are a joint initiative administered by the World Bank, the EBRD and the European Investment Bank (EIB). They were first conducted in selected MENA countries in 2013 and 2014. The surveys cover the countries of the southern and eastern Mediterranean namely Egypt, Jordan, Morocco and Tunisia as well as Djibouti, Israel, Lebanon and Yemen. Both surveys cover the majority of manufacturing sectors (excluding mining), as well as retail and other sectors including most service sectors (such as wholesaling, hotels, restaurants, transport, storage, communications and IT) and construction. Only official in other words, registered companies with five employees or more are eligible to participate. The survey is conducted at an establishment level, even though some questions (like those about the ownership) concern the firm the establishment belongs to. In some larger economies (such as Russia, Turkey and Ukraine) the survey is representative across additional subsectors for some of the sectors that make the largest contributions to employment and value added. Firms that are wholly owned by the state are not eligible to participate.

COUNTRIES in BEEPS-MENA ES surveys

- BEEPS countries: Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyz Republic, Kosovo Montenegro, Lithuania, Latvia, FYR Macedonia, Moldova, Mongolia, Montenegro, Poland, Russian Federation, Romania, Serbia, Slovak Republic, Slovenia, Tajikistan, Turkey, Ukraine, Uzbekistan.
- MENA countries: Egypt, Israel, Jordan, Lebanon, Morocco, Tunisia (The MENA-ES survey was also conducted in Greece, Cyprus, Djibouti, Yemen, and West Bank and Gaza, but these countries are not considered in our analysis).

Data are about 17,133 manufacturing firms but those about Management Quality were asked to establishments with more than 20 employees (more than 50 employees in Russia). Therefore the largest part of the statistical analysis in this paper is conducted over 3,948 manufacturing firms only. The unit of the statistical analysis is the establishment. The survey is defined as a firm-level survey, conducted at an establishment level, even though some questions (like those about the ownership) concern the firm the establishment belongs to. It is not possible to reconduct establishment data at the firm level. Because of this, no analysis is developed on between-firm versus between-plant (or establishment).

VARIABLES

- QUALITY of MANAGEMENT PRACTICE. We considered all the questions but one in the section R, dedicated to the managerial practices, of the Innovation Module (Questions R.1, R.6, R.7, R.8, R.11, R.13, R.15). The construction of the normalized management quality score (MQS) is described in the Appendix B of this paper.
- SIZE. It is the logarithm of the number of permanent, full-time employees working in the establishment (Question L.1 of the Manufacturing Module).
- EDUCATION. It is the logarithm of the percentage of permanent, full-time university graduated employee working in the establishment (Question Q.69 of the Manufacturing Module).
- Number of COMPETITORS in the main market of the establishment. This information is drawn from Question E.2 of the Manufacturing Module. As the effect of the number of competitors on management quality is not linear neither quadratic, we built some dummy variables representing intervals of number of competitors. One of the answers to the question about the number of competitors is 'too many competitors'. This is the baseline for this variable.

- Position respect to a GLOBAL VALUE CHAIN. According to the methodology proposed in Transition Report of 2014 (EBRD, 2014), an establishment is considered to belong to a GVC if it imports from abroad at least 10% of its total inputs and if it exports at least 10% of its total output. Then, among the firms partecipating in a GVC, three categories were identified: firms that make only direct exports (direct GVC); firms that make only indirect exports (indirect GVC); firms that make both direct and indirect exports (dirandindirGVC). Firms not partecipating in a GVC are the baseline for this variable. Variables are drawn from the answers to questions D.3 and D.12 of the Manufacturing Module.

- OWNERSHIP. This information is at the firm level (Question D.2 of the Manufacturing Module). We identify five typologies of firms on the basis on the prevalent percentage among the different categories: Domestic and private, Foreign and private (foreignprivate), Domestic and public (domesticpublic) and two mixed categories: Domestic and foreign private (mix_domprivforpriv), Domestic private and public (mix_domprivforpriv). Domestic private firms are the baseline for this variable.

- TECHNOLOGY. The sampling plan kept into account the industrial sector of the establishment (Section A.4 of the Manufacturing Module). The Transition Report of 2014 (EBRD, 2014) classified the manufacturing sectors in three technological levels(Highandmedium, Medium tech and Low tech sectors). In the regression analysis the first two levels are merged, therefore we have high and medium tech sectors (MediumhighTech) and low tech sectors, which are the baselines.

- AGE. The age of the firms is obtained subtracting from the year of the interview (2012) the year when the establishment began operations (Question B.5 of the Manufacturing Module).

- MANAGEMENT CHARACTERISTICS. Experience of the top manager and gender.

- EXPERIENCE. It is the logarithm of the years of experience of the top manager in the sector of the establishment(Question B.7 of the Manufacturing Module).

- GENDER. It is the sex of the Top Manager (Question B.7a of the Manufacturing Model).

- COUNTRIES by Income: see Tab.4 in the Appendix for details. In the regression reported in Table 2, Column (1), countries are divided in three groups according to their per-capita income: High income countries (highIncome), upper-middle income countries and low-middle income countries (lowMiddleIncome); the upper-middle income countries are the baselines. For the following analysis countries are grouped in two groups: high income countries (highGDP) and low income countries: the variable highGDP is used in the regression with interaction reported in Appendix C.

- COUNTRIES by institutions: see Tab. A2 in the Appendix for details. In the regression reported in Table 2, Column (2), countries are divided in seven groups according to their institutional (respect to EU) or geographic situation: Admission to EU before 2007 (EUbefore07); Admission to EU after 2007; Candidates for admission to EU (EUcandidates); Potential candidates (potentialEU); Eastern Europe and Caucasus (EEC); (CA); South and eastern Mediterranean (SEM); there are also the dummy variables for Russia and Israel; countries admitted to EU after 2007 are the baseline of the regression.

COUNTRIES by income

Table A.1: High(HI), UpperMiddle(UM)and LowMiddleIncome countries(LM)(*); High and Low income countries(**)

Countries	No. of Manuf. Firms	No. of firms with MQ data	(*)	(**)
Albania	360	41	UM	H
Azerbaijan	248	53	UM	H
Belarus	285	64	UM	H
Bosnia Herzegovina	297	51	UM	H
Bulgaria	273	47	UM	H
Croatia	322	52	HI	H
Czech Republic	217	55	HI	H
Estonia	243	30	HM	H
FYR Macedonia	346	51	UM	H
Hungary	197	25	UM	H
Israel	438	107	UM	H
Kazakhstan	430	88	UM	H
Latvia	270	44	HI	H
Lebanon	483	98	UM	H
Lithuania	225	48	HI	H
Montenegro	102	11	UM	H
Poland	392	58	HI	H
Romania	476	85	UM	H
Russia	3,030	365	HI	H
Serbia	333	42	UM	H
Slovak Republic	173	32	HI	H
Slovenia	244	36	HI	H
Turkey	839	425	UM	H
	10223	1914		
Armenia	245	37	LM	L
Egypt	2,457	934	LM	L
Georgia	289	49	LM	L
Jordan	548	174	UM	L
Kyrgyz Rep.	215	49	LM	L
Kosovo	179	27	LM	L
Moldova	312	36	LM	L
Mongolia	324	59	LM	L
Morocco	374	98	LM	L
Tunisia	580	243	UM	L
Tajikistan	253	24	LM	L
Ukraine	769	237	LM	L
Uzbekistan	365	67	LM	L
	6919	2034		
Total	17133	3948		

Notes:

- (*) Income/region categories are from the World Bank lending group definitions for 2012. This classification is utilized for results in Tab. 2 of the text.
- (**) In the low income group (L) of this column all the World Bank countries with low-middle income (LM) and the two poorest countries (lowest GDP per capita) of the upper-middle income group (Jordan and Tunisia) are grouped. In the high income (H) all the World Bank high income (HI) and upper-middle (UM) income countries, except Jordan and Tunisia, are grouped. This classification is utilized for results in Tab. 3 of the text.

Table A.2: Countries by institutional or geographic groupings

	Country groupings	No. countries	No. Manuf. Firms	No. of firms with reported MQ
1	Admission to EU before 2007	8	1961	334
2	Admission to EU after 2007	3	1071	184
3	Candidates for admission to EU	5	1980	1081
4	Potential candidates	2	476	78
5	Eastern Europe and Caucasus	6	2148	476
6	Central Asia	5	1587	287
7	South and eastern Mediterranean	5	4442	1547
	Russia	1	3030	365
	Israel	1	438	107
		36	17133	3948

Note: Country grouping:

- 1. Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia.
- 2. Bulgaria, Croatia, Romania
- 3. Albania, FYR Macedonia, Montenegro, Serbia, Turkey.
- 4. Bosnia and Herzegovina, Kosovo.
- 5. Armenia, Azerbaijan, Belarus, Georgia, Moldova, Ukraine.
- 6. Kazakhstan, Kyrgyz Republic, Mongolia, Tajikistan, Uzbekistan.
- 7. Egypt, Jordan, Lebanon, Morocco, Tunisia

Table A.3: Means of the continuous variables. Firms reporting Management Quality data.

	All countries	High Income	Low Income
Managerial quality or MQS	0	0.144	-0.135
SIZE			
Employees	194.251	186.371	201.665
$= log\, of$	4.418	4.436	4.402
EDUCATION			
$\%\, of\, graduates$	22.048	20.406	23.614
$= log\, of$	2.730	2.590	2.864
COMPETITION			
(*)Number of compet.	9.674	9.454	9.986
(**)Number of compet.	140.561	102.558	174.820
AGE	20.748	22.396	19.194
MANAGER characteristics			
$Years\, of\, experience$	20.594	20.895	20.310
$= log\, of$	2.814	2.830	2.798

(*) Excluded firms with 'too many competitors to count'.
(**)Attributing 300 competitors to firms with 'too many competitors ro count'.

Table A.4: Distribution of the categorical variables. Firms reporting Management Quality data.

	All countries	High Income	Low Income
COMPETITION			
competitors0	103	51	52
competitors1to5	777	443	334
competitors6to10	388	246	142
competitors11to50	260	159	101
competitors51to300	30	15	15
too many competitors to count	1279	431	848
GVC PARTECIPATION			
No partecipation in GVC	2556	1129	1427
directGVC	853	449	404
indirectGVC	201	113	88
dirandindirGVC	241	158	83
OWNERSHIP			
domestic private	3466	1677	1789
foreignprivate	339	163	176
domesticpublic	45	20	25
mixdomprivforpriv	41	16	25
mixdomprivdompub	2	1	1
TECHNOLOGY			
mediumhighTech	615	415	200
low tech	2989	1459	1530
Manager's characteristics (Gender)			
Male	3570	1690	1880
Female	368	218	150

.

Table A.5: Pearsons correlations of continuous variables. All countries. Firms reporting Management Quality data

	MQS	SIZE	EDUCATION	nconp†	ncomp♯	AGE	MAN. Characteristics
Managerial quality or MSQ	1.0000						
SIZE	0.1869***	1.0000					
EDUCATION	0.0772***	0.0838**	1.0000				
(')Number of competitors	-0.0336	-0.0853***	-0.0089	1.000			
(")Number of competitors	-0.0871	-0.0714***	-0.0343*	1.000	1.000		
AGE	0.0618***	0.2245***	-0.0018	-0.0505**	-0.0616***	1.0000	
MAN. characteristics	0.0796***	0.0424***	-0.0489***	0.0264	0.0193	0.1916***	1.0000

*** Significant at 1%; ** Significant at 5%; * Significant at 10%.

† Excluding firms with too many competitors to count.

♯ Attributing 300 competitors to firms with 'too many competitors to count'.

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Table A.6: Pearsons correlations of continuous variables. HIGH-Income countries. Firms reporting Management Quality data

	MQS	SIZE	EDUCATION	Ncomp†	Ncomp♯	AGE	Man. Characteristics
Managerial quality or MQS	1.0000						
SIZE	0.2082***	1.0000					
EDUCATION	0.1864***	0.2082***	1.0000				
† Number of competitors	-0.0161	-0.0415	-0.0572	1.000			
♯ Number of competitors	-0.1269***	0.0042	-0.1115***	1.000	1.000		
AGE	0.0718***	0.2711***	0.0422*	-0.0400	-0.0248	1.0000	
MAN. Characteristics	0.0105	0.0302	0.0538**	0.0431	0.0067	0.1218***	1.0000

*** Significant at 1%; ** Significant at 5%; * Significant at 10%.

† Excluding firms with too many competitors to count.

♯ Attributing 300 competitors to firms with 'too many competitors too count'.

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Table A.7: Pearsons correlations of continuous variables. LOW-Income countries. Firms reporting Management Quality data

	MQS	SIZE	EDUCATION	Ncomp†	Ncomp♯	AGE	MAN. Characteristics
MQS	1.0000						
SIZE	0.1690***	1.0000					
EDUCATION	0.0071	-0.0360	1.0000				
† Number of competitors	-0.0432	-0.1239***	0.0344	1.000			
♯ Number of competitors	0.0092	-0.1080***	-0.0205	1.000			
AGE	0.0251	0.1765	-0.0331	-0.0657	-0.0586**	1.0000	
MAN. Characteristics	0.1362***	0.0523**	-0.0369	0.0156	0.0395	0.2788***	1.0000

*** Significant at 1%; ** Significant at 5%; * Significant at 10%.

† Excluding firms with too many competitors to count.

♯ Attributing 300 competitors to firms with 'too many competitors too count'.

Table A.8: Mean MQSs by categorical variables. Firms reporting Management Quality data

	All countries	HIGH Income	LOW Income
COMPETITION			
competitors0	0.0410	0.2417	-0.1558
competitors1to5	0.0641	0.2344	-0.1617
competitors6to10	0.1091	0.2229	-0.0878
competitors11to50	0.0531	0.2483	-0.2542
competitors51to300	-0.1563	0.1153	-0.4279
too many competitors to count	-0.1018	-0.0258	-0.1404
GVC PARTECIPATION			
Not belonging to a GVC	-0.0775	0.0997	-0.2176
directGVC	0.2501	0.3238	0.1681
indirectGVC	-0.1646	-0.0497	-0.3122
dirandindirGVC	0.1020	0.1340	0.0410
OWNERSHIP			
domestic private	-0.0273	0.1102	-0.1561
foreignprivate	0.2441	0.4525	0.0510
domesticpublic	0.2343	0.5359	-0.0070
mixdomprivforpriv	0.2838	0.2434	0.3096
mixdomprivdompub	0.5461	0.5086	0.5835
TECHNOLOGY			
mediumhighTech	0.1721	0.3234	-0.1416
low tech	-0.0421	.0879	0.166
MANAGER's gender			
Male	0.0147	0.1603	-0.116111
Female	-0.1423	0.0244	-0.3845

Appendix B. How to measure management score

BEEPS-MENA ES include a section on management practices in the areas of operations, monitoring, targets, and incentives. The operations question focuses on how the firm handles a process-related problem, such as machinery breaking down. The monitoring question covers the collection of information on production indicators. The questions on targets focus on the timescale for production targets, as well as their difficulty and employees'awareness of them. Lastly, the incentives questions cover criteria governing promotion, practices for addressing poor performance by employees, and the basis on which the achievement of production targets are rewarded. These questions were answered by all manufacturing firms with at least 20 employees (at least 50 employees in the case of Russia). The scores for individual management practices (in other words, for individual questions) were converted into z-scores by normalizing each practice so that the mean was 0 and the standard deviation was 1. To avoid putting too much emphasis on targets or incentives, unweighted averages were first calculated using the z-scores of individual areas of the four management practices. An unweighted average was then taken across the z-scores for the four practices. Lastly, a z-score of the measure obtained was calculated. This means that the average management score across all firms in all economies in the sample is equal to zero. The management practices of individual firms deviate either left or right from zero, with those to the left denoting bad practices and those to the right indicating good practices.

$$Z_{p_{ijc}} = \frac{P_{ijc} - \bar{P}_{ijc}}{\sigma_{P_{ijc}}} \tag{5}$$

Where where $Z_{p_{ijc}}$ is the z-score of management practice P_{ijc} of a firm i in industry j and country c, $\bar{P_{ijc}}$ is the unweighted average of management practice P_{ijc} across all observations in all countries and $\sigma_{P_{ijc}}$ is the standard deviation of management practice P_{ijc} across all observations in all countries.
The second step consist of the calculation of the average of z-scores of different practices belonging to the same area. This is necessary to avoid biases towards the area of the management represented by the higher number of questions in the survey. Thus, the following unweighted average is calculated:

$$\bar{M}^{A}_{ijc} = \frac{1}{n_{P_{ijc},A}} \sum_{P_{ijc} \in A} Z_{p_{ijc}} \tag{6}$$

Where where $\bar{M}^{A}_{ijc}$ is unweighted average of management practices (z-scores) $Z_{p_{ijc}}$ belonging to the same management area A (operations, monitoring, targets or incentives) of a firm i in industry j and country c.

The third step is to average the performance of a firm across different management areas:

$$\tilde{M}_{ijc} = \frac{1}{4}(\bar{M}_{ijc}^{Oper} + \bar{M}_{ijc}^{Monit} + \bar{M}_{ijc}^{Targ} + \bar{M}_{ijc}^{Incent}) \tag{7}$$

The final step of the calculations consists of the trasforming the unweighted average in the z-score of the final measure with the mean zero and standard deviation 1:

$$MQ_{ijc} = \frac{\tilde{M}_{ijc} - \bar{\tilde{M}}_{ijc}}{\sigma_{\tilde{M}_{ijc}}} \tag{8}$$

The overall result M_{ijc} can be used as a measure of the management quality (across countries and across practices)together with the deviations from the average score when the benchmark is a a group of countries.

Appendix C. Results from the interaction model

In this Appendix we report and briefly comment the results of the estimated model with interactions. The typical treatment of interactions in linear models is to consider the interaction as a product term of the main effects variables:

$$Y_i = \beta_0 + \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_{i1} X_{i2}$$

rewritten as:

$$Y_i = \beta_0 + \beta_1 X_{i1} + (\beta_2 + \beta_3 X_{i1}) X_{i2}$$

In this case, the effect of levels of X_{i2} on the outcome variable are intrinsically tied to specific levels of X_{i1}: the marginal contribution of X_{i2} is conditional on X_{i1} as $\frac{\partial X_i}{\partial X_{i2}} = \beta_2 + \beta_3 X_{i1}$. Two scenarios occur. The first occurs when high levels of one variable have an accelerating effect on the other (β_3 has the same sign as β_2), and the other when high levels of one variable have a dampening effect on the other (β_3 has the opposite sign of β_2). So the sign of first-order interaction effects tells us quite a bit about the conditional effect that a given explanatory variable has on the outcome variable. The interpretation of a given coefficient' s effect is now complicated by the requirement that it occurs at a specified level of the other explanatory variable. In our case all the covariates X_i are interacted with the dummy variable, highGDP, which assumes value 1 if the firm is located in a country with high income and assumes value 0 if the firm is established in a country with low income. For instance, in the case of size, $SIZE_{hGDP}$ is the interaction between the variable SIZE and the variable highGDP. The results of this model are consistent with those obtained by making two separated estimations in the two groups of countries: if the coefficient of a covariate is higher in the high (low) income group of countries, the sign of the corresponding interaction variable is positive (negative). Considering the cases when the coefficients of the interaction variables are significant, we can observe dampening and accelerating effects. From table C.1 we observe:

- the positive relationship between education and management quality is stronger in the high income countries;
- the advantage, in term of management quality, of the firms with a countable number of competitors is higher in the high-income countries than in low-income.
- the positive relationship between technology and the management quality is stronger in the high income countries.
- the advantage, in term of management quality, of the firms partecipating in a GVC that make only direct exports with respect to firms not partecipating in a GVC is higher in low income countries.
- the advantage, in term of management quality, of the firm with mixed (domestic plus foreign private subjects; domestic private plus public subjects) ownership with respect to the firms with private domestic ownership is higher in low income countries.

At the end, we can identify an accelerating effect in high income countries for education competition and technology, whereas in low income the same accelerating effect is played by ownership (mixed) and participation in GVC. Results concerning technology, GVC and mixed (domestic plus foreign subjects) ownership are significant at 0.10 level; the other results are significant at the usual 0.05 level.

Table C.1: Firm and country characteristics and MQS

	MQS
SIZE	0.152***
	(4.95)
SIZE_hGDP	-0.0208
	(-0.50)
EDUCATION	0.00389
	(0.12)
EDUCATION_hGDP	0.112**
	(2.69)
COMPETITION	
competitors_0	-0.166
	(-1.01)
competitors_1to5	-0.0790
	(-1.00)
competitors_6to10	0.0617
	(0.54)
competitors_11to50	-0.102
	(-0.98)
competitors_51to300	-0.249
	(-1.61)
COMPETITION_hGDP	

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	MQS
$competitors\_0\_hGDP$	0.429*
	(2.11)
$competitors\_1to5\_hGDP$	0.310**
	(2.97)
$competitors\_6to10\_hGDP$	0.207
	(1.50)
$competitors\_11to50\_hGDP$	0.416**
	(3.05)
$competitors\_51to300\_hGDP$	0.446∘
	(1.65)
GVC PARTECIPATION	
directGVC	0.276***
	(3.33)
indirectGVC	-0.284
	(-1.59)
dirandindirGVC	0.0153
	(0.07)
$GVCPARTECIPATION\_hGDP$	
$directGVC\_hGDP$	-0.213∘
	(-1.92)
$indirectGVC\_hGDP$	0.0459
	(0.20)
$dirandindirGVC\_hGDP$	0.0606
	(0.25)
OWNERSHIP	
foreignprivate	0.202∘
	(1.94)
domesticpublic	0.107
	(0.53)
mix_domprivforpriv	0.710*
	(2.03)
mix_domprivdompub	1.160***
	(11.94)
$OWNERSHIP\_hGDP$	
$foreignprivate\_hGDP$	0.0359
	(0.24)
$domesticpublic\_hGDP$	-0.0353
	(-0.13)
$mix\_domprivforpriv\_hGDP$	-0.754∘
	(-1.64)
$mix\_domprivdompub\_hGDP$	-0.906***
	(-5.45)
TECHNOLOGY	
mediumhighTech	-0.0248
	(-0.29)
$TECHNOLOGY\_hGDP$	
$mediumhighTech\_hGDP$	0.179∘
	(1.68)
AGE	-0.00198
	(-0.94)
AGE_hGDP	0.00153
	(0.57)
Manager characteristics	YES
$Manager \quad characteristics\_hGDP$	YES
Constant	-1.524***
	(-7.27)
Observations	2325
R^2	0.1130
$(*)Adj.R^2$	0.0987
F	F(36,2287)=31.64
Prob.>F	Prob>F=0.000
VIF	5.37

t statistics in parentheses
∘($p < 0.10$),*($p < 0.05$), **($p < 0.01$), ***($p < 0.001$)