

The land that lean manufacturing forgot?

*Management practices in transition countries*¹

Nicholas Bloom*, Helena Schweiger** and John Van Reenen***

*Stanford University, Stanford, CA, USA, Centre for Economic Performance, London, UK, CEPR, London, UK and NBER, Cambridge, MA, USA. E-mail: nbloom@stanford.edu

**European Bank for Reconstruction and Development, London, UK. E-mail: schweigh@ebrd.com

***London School of Economics, London, UK, Centre for Economic Performance, London, UK, CEPR, London, UK and NBER, Cambridge, MA, USA. E-mail: j.vanreenen@lse.ac.uk

Abstract

We have conducted the first large-scale survey on management practices in transition countries. We found that Central Asian transition countries, such as Uzbekistan and Kazakhstan, have on average very poor management practices. Their average scores are below developing countries such as India. In contrast, the Central European transition countries such as Poland and Lithuania operate with management practices that are only moderately worse than those of Western European countries such as Germany. As we find these practices are strongly linked to firm performance, this suggests that poor management practices may be impeding the development of Central Asian transition countries. We find that competition, multinational ownership, private ownership and

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human capital are all strongly correlated with better management. If causally interpreted, this would imply that the continued opening of markets to domestic and foreign competition, privatization of state-owned firms and increased levels of workforce education should promote better management, and ultimately faster economic growth.

JEL classifications: L2, M2, P21.

Keywords: Management, firm performance, transition economies.

1. Introduction

Firms in transition countries were generally not exposed to market forces until the beginning of the 1990s, and, in some transition countries, the state still accounts for more than half of GDP (e.g. Belarus, Turkmenistan and Uzbekistan). What do management practices look like in these countries? Have they been modernized by the wave of lean manufacturing that washed over Europe, the United States and Asia in the last three decades, or are these firms still operating using communist-era low quality mass production?² Moreover, do Western definitions of 'good management' even apply in the ex-communist countries? For example, if corruption is widespread maybe it is best not to monitor the production process in order to minimize the availability of information on the basis of which officials can extract bribes.

Anecdotal evidence suggests that although there are many well-managed firms in transition countries, many firms are also operating with poor practices. For example, when we visited some of these countries, we came across many well-run establishments (e.g. Exhibit 1), but also firms without any formal maintenance programme, inventory or quality control system and disorganized factories (e.g. Exhibits 2 and 3). More generally, it appeared that decades of central planning had left many managers with weak financial management skills, and with little vision of how to develop their company or how much investment was needed.

² Lean manufacturing was developed by Toyota in Japan, and focuses on continuous production monitoring, generating rapid productivity growth.

Exhibit 1: Examples of good management practices – two multinational factories

Exhibit 1(a). Food company with a clear production floor, demarked areas (floor markings) and continuous output monitoring and control.

Exhibit 1(b). Pharmaceutical company with a clear production floor and detailed monitoring of the production process.



Source: EBRD.

Exhibit 2: Examples of poor management practices – wood and clay products

Exhibit 2(a). Factory in Central Asia, with disorganized and excessive inventory, messy working conditions and poor safety (cutting tools being used with no protective clothing).

Exhibit 2(b). Brick factory with dirty working conditions, no production monitoring and excessive manning.



Source: EBRD.

Exhibit 3: Examples of poor management – metal products

Exhibit 3(a). Aluminium factory with dirty working conditions (making leaks very hard to spot), poor insulation and no process-wise monitoring.

Exhibit 3(b). Metal fittings company with raw materials littering the factory floor, no production metrics on display and tools left lying around.





Source: EBRD.

Several studies on firm productivity in transition countries allude to the lack of appropriate managerial skills as a possible explanation for lower productivity found among state-owned or formerly state-owned firms (see, e.g. Brown *et al.*, 2006; Estrin *et al.*, 2009; Steffen and Stephan, 2008; Yudaeva *et al.*, 2003; Zelenyuk and Zheka, 2006). But progress on studying productivity and management has been limited due to the lack of data on management practices in transition countries.

Consequently, in 2008 and 2009, the European Bank for Reconstruction and Development (EBRD) in cooperation with the World Bank (WB) conducted a new survey, the EBRD-WB Management, Organisation and Innovation survey, henceforth 'MOI'. The survey adopted the approach of Bloom and Van Reenen (2007), focusing on core manufacturing management practices relating to operations, monitoring, targets and incentives. The survey ran 1,874 face-to-face interviews with factory managers in 10 transition countries (Belarus, Bulgaria, Kazakhstan, Lithuania, Poland, Romania, Russia, Serbia (excluding Kosovo), Ukraine and Uzbekistan) as well as Germany as an advanced country benchmark and India as a developing country benchmark. We also matched our data to independently collected accounting data and compared management scores with surveys on other countries such as Bloom and Van Reenen (2010), and Bloom *et al.* (2012b).

We found several striking results. First, there is widespread variation in management practices both within and across countries. In particular, firms in Central Asian transition countries, like Uzbekistan and Kazakhstan, often operate with extremely poor management practices. Their firms are worse on average than those in developing countries like India. In contrast, Central European transition

countries like Poland and Lithuania operate with practices which are only moderately worse than those of Western European countries like Germany.

Matching our management data up to company accounts data enables us to evaluate to what extent management is linked to firms' productivity and profitability. Similar to Bloom and Van Reenen (2010) for non-transition countries, we find that 'good' management is also strongly linked to better firm performance in transition countries. This suggests that poor management practices may be impeding the development of Central Asian transition countries. Here and throughout the paper we use 'good management' as shorthand for management practices that are likely *on average* to raise productivity. This is only an average, and for any individual firm the higher scoring practices may not always be best.

Finally, we investigate the factors that may account for poor management. We find that factors that matter in non-transition countries also matter in transition economies. Stronger product market competition, higher levels of multinational ownership and greater employee education are all strongly correlated with better management. We are also able to show that higher levels of private ownership are strongly correlated with better management, something that was not easily documented in our previous work on management practices. If interpreted causally, this would suggest that the continued opening of markets to domestic and foreign competition, privatization of state-owned firms and increased levels of education should promote better management, and ultimately higher national productivity.

The structure of the paper is as follows. Section 2 explains how we measure management practices, Section 3 describes the pattern of management practices we see across transition countries, while Section 4 relates management practices to performance and Section 5 investigates the factors accounting for differences in management practices across firms and countries. Finally, Section 6 concludes with a summary and some policy implications.

2. Measuring management practices

2.1 Scoring management practices

The concept of 'good' or 'bad' management in terms of its impact on firm productivity needs to be translated into a measure applicable to different firms across the manufacturing sector in various countries. In contrast to our previous questionnaires on management practices, the MOI survey consisted mostly of closed-ended questions, in which the options offered to interviewees were based on the responses from Bloom and Van Reenen (2007). The practices were limited to those that fulfilled two criteria: (1) the questions were simple to adapt from an open-ended to a closed-ended format, and (2) the practices were shown to have a good explanatory power in previous research by Bloom and Van Reenen. They in turn used a practice

evaluation tool developed by a leading international management consultancy firm. One could argue that what constitutes ‘good’ management practices in the sense of getting things done in Eastern Europe and Central Asia and being good for firm productivity differs from what constitutes ‘good’ management practices in other parts of the world, in particular Western Europe, due to a different business environment. So we focused on practices that we believe are clearly ‘good’ for firm productivity, regardless of the environment a particular firm operates in, such as monitoring production to identify and fix repeated problems, making promotion decisions based on employees’ performance (rather than, for example, family connections), and retraining or moving incompetent employees (rather than leaving them in post). As we show, these management practices are unsurprisingly strongly correlated with superior firm performance.

Management practices were grouped into four areas: *operations* (one question), *monitoring* (seven questions), *targets* (one question) and *incentives* (three questions). The operations question focused on how the establishment handled a process problem, such as machinery breakdown. The monitoring questions covered collection, monitoring, revision and use of production performance indicators. The targets question focused on the timescale of production targets, and the incentives questions covered promotion criteria, practices for addressing poor employee performance and rewarding production target achievement. We list the questions we used for each management practice and the scoring we assigned to answers in Appendix A.

As the scaling varied across management practices, the scores were converted to z-scores by normalizing each practice (i.e. each question) to mean zero and standard deviation one:

$$z_{m_i} = \frac{m_i - \bar{m}_i}{\sigma_{m_i}} \quad (1)$$

where z_{m_i} is the z-score of management practice m_i in firm i , \bar{m}_i is the unweighted average of management practice m_i across all observations in all countries and σ_{m_i} is the standard deviation of management practice m_i across all observations in all countries. To avoid putting the most emphasis on the monitoring aspect of management practices (which had the most underlying questions), an unweighted average was first calculated across z-scores for a particular area of the four management practices:

$$\bar{m}_{i,A} = \frac{1}{n_{m_i,A}} \sum_{m \in A} z_{m_i} \quad (2)$$

where $\bar{m}_{i,A}$ is the unweighted average of management practices belonging to an area of management A (operations, monitoring, targets or incentives) in firm i , and $n_{m_i,A}$ denotes the number of observations for which the measures are available.

Lastly, an unweighted average was then taken across the scores for the four practices, and finally, a z-score of the measures obtained was calculated:³

$$\begin{aligned}\tilde{M}_i &= \frac{1}{4}(\bar{m}_{i, operations} + \bar{m}_{i, monitoring} + \bar{m}_{i, targets} + \bar{m}_{i, incentives}) \\ z_{\tilde{M}_i} &= M_i = \frac{\tilde{M}_i - \bar{\tilde{M}}_i}{\sigma_{\tilde{M}_i}}.\end{aligned}\quad (3)$$

This means that the average management practices across all firms in all countries in the sample are equal to zero, and the actual management practices of the firm deviate from zero either to the left ('bad' practices) or to the right ('good' practices).

Indicators of management practices can be thought of as indicators for the quality of management (a latent variable, which cannot be observed directly). We think of management as an ability which determines/influences the management practices (Diamantopoulos and Winklhofer, 2001). Bollen and Lennox (1991) emphasize that the correlations between these types of indicators should be positive, with higher correlations superior to lower ones. Correlations between the operations, monitoring, targets and incentives management practices are all positive and highly significant, and this is also true for the vast majority of the pairwise correlations between the underlying individual management practices.⁴

2.2 Collecting accurate responses

MOI interviews were conducted face-to-face and the interviewers were recruited by the local survey companies. This makes the MOI survey different from the Bloom and Van Reenen (2007, 2010) management practices surveys, which were conducted by phone from London with MBA students as interviewers. We took several steps to increase the accuracy of answers.

First, the interviewers were trained to not lead the managers to a particular answer. As part of this process, the options offered to the managers did not always follow the same pattern – that is, sometimes the worst question was offered first and other times it was offered last.⁵

Second, the interviewers did not have access to the firm's financial information or performance in advance of the interview. They only received firm names and contact details. While they (as locals) may have by chance been familiar with the performance of a couple of larger firms they interviewed, they would not know that for the vast majority, and they had no interest in spending time researching the firms' performance prior to the interview. We selected medium-sized manufactur-

³ This is an accepted way of calculating index numbers – see Bresnahan *et al.* (2002). In practice, not too much depended on the precise weighting scheme used.

⁴ Cronbach's alpha for the individual management practices is 0.7.

⁵ The actual questions used and the scoring we assigned to answers can be found in Appendix A.

Table 1. Summary statistics

Country	Number of firms in the sample	Number of firms in the survey	Median employees based on survey	Median employees based on Orbis	Median operating revenue, thousand \$	Median return on total assets, %	Median profit margin, %	Median EBITDA margin, %	Share of foreign-owned MNEs, %	Share of privatized companies, %	Share of state-owned firms, %
Belarus	102	402	473	20,069	3.31	5.72	12.10	1.0	10.78	78.43	
Bulgaria	154	99	96	2,488	3.31	3.47	12.10	4.6	27.92	1.30	
Germany	222	170	192	61,922	5.14	2.43	6.65	15.8	4.50	0.45	
India	200	130	847	27,666	3.38	3.02	7.72	4.0	0.00	3.00	
Kazakhstan	125	140	320	10,610	2.11	3.00	9.82	2.4	41.60	7.20	
Lithuania	100	112	88	5,721	2.51	2.13	6.44	13.0	32.00	3.00	
Poland	103	248	200	17,528	3.62	2.75	6.44	13.7	29.13	10.68	
Romania	152	101	88	2,492	2.60	2.08	8.32	2.6	23.68	0.00	
Russia	311	124	148	6,103	5.69	3.09	4.74	1.0	31.83	11.58	
Serbia	135	100	101	3,334	-1.66	-1.05	4.74	7.4	47.76	17.91	
Ukraine	147	140	130	2,293	0.21	0.14	4.58	0.0	44.90	13.61	
Uzbekistan	123	81	139	6,049	2.96	2.30	7.07	1.6	40.65	17.89	
Total	1,874	404	139	6,049	2.96	2.30	7.07	5.4	26.32	11.43	

Sources: MOI survey and Orbis.

Note: Summary statistics for the variables from Orbis (number of employees, operating revenue, return on total assets, profit margin and EBITDA margin) refer to 2008. Data on these variables may not be available for all companies in the sample, which is why there can be significant discrepancies between the median number of employees based on the survey and based on Orbis. EBITDA stands for earnings before interest, taxes, depreciation and amortization. MNEs are multinational enterprises.

ing firms (the median size was 130 employees; see Table 1), which would in general not be known by name.

Third, we collected a detailed set of information on the interview process (local time of day, date, duration of the interview), on the manager (gender, seniority, nationality, company and job tenure, location) and on the interviewer (gender, age and highest education level achieved). By including this information in the analysis, we explicitly controlled for at least part of interview bias.

The questionnaire comprised seven sections organized by topic. The first asked questions about the characteristics of the firm, such as legal status, ownership and number of years in operation. This was followed by sections on management practices, organization of the firm, innovation and R&D, degree of competition and labour. The MOI questionnaire was developed and tested in two pilot surveys prior to its implementation in the field.⁶

2.3 Correlation of management scores across different surveys

The MOI survey deliberately re-interviewed 404 firms that were interviewed in 2006 for the Bloom and Van Reenen (2010) survey (henceforth the BVR survey) in Germany, India and Poland. We did this to enable us to directly compare across the two different surveys of management practices. We found a correlation of 0.298 between the two surveys, which was significant at the 1 percent level. This correlation is high given that: (i) 2–3 years have passed between the two sets of interviews, (ii) the surveys asked a different set of questions and were scored using a different approach (open-ended questions for BVR and multiple choice for the MOI survey), (iii) the surveys typically asked different people (most firms have several factory, production or operations managers), who were possibly at different locations than in the BVR interview, (iv) the interviewers were different (MBA students working in London for BVR and local survey agents for the MOI survey), and (v) the survey approach was different (phone survey vs. face-to-face survey). As a benchmark, in Bloom and Van Reenen's work, the correlation between the 2006 and 2010 rounds of their survey is 0.427 when different managers (at possibly different locations) were interviewed. This indicates the correlation of about 0.298 between the MOI and BVR scores is high given the inherent noise in measuring management.⁷

⁶ The first pilot survey took place simultaneously in Ukraine and the US, and the second pilot survey took place in the UK.

⁷ In the MOI survey, only one establishment, in one location, was interviewed per firm. There can be no cases where two different establishments belonging to the same firm would participate in the MOI survey.

2.4 *Obtaining interviews with managers*

From October 2008 to April 2010,⁸ the EBRD conducted the first MOI survey in collaboration with the World Bank. The survey was primarily targeted at factory, production or operations managers, who are close to the day-to-day operations of the firm but are at the same time senior enough to have an overview of management practices.⁹ In reality, the respondents often included more senior managers (CEOs, Vice Presidents, General Directors) because they said they are ultimately responsible for production and wanted to be the ones providing the answers.¹⁰ Interviews were conducted face-to-face in the manager's native language by interviewers employed by the market research companies hired to implement the MOI survey. The interviews lasted on average 54 minutes.

The average response rate to the survey was over 40 percent and this appeared to be uncorrelated with productivity or profitability. There was some evidence that larger firms were more likely to respond, which is why the regressions typically control for size to offset any potential sample selection bias. In the initial contact with the firm, the interview was introduced as part of a study that would not discuss the firm's financial position or its accounts, making it relatively non-controversial for managers to participate. As in Bloom and Van Reenen (2007, 2010), management practices were ordered to lead with the least controversial (operations management) and finish with the most controversial (promotions and firings). In several countries, we also provided a letter from the EBRD and the World Bank confirming that the local survey company was doing the survey on their behalf.

2.5 *Characteristics of chosen countries*

The survey covered 1,874 manufacturing firms with between 50 and 5,000 employees in 10 transition countries, and Germany and India. The transition countries were chosen to cover a range of progress in transition. Germany was chosen as a developed country benchmark – only the US superseded it in terms of average management practices in Bloom and Van Reenen (2010). India was chosen as a developing country benchmark and is in some respects similar to the transition countries. India became independent in 1947. From the 1950s, a 'License Raj' was in operation: a rigid and stern licensing regime which restricted entry into the manufacturing industry and put several microeconomic restrictions on licensed firms (see Sharma,

⁸ Fieldwork in Belarus, Bulgaria, Kazakhstan, Lithuania, Poland, Romania, Russia (excluding Far East), Serbia, Ukraine, Uzbekistan and Germany took place between October 2008 and March 2009. Fieldwork in India took place between August 2009 and October 2009 and in the Russian Far East between February 2010 and April 2010. For more details, please refer to the Technical Report available on the EBRD's website.

⁹ Factory managers are usually responsible for the efficient operation, maintenance and budgetary control of production. Production/operations managers ensure that goods are produced efficiently, at the right quality, quantity and cost, and that they are produced on time.

¹⁰ The results were robust to controlling for the respondent's level in the organisation.

Table 2. Some characteristics of countries covered by the MOI survey

Country	Population 2008, million	Private sector share of GDP in 2009 (EBRD estimate), %	EBRD index of governance and enterprise restructuring	GDP per capita 2008, \$ PPP	Manufacturing value added 2008, % GDP
Belarus	10	30	2–	11,353	33
Bulgaria	8	75	3–	11,259	15
Germany	82	na	na	33,718	24*
India	1,140	na	na	2,796	16
Kazakhstan	16	65	2	10,469	13
Lithuania	3	75	3	17,571	18
Poland	38	75	4–	16,436	17
Romania	22	70	3–	11,782	21
Russia	142	65	2+	14,706	18
Serbia	7	60	2+	10,229	na
Ukraine	46	65	2+	6,721	23
Uzbekistan	27	45	2–	2,455	12

Sources: EBRD *Transition Report 2009* and World Bank World Development Indicators.

Note: * denotes that the data refer to 2007. Population data for Serbia do not include Kosovo.

2008). Some of these were similar in spirit to the command economy in transition countries. There was initial deregulation in the 1980s and trade reforms in the 1990s and this has transformed India into one of the fastest growing economies.

Table 2 shows selected indicators for these countries. Germany had the highest GDP per capita in 2008 among the selected countries and Uzbekistan the lowest (in constant 2005 international US\$ PPP terms). Private sector share of GDP ranged from 30 percent in Belarus to 75 percent in Bulgaria, Lithuania and Poland. The EBRD transition index in the area of governance and enterprise restructuring, which measures the absence of soft budget constraints and effective corporate governance, was lowest in Belarus and Uzbekistan (2–) and highest in Poland (4–).¹¹ Value added in manufacturing as a percentage of GDP varied between 12 percent in Uzbekistan and 33 percent in Belarus.

2.6 Sampling frame and additional data

The sampling frame, from which these firms were picked in main cities randomly with equal probability, was based on Bureau Van Dijk's Orbis database (as avail-

¹¹ EBRD transition index scores range from 1 to 4+, with 1 being the lowest score and 4+ the highest. It allows minus and plus scores that are ordered (e.g. 2– is worse than 2, which is in turn worse than 2+).

able in August 2008) with the exception of India, Kazakhstan and Uzbekistan. The sampling frame in Kazakhstan was the official list of establishments obtained from the Agency of Statistics of the Republic of Kazakhstan,¹² and in Uzbekistan the Uniform State Register of Enterprises and Organisations published by the State Department of Statistics of the Republic of Uzbekistan. In the Russian Far East, the Orbis database was augmented with Business Card Database (BCD).¹³ In Poland, Germany and India, several establishments that participated in a previous survey on management practices were re-interviewed as well. All regions within a country had to be covered¹⁴ and the percentage of the sample in each region was required to be equal to at least one half of the percentage of the sample frame population in each region.¹⁵

Firm-level performance data – balance sheets and income and loss statements – were obtained from Bureau Van Dijk's Orbis database for the countries covered. These data come from a source independent of the survey and allow us to examine the external validity of our measures of management practices by examining whether the data we collect are correlated with external measures of firm performance.

We were able to perfectly match the survey data back to the Bureau van Dijk's Orbis database on the basis of the Bureau van Dijk's firm identification number, which was included in the survey data. The latter also included the name, address and phone number of the firm, and we cross-checked the firm names and addresses manually after the matching. In some of the countries that did not use Bureau van Dijk's Orbis database as a sample frame, we were able to find some of the firms in the Orbis database on the basis of their name, industry and address at a later date when the coverage in Orbis improved.

Comparison of the responding firms with those in the sampling frame revealed that responding firms tended to be slightly larger, but no evidence could be found of the responding firms being systematically different from the non-responding firms on any of the performance measures.

¹² At the time of fieldwork preparation, Bureau van Dijk's Orbis had very little data on manufacturing firms in Kazakhstan. They have since improved the coverage, but financial information is available only for a limited number of firms.

¹³ BCD includes systematized statistical and other information on manufacture and infrastructure of area, region and the country as a whole.

¹⁴ The Far East of Russia was covered in a subsequent wave of the MOI survey, which took place from February to April 2010.

¹⁵ More details on the sampling are available in the Note on sampling methodology for the MOI survey, available on the EBRD website (<http://www.ebrd.com/pages/research/economics/data/moi.shtml>).

2.7 Summary statistics

Table 1 shows the summary statistics for the firms that participated in the MOI survey. With the exception of Belarus,¹⁶ the median number of employees in firms in all countries was less than 250, which means that most firms participating in the MOI survey were medium-sized firms. Share of foreign-owned multinational enterprises (MNEs) in the sample ranges from 0 in Ukraine to 15.8 percent in Romania, while the share of privatized firms ranges from 0 in India to 47.8 percent in Serbia. Belarus had the highest share of firms that are still state-owned, 78.4 percent, while none of the firms interviewed in Romania was still state-owned.

3. Patterns of management practices in transition countries

Patterns of management practices in developed and developing countries have been documented in Bloom and Van Reenen (2010). We find that their main findings hold for transition countries as well. Figure 1 shows the average country-level management practice scores from 1,874 interviews. Germany has the highest management practice scores on average (as we expected), followed by Lithuania and Poland, with Uzbekistan in last place.

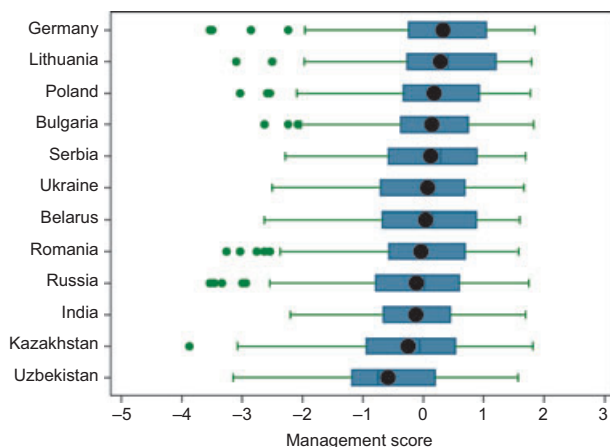
Looking at Figure 1 we see that, first, Kazakhstan and Uzbekistan have on average worse management practices than India, a developing country whose GDP per capita was slightly higher than Uzbekistan's. Russia's management practices are at about the same level.¹⁷ This is possibly because of India's more pro-multinational climate. India scored much better on getting credit and protecting investors as well as trading across borders in World Bank's Doing Business 2011, which indicates that it is a more open economy and more attractive for foreign investors, who tend to bring better management practices with them. On the Economic Freedom of the World 2007 Index, India also has fewer restrictions on foreign ownership and investment than any other transition country in the sample (Gwartney *et al.*, 2009). These three countries are also rich in natural resources, while India is not. Russia and Kazakhstan are major oil and gas producers. Extraction accounted for 8 percent of GDP in Russia and 18.7 percent of GDP in Kazakhstan in 2008, but only about 2.5–3 percent of GDP in India.

This cross-country ranking approximates the cross-country productivity rankings, though not perfectly. The correlation coefficient between PPP GDP per capita at constant 2005 international dollars in 2008 and average country-level manage-

¹⁶ Orbis tends to cover larger firms in Belarus (the 25th quartile of the number of employees in manufacturing firms in 2008 is 211, the median 350 and the 75th quartile 721 employees), and since our sample frame was based on Orbis, firms in Belarus were on average larger.

¹⁷ It should be noted that differences in average management scores between Germany and Lithuania and between India and Kazakhstan are not statistically significant.

Figure 1. Management scores across countries



Source: MOI survey.

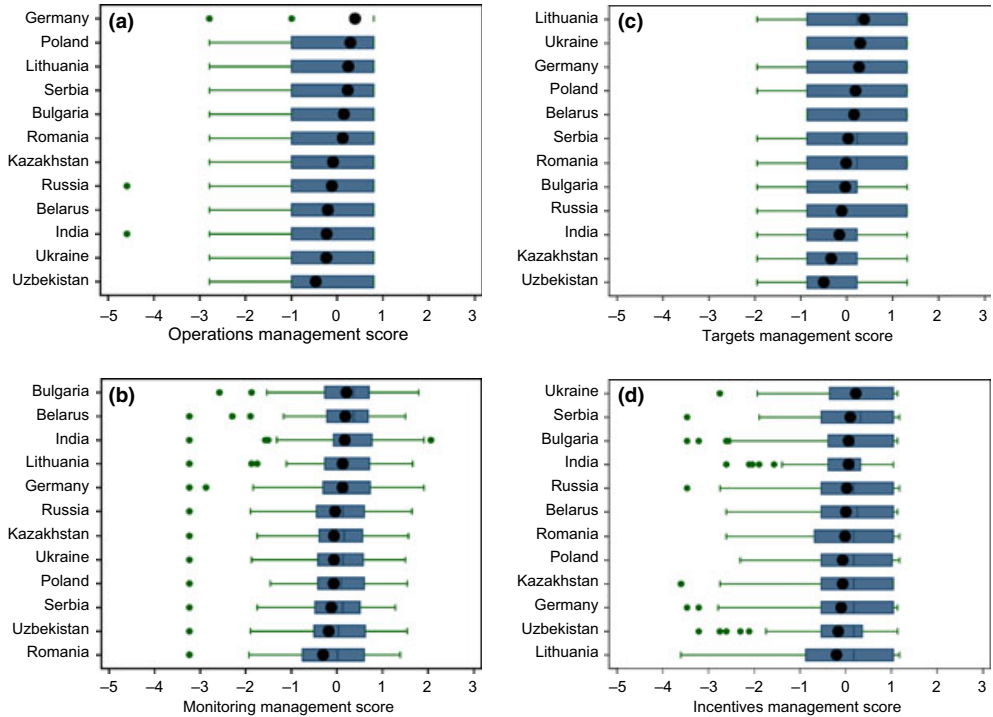
Note: Scores are reported as z-scores, so are in deviations from the sample average of zero. The median for each country is indicated by the vertical line within the box, and the first and third quartiles are the edges of the box – interquartile range (IQR). The extreme values (within 1.5 times the interquartile range from the upper or lower quartile) are the ends of the lines extending from the IQR. Points at a greater distance from the median than 1.5 times the IQR are plotted individually as small dots. These points represent outliers. Large dots within the box represent average management scores.

ment score is 0.69, significant at the 5 percent significance level (P -value = 0.013). However, a better measure may be manufacturing value added per employee, since our survey covers only manufacturing firms. Unfortunately data on manufacturing value added per employee are only available for a sub-sample of the countries included in our analysis.¹⁸

The overall management scores can be separated into four areas: operations, monitoring, targets and incentives. Figure 2 shows the country-level average scores for each of them. In line with the overall rankings, Germany is in the top five in three of the four categories, while Uzbekistan is consistently in the bottom two. However, there are also some interesting differences across categories. While many

¹⁸ Approximate data are available for Belarus, Bulgaria, Kazakhstan, Lithuania, Poland, Ukraine and Uzbekistan which have data on manufacturing value added and percentage of employment in industry. Manufacturing value added per capita is available for more countries, but still missing for Romania, Russia and Serbia. The correlation coefficient between manufacturing value added per capita (where available) and average country-level management score is positive, but insignificant (0.66, P -value 0.1089), but the Spearman (rank) correlation coefficient is highly positive and significant (0.68, P -value 0.0938). However, the correlations with GDP per capita are also higher in this sub-sample (correlation: 0.81, P -value 0.0257; rank correlation: 0.82, P -value 0.0234).

Figure 2. Management scores across countries by management categories: (a) operations management scores, (b) monitoring management scores, (c) targets management scores and (d) incentives management scores



Source: MOI survey.

Note: Scores are reported as z-scores, so are in deviations from the sample average of zero. The median for each country is indicated by the vertical line within the box, and the first and third quartiles are the edges of the box – interquartile range (IQR). The extreme values (within 1.5 times the interquartile range from the upper or lower quartile) are the ends of the lines extending from the IQR. Points at a greater distance from the median than 1.5 times the IQR are plotted individually as small dots. These points represent outliers. Large dots within the box represent average management scores.

firms interviewed in Belarus and Bulgaria, for example, excel at monitoring – that is, frequently collecting data on several production performance indicators, showing it to factory managers and workers, and regularly reviewing the production performance indicators – they are less adept at translating monitoring into operations. Firms in Ukraine tend to be good at targets management, but bad at operations management. Firms in Kazakhstan, Russia and Uzbekistan tend not to be good at targets management nor at monitoring management, the opposite to what one might expect given the legacy of meeting planned production targets in

these countries. The most eclectic ranking emerges on incentives management, although differences across countries are smaller in this category than in others and are often not statistically significant.¹⁹

The data in Figure 2 also describe how management styles differ across countries. Relative to the average, the use of incentives is greater than the use of monitoring in Ukraine, Serbia and Romania. However, in Lithuania and Germany, the use of monitoring and target management (relative to the average) exceeds their use of incentives (relative to the average). In Belarus, the managerial use of monitoring (relative to the average) is far greater than the operations management (relative to the average).

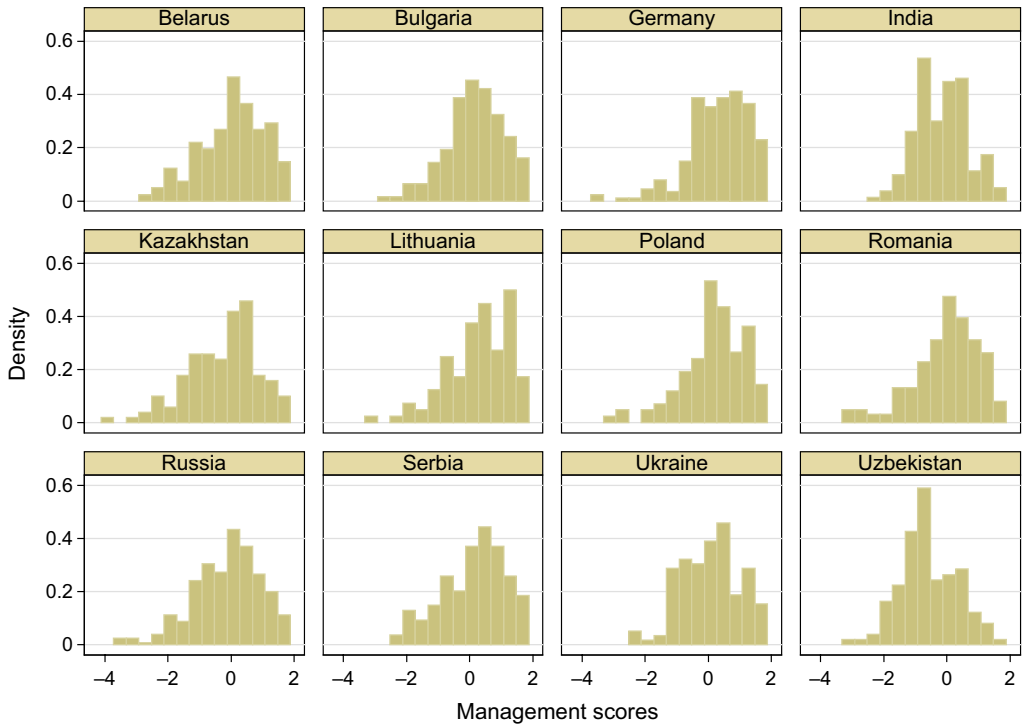
There could be many reasons for this pattern of specialization across countries, one of them being the business environment. For example, countries with less stringent labour market regulations may use incentives more as it is easier to remove poor performers and to reward high performers. In the EBRD and World Bank Business Environment and Enterprise Performance Survey 2008-2009 (henceforth BEEPS), which was in the field during a similar period as the MOI survey, inadequately educated workforce was one of the top two business environment obstacles in all transition countries except Bulgaria (see EBRD, 2010, Chapter 5). Labour regulations tended to be in the bottom half of the business environment obstacles, but in general they are a bigger obstacle in the EU-10 than the rest of the transition countries.

The fact that Germany is among the top five countries in three of four management areas and Uzbekistan among the bottom two on all four management areas does not mean that there are no firms with bad management practices in Germany and no firms with good management practices in Uzbekistan. What it does indicate, though, is that the proportion of firms with good management practices in Uzbekistan is lower than the proportion of firms with good management practices in Germany. Figure 3 illustrates this by looking at the firm-level histogram of management practices by country. The bars show the actual data in each country.

Countries can improve average management practices in two ways: (i) by promoting factors that increase average management quality in each firm (e.g. through better business education), and (ii) through improved reallocation across firms (e.g. letting efficient firms grow larger). The first option aims at increasing productivity within the average firm, while the second improves the allocative efficiency.²⁰ We look at both factors in turn in the next section.

¹⁹ Differences in average incentives management scores are not statistically significant between Serbia and Ukraine, between Germany, Kazakhstan, Lithuania, Poland and Uzbekistan, and between Belarus, Bulgaria, Germany, India, Kazakhstan, Poland, Romania and Russia.

²⁰ See Olley and Pakes (1996) for a decomposition of aggregate productivity into unweighted average productivity and the cross-sectional allocative efficiency.

Figure 3. Distribution of firm-level management scores

Source: MOI survey.

Note: Bars are the histograms of the actual density. Scores are reported as z-scores, so are in deviations from the sample average of zero.

4. Management quality and firm performance

4.1 Management and firm performance

To estimate how firm management practices relate to firm performance in the MOI survey sample, we estimated the following firm-level performance regressions:

$$y_{itc} = \alpha_l l_{itc} + \alpha_k k_{itc} + \alpha_n n_{itc} + \beta M_i + \gamma Z_{itc} + u_{itc} \quad (4)$$

where y is a measure of firm performance, l is the logarithm of labour, k is the logarithm of capital, and n is the logarithm of material inputs of firm i in country c at time t . The Z s are all other controls that will affect productivity, such as workforce characteristics (employees with a completed university degree and the average weekly hours worked), firm characteristics (firm age and whether it is listed on the stock market), a set of two-digit industry fixed effects, country and country-year

fixed effects. M represents average management quality, based on a scoring of each of 12 individual management practices, averaged over the variables included in each of the four core areas of management practices, and finally averaged over these four areas (as explained in Section 2).

In terms of performance metrics, we looked at operating revenue, profit margin (sum of operating profit and financial profit divided by total operating revenue), EBITDA margin²¹ and return on total assets (ROTA) for a subset of firms with available company accounts.

We estimate equation (4) by running OLS on the unbalanced panel with standard errors clustered by firm and assume that all the correlated heterogeneity is captured by the control variables. The sample consists of all firms with available accounts data in years after the interview (i.e. 2009 or 2010). Under the assumption that management practices in a company do not change rapidly – something that is often found in short panels of management data (see, e.g. the survey in Bloom and Van Reenen, 2011) – we extend the analysis to a sample of all firms with available accounts data from 2003 to 2010 and find our results to be robust (available on request).

4.2 Production functions

Table 3 looks at the association between firm performance as measured by operating revenue and management practices. This means the relationships we uncover are not necessarily causal – we can only identify conditional correlations between our variables. In a recent work, Bloom *et al.* (2011) have run management field experiments in India, identifying a causal impact of these types of management practices on firms' productivity and profitability.

Column (1) of Table 3 includes only industry, country and country by year fixed effects as additional controls. The management score is strongly positively and significantly associated with higher operating revenue (sales) and the coefficient suggests that firms with one point higher average management score have about 29 log points (almost 34 percent) higher sales. Column (2) includes employment as an additional control so the coefficient of management can be interpreted as the 'marginal effect' on labour productivity. This reduces the coefficient on the management score, but it remains positive and significant. Column (3) includes controls such as average hours worked, firm age, listing status, education and a set of interview noise controls, which reduces the coefficient on management score further, but it remains significant. The other coefficients take intuitive signs. For example, as shown in the table, firms with more human capital (as proxied by the proportion of employees with a college degree) have higher productivity. In column (4), we add fixed capital so the coefficient on management can be interpreted

²¹ EBITDA stands for earnings before interest, taxes, depreciation and amortization. It is equal to the sum of operating profit and depreciation.

Table 3. Estimates of firm performance equations – operating revenue

	(1)	(2)	(3)	(4)	(5)	(6)
Management z-score	0.290*** (0.057)	0.164*** (0.040)	0.140*** (0.041)	0.094** (0.040)	0.141*** (0.046)	0.050* (0.028)
Ln(Labour)		0.940*** (0.049)	0.969*** (0.049)	0.786*** (0.054)	0.757*** (0.062)	0.341*** (0.056)
Ln(Capital)				0.204*** (0.033)	0.279*** (0.035)	0.096*** (0.037)
Ln(Material)						0.519*** (0.038)
Ln(% employees with a college degree)			0.116*** (0.042)	0.082** (0.040)	0.037 (0.045)	0.054* (0.031)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
2-digit industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country*year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Extra controls	No	No	Yes	Yes	Yes	Yes
Noise controls	No	No	Yes	Yes	Yes	Yes
Firms	717	717	717	717	490	490
Observations	974	974	974	974	644	644
R-squared	0.425	0.701	0.720	0.749	0.799	0.903

Sources: MOI survey and Orbis.

Note: * = significant at the 10% level, ** = significant at the 5% level * = significant at the 1% level. Dependent variable is log(operating revenue). All columns are estimated by OLS, with robust standard errors clustered by firm in brackets below coefficient. The sample is of all firms with available accounts data in the year after the interview took place and up to 2010. The management score has a mean of 0.072 and a standard deviation of 0.998 in the sample used in columns (1)–(4) and a mean of 0.118 and a standard deviation of 0.960 in the sample used in columns (5)–(6). Extra controls comprise an indicator for whether the firm is listed, log of average hours worked for production and non-production workers, and indicators for missing information on % of production and non-production employees with a college degree. Noise controls are gender, years working in the position for the respondent, the day of the week the interview was conducted, the time of day the interview was conducted, the duration of interviews, interviewer's perception of the truthfulness of the information and respondent's knowledge about the firm as well as controls for interviewer's age, gender and education.

as the effect on total factor productivity. This significantly reduces the coefficient on management score, suggesting that firms with one point higher average management score have about 9 percent higher productivity. In the final two columns we control for materials. As this variable is only available for a subset of the sample, we first confirm that the results are robust to estimating on this smaller sample

in column (5). The management coefficient is actually somewhat larger. Finally, in column (6), we add materials, which results in a smaller coefficient on the management score but it still remains positive and significant at 10 percent, suggesting that firms with one point higher average management score have about 5 percent higher total factor productivity. Note that the coefficients on the factor inputs are approximately equal to the revenue share of the relevant factors of production, which is reassuring. Overall, Table 3 suggests that the average management score is positively and significantly correlated with total factor productivity.²²

4.3 Profitability and management

In Table 4, we look at various measures of profitability. All of them are winsorised at 1 percent,²³ to limit the impact of outliers on the results. The first three columns look at the profit margin (operating and financial profit divided by total operating revenue). The management score is strongly and positively associated with the profit margin, suggesting that firms with one point higher average management score have almost 2.0 percentage points higher profit margin, which is substantial given that the median profit margin in Table 1 is 2.3 percent. In column (4), we look at the EBITDA margin (EBITDA divided by total operating revenue). The sample is much smaller than in the previous columns, and the association between the management score and EBITDA margin is not significant in the short panel.²⁴ Finally, we look at return on total assets (ROTA, defined as earnings before interest and taxes (EBIT) over total assets). It is an indicator of how effectively a company is using its assets to generate earnings before contractual obligations must be paid. We find that ROTA is about 1.4 percentage points higher for every one point increase in the management score (and median ROTA in Table 1 is 3.0 percent). Overall, Table 4 suggests that the management score is positively and significantly correlated with profitability measures.

The coefficients in Tables 3 and 4 are of quantitative as well as statistical significance. While we cannot establish causality between the management scores and firm performance, the association between the two is quite strong, as shown in Figure 4. A movement from the lower quartile (-0.66) to the upper quartile (0.70) of management scores between firms is associated with an increase in operating reve-

²² The results in Table 3 are robust to using a factor-analytic version of the management practice indicator: the coefficient remains positive and significant (with the exception of those equivalent to specification in column (6)), as well as roughly similar in magnitude.

²³ This means that all the data below the 0.5th percentile are set to 0.5th percentile and all the data above the 99.5th percentile are set to 99.5th percentile.

²⁴ It is, however, significant in the longer panel using data covering the period 2003–2010, and we find that firms with one point higher average management score have about 1.6 percentage point significantly higher EBITDA margin (where the sample average EBITDA margin during that period is 6.2 percent). This suggests that the year to year volatility in EBITDA is the reason for the absence of a significant correlation in the short panel.

Table 4. Estimates of firm performance equations – profit margin, EBITDA margin and return on total assets

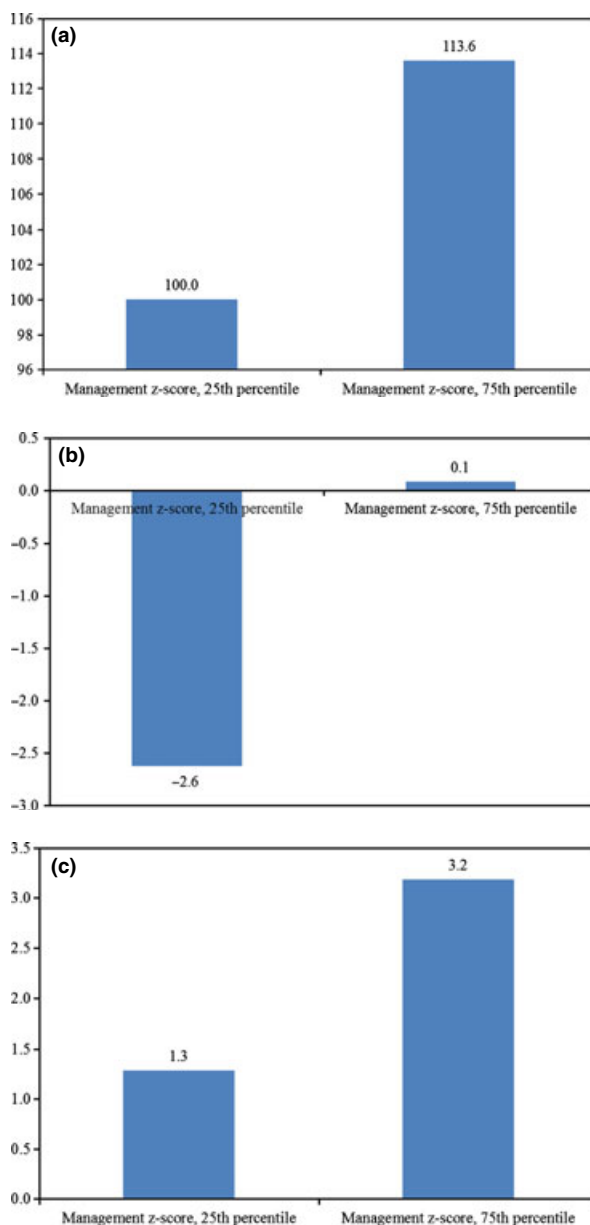
Dependent variable	(1)	(2)	(3)	(4)	(5)
	Profit margin, %			EBITDA margin, %	Return on total assets, %
Management z-score	1.989*** (0.706)	1.979*** (0.710)	2.245*** (0.723)	0.814 (0.852)	1.396** (0.608)
Ln(Labour)		2.001*** (0.765)	3.111*** (0.837)	0.412 (1.141)	1.849*** (0.672)
Ln(Capital)			-1.185*** (0.403)	0.725 (0.660)	-0.351 (0.360)
Ln(% of employees with a college degree)		-0.497 (0.780)	-0.277 (0.785)	0.598 (0.848)	-0.510 (0.677)
Country fixed effects	Yes	Yes	Yes	Yes	Yes
2-digit industry fixed effects	Yes	Yes	Yes	Yes	Yes
Country*year fixed effects	Yes	Yes	Yes	Yes	Yes
Extra controls	No	Yes	Yes	Yes	Yes
Noise controls	No	Yes	Yes	Yes	Yes
Firms	698	698	698	475	723
Observations	942	942	942	617	979
R-squared	0.110	0.168	0.177	0.157	0.126

Sources: MOI survey and Orbis.

Note: * = significant at the 10% level, ** = significant at the 5% level * = significant at the 1% level. Dependent variables are winsorised at 1% (0.5% at each side). All columns are estimated by OLS, with robust standard errors clustered by firm. The sample is of all firms with available accounts data in the year after the interview took place and up to 2010. The management score has a mean of 0.088 and a standard deviation of 0.991 in the sample in columns (1)–(3), a mean of 0.154 and a standard deviation of 0.940 in the sample in column (4) and a mean of 0.069 and a standard deviation of 0.997 in column (5). Extra controls comprise indicators for whether the firm is listed, log of average hours worked for production and non-production workers, and indicators for missing information on % of production and non-production employees with a college degree. Noise controls are gender, years working in the position for the respondent, the day of the week the interview was conducted, the time of day the interview was conducted, the duration of interviews, interviewer's perception of the truthfulness of the information and respondent's knowledge about the firm as well as controls for interviewer's age, gender and education.

nue of about 7–13 percent (Table 3, columns (4) and (6)), an increase in profit margin of about 2.7 percentage points (Table 4, column (3)), and an increase in return on total assets of about 1.9 percentage points (Table 4, column (5)) in the years after the interview. These results imply that the MOI survey tool is not simply measuring

Figure 4. Management practices and measures of financial performance.
 (a) Operating revenue, indexed. (b) Profit margin, %. (c) Return on total assets, %



Source: MOI survey. *Note:* Results for operating revenue are based on Table 3, column (4). Results for profit margin are based on Table 4, column (3) and results for return on total assets on Table 4, column (5).

statistical noise. Under the assumption that management practices in a company do not change rapidly, it is interesting to note that the economic importance of management practices is in general higher in the years after the interview (2009–2010) than in the years before the start of the global economic crisis (2003–2007).²⁵ In other words, the quality of management practices appears to become more important during the crisis period.

4.4 Other performance results

Another dimension of performance is firm size. As with column (1) of Table 3, we found that in most countries large firms have on average better management practices than SMEs (small- and medium-sized enterprises);²⁶ the exceptions were Kazakhstan and Ukraine. One possible explanation is of course that good management enables firms to grow. Under this interpretation, reallocation effects may be weaker in the Kazakh and Ukrainian economies than elsewhere. However, a second explanation may be that there are scale economies with management practices. For example, SMEs may find the fixed costs of hiring management consultants too large to justify given their scale of production (alternatively SMEs may not have access to management consultants or are not aware of how they could help them). MOI data suggest that large firms are more likely to have used an external consultant to help them improve an area of management than SMEs.

4.5 Management area practices and firm performance

We also investigated disaggregating the management scores into their component questions (results available on request). Answers to individual questions on management practices tend to be positively correlated: if a firm is good at one dimension of management, then it tends to be good at all of them. Transition countries are no different from non-transition countries covered by Bloom and Van Reenen (2010) in this respect. Because of this, identifying if some practices matter more than others for firm performance is difficult. The only exception is the promotions policy which is not significantly correlated with most other management practices.

Figure 2 suggests that some of the management practices might matter more in some countries than in others. We explore that further by running the same regressions as discussed above, replacing the composite management z-score with the management area z-scores, both one at a time and all four of them together. We also looked at regressions where the composite management z-score was replaced by each individual management practice z-score. The results are available on request, and we discuss them briefly here.

²⁵ Results are available on request.

²⁶ We define SMEs as establishments with fewer than 250 employees.

In regressions using the performance data in years after the interview, the coefficients on management area z-scores for incentives, monitoring and targets are positively and significantly correlated with productivity (with the exception of column (6)). The coefficients are not robust when we include all four management area z-scores at the same time (due to collinearity issues), but they are always positive and coefficients on monitoring and incentives management area z-scores tend to be significant as well. Incentives management practices turn out to be positively and significantly correlated with the firm performance measures used in Table 4, while monitoring management practices are positively and significantly correlated with return on total assets and targets management practices with profit margin. The latter result persists when all four management area z-scores are included at the same time.²⁷

The coefficients on individual management practice management z-scores were generally positive and usually significant in regressions with log operating revenue. For example, the coefficients on z-scores for management practice 2 (number of production performance indicators monitored), practice 3 (frequency of collecting production performance indicators) and practice 10 (rewarding achievement of targets) are positively and significantly correlated in all specifications, while the coefficients on z-scores for management practice 5 (frequency of showing the performance indicators to workers) and practice 11 (promotions policy) are not significant; the coefficients on other individual management practices are not robust. Coefficients on individual practices 9 (timescale of production targets) and 10 are positively and significantly correlated with profit margin, while practice 8 (using production performance indicators to compare groups of employees) is negatively and significantly correlated with EBITDA margin. Practice 3 and practice 10 are positively and significantly correlated with return on total assets. The coefficients on other individual management practices in Table 4-like regressions are not robust.²⁸

There are not enough observations per country to be able to estimate precisely the coefficients on management z-scores, either composite or by area, at the country level.

²⁷ Using 2003–2010 in the estimation, all management area z-scores are positively and significantly correlated with log operating revenue (exceptions are monitoring in column (6) and incentives in column (4)), with operations, monitoring and targets retaining their significance even when all four management area z-scores are included in the estimation at the same time (with the exception of columns (5) and (6)). Operations and targets management area z-scores are also positively and significantly correlated with profit margin and EBITDA margin, while the incentives management area z-scores are positively and significantly correlated with all the outcomes. Operations and targets management area z-scores remain positively and significantly correlated with profit margin and EBITDA margin when all four management area z-scores are included at the same time, while incentives remain positively and significantly correlated with return on total assets.

²⁸ Numbering of practices follows the numbering used in Appendix A.

4.6 Sensitivity analysis

In the empirical analysis, we control for country fixed effects, country interacted with year fixed effects and industry fixed effects, as well as for the noise controls that might influence the respondent's answers (gender, years working in the position for the respondent, the day of the week the interview was conducted, the time of day the interview was conducted, the duration of interviews, interviewer's perception of the truthfulness of the information and respondent's knowledge about the firm as well as controls for interviewer's age, gender and education). We winsorise the outcome variables in Tables 3²⁹ and 4 at 1 percent, to exclude outliers.

To test for the robustness of results to outliers, we also re-estimate the results in Tables 3 and 4 using robust regressions and by excluding outliers.³⁰ The coefficients on management z-score remain positive and significant (with the exception of column (6) in Table 3). Their magnitudes are roughly similar for the regressions equivalent to those in Table 3, but much smaller when the outcome variable is profit margin (less than half of the magnitude of the coefficients reported in Table 4).

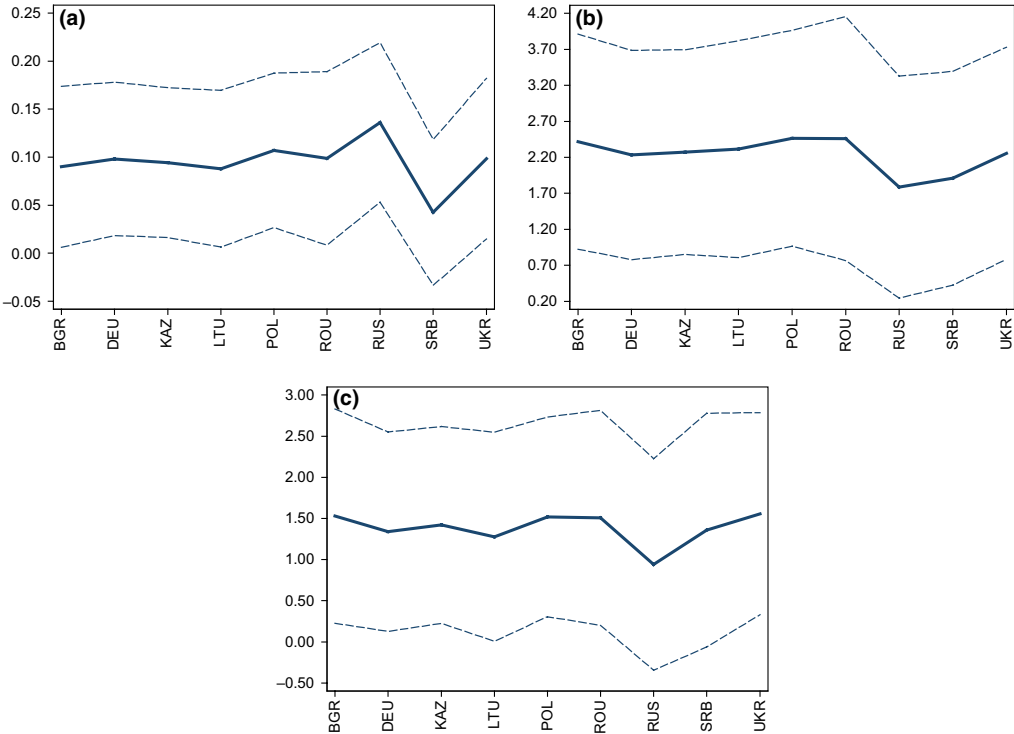
However, given that the variables from Bureau van Dijk's Orbis are not available for all countries (nor for all firms within a country), we run the risk that the results are driven by a specific country. To test for the robustness of our results to changes in the sample, we re-estimate specifications in Tables 3 and 4, removing one country at a time from the sample. The point coefficient estimates are always positive and significant (apart from those in column (6) of Table 3), but their magnitude varies. The results in Figure 5 show stability of the estimated coefficient for management z-score to changes along the country dimension for the three outcomes: productivity, profit margin and return on total assets. Although the coefficients are robust, Russia and, to a lesser extent, Serbia are important influences on the overall coefficient.

The results are also robust to using a longer time period, covering both years before and after the interview, in the estimations. Using the period from 2003 to 2010, the estimated coefficient on management z-score is normally significant at a higher level of significance and across all the specifications used in Tables 3 and 4. The results obtained with larger samples and fewer control variables are stable if we restrict the samples to the smaller samples used when all control variables are included.

²⁹ Not reported, but available upon request.

³⁰ To identify outliers, the outcome variable was regressed on country fixed effects, country*year fixed effects and 2-digit industry fixed effects. Outliers were identified as those observations that fulfil the following criteria: $abs(DFITS) > 2 * \sqrt{\frac{df_m+1}{N}}$ and $abs(COVRATIO - 1) > 3 * \frac{df_m+1}{N}$, where N is the number of observations and df_m degrees of freedom of the model.

Figure 5. Sensitivity analysis: Estimated coefficient on management z-score and 95 percent confidence intervals, excluding one country at a time. (a) Log operating revenue. (b) Profit margin. (c) Return on total assets



Source: MOI survey.

Note: Dashed lines represent the 95 percent confidence interval. Results for log operating revenue refer to Table 3, column (4). Results for profit margin refer to Table 4, column (3) and results for return on total assets to Table 4, column (5).

5. Factors explaining differences in management practices

As shown in Figure 3, there is a lot of heterogeneity in management practices within each country, with firms spread across most of the distribution. Country fixed effects explain less than 5 percent of the differences in management practices in our sample, while 2-digit industry fixed effects account for only 1.3 percent of the differences. The proportion of explained differences is larger in non-transition countries (Germany and India) than in transition countries, but still relatively low. Together, country and 2-digit industry fixed effects account for 5.6 percent of the differences in management practices in transition countries in our sample and for

Table 5. Analysis of variance

	Management practices z-score		
	All	Transition	Non-transition
Country fixed effects	0.0475	0.0405	0.0593
Industry fixed effects (2-digit)	0.0133	0.0116	0.0440
Country and industry fixed effects (2-digit)	0.0625	0.0564	0.0995
Total variance	1.0000	1.0417	0.8410

Source: MOI survey.

Note: Adjusted R-squared, except for total variance.

10.0 percent of the differences in management practices in non-transition countries in our sample (see Table 5).

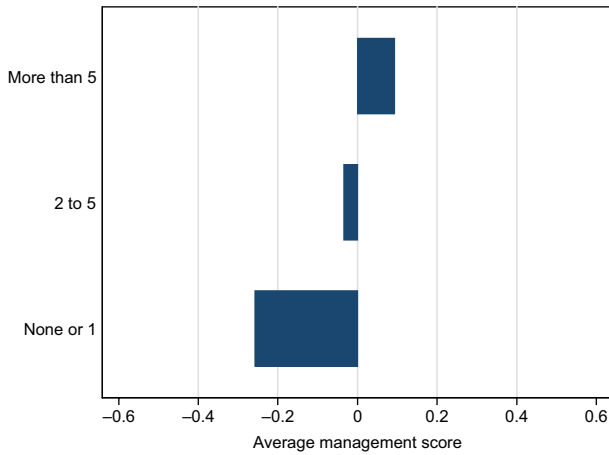
Several factors may help to explain the difference in firm-level management scores, among them product market competition, ownership and education of employees. Figures 6–9 look at average management scores by some of these factors in the raw data.

5.1 Product market competition

First, we look at product market competition. The importance of competitive intensity in improving productivity and management is a robust finding from a wide range of economic studies. Stronger competition can drive out poorly managed firms but can also change the behaviour of incumbent managers who have to lift their performance in order to survive and prosper. Firms in which the number of competitors as perceived by managers is higher, have better management practices on average (Figure 6). We also look at this in a regression format in Table 6, creating two dummy variables, one for firms with 2–5 competitors and another for firms with more than five competitors. The omitted category is firms with zero competitors or one competitor. In column (1) of Table 6, we see that better management practices are positively and significantly associated with the managers' own self-reported measure of the number of competitors they face. The estimated coefficient on the dummy variable for firms with more than five competitors is 1.59 times larger than the estimated coefficient on the dummy variable for firms with 2–5 competitors. Increasing the number of competitors from 0–1 to 2–5 is associated with a management z-score increase of 0.150 (not significant), and increasing the number of competitors further above 5 is associated with an additional increase in management z-score of 0.088 (this most competitive dummy is significantly different from the monopolistic baseline).

Competition has of course been found to play an important role in determining management practices in other contexts (Bloom and Van Reenen, 2010) and total factor productivity more generally (Syverson, 2011).

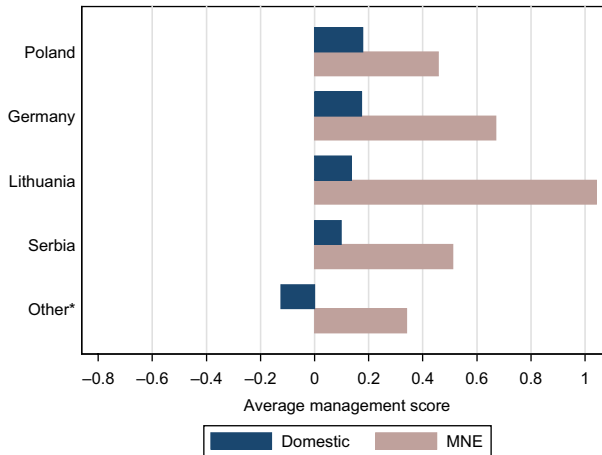
Figure 6. Average management scores by number of competitors



Source: MOI survey.

Note: Scores are reported as z-scores, so are in deviations from the sample average of zero.

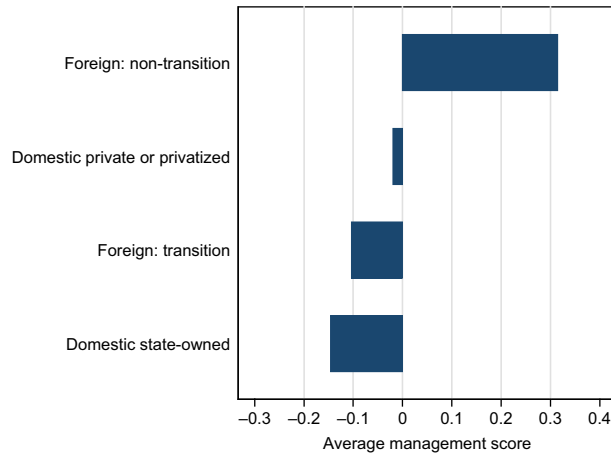
Figure 7. Average management scores by foreign-owned multinationals vs. domestic firms



Source: MOI survey.

Note: Scores are reported as z-scores, so are in deviations from the sample average of zero. Definition of MNEs excludes domestically owned MNEs, which are not shown. Domestic MNEs and foreign-owned single location firms are not shown. Other* includes Belarus, Kazakhstan, Romania, Russia, Ukraine and Uzbekistan.

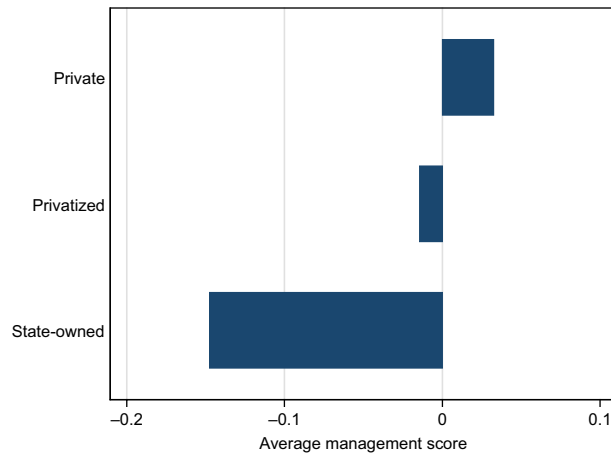
Figure 8. Average management scores by ownership



Source: MOI survey.

Note: Scores are reported as z-scores, so are in deviations from the sample average of zero.

Figure 9. Management scores by privatization status



Source: MOI survey.

Note: Scores are reported as z-scores, so are in deviations from the sample average of zero.

5.2 Management practices and firms belonging to foreign-owned multinationals

Prior to the start of transition, firms were mostly state owned and separated from the outside world, and their objective was not profit maximization. At the beginning of transition, there were a lot of potential investment opportunities in transition economies, which were industrialized and had cheap but highly educated workforces. However, the technologies they were using were behind the technology used in the developed world and the managers of firms had little experience of 'working with clients, marketing their products and reacting to demand changes' (Yudaeva *et al.*, 2003, p. 384). Foreign direct investment (FDI) was perceived as a catalyst because it could bring '...technology and *managerial know-how* necessary for restructuring firms' (Campos and Kinoshita, 2003, p. 3).

We find that management scores of firms belonging to foreign-owned multinational companies are on average significantly higher than the management scores of firms belonging to domestically owned firms (including domestically owned multinationals). The difference is particularly striking in Lithuania (Figure 7). This is true both for the composite management scores, and for area management scores; the only exception is Poland where firms belonging to domestically owned firms have a higher targets management score than firms belonging to foreign-owned multinational companies. Furthermore, firms with foreign owners from non-transition countries have on average higher management scores than firms with foreign owners from transition countries and domestically owned firms (Figure 8). More specifically, firms with foreign owners from non-transition countries have on average statistically significantly better management practices than the other three groups (P -value for the first pair is 0.00), and domestic private or privatized firms also have statistically significantly better management practices than domestic state-owned firms (P -value is 0.04).

We examine this in a regression format in Table 6, columns (2) and (3). We look at foreign-owned multinationals regardless of the country of origin and then split these into foreign-owned multinationals from transition and non-transition countries. A Russian owner of a Kazakh firm may not implement much better management practices than a Kazakh owner would, but a German owner might. The estimated coefficient on the indicator for the foreign-owned multinationals is always positive, but as Figure 7 hinted, this effect appears to be driven by foreign-owned multinationals with owners from non-transition countries. The coefficient on the latter is statistically significant, while the coefficient on the foreign-owned multinationals with owners from transition countries is not. However, this is probably due to the low incidence of foreign-owned multinationals with owners from transition countries in our sample – only 0.5 percent of the companies in our overall sample fall into this category, and this makes it difficult to estimate the coefficient

Table 6. Factors explaining differences in management practices

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2-5 competitors	0.150 (0.103)				0.159 (0.101)	0.159 (0.101)	0.150 (0.102)	0.150 (0.102)
More than 5 competitors	0.238*** (0.090)				0.267*** (0.089)	0.267*** (0.089)	0.243*** (0.089)	0.243*** (0.089)
Foreign-owned MNEs		0.313*** (0.091)			0.323*** (0.089)		0.327*** (0.090)	
Foreign-owned MNEs (transition countries)			0.340 (0.295)			0.301 (0.321)		0.324 (0.297)
Foreign-owned MNEs (non-transition countries)			0.310*** (0.097)			0.325*** (0.095)		0.327*** (0.096)
Currently state-owned				-0.138 (0.092)	-0.181** (0.085)	-0.181** (0.085)	-0.135 (0.090)	-0.135 (0.090)
Ln(% of employees with a college degree)	0.081*** (0.026)	0.082*** (0.026)	0.082*** (0.026)	0.081*** (0.026)	0.081*** (0.026)	0.081*** (0.026)	0.081*** (0.026)	0.081*** (0.026)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2-digit industry fixed effects	Yes	Yes	Yes	Yes	No	No	Yes	Yes
Extra controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Noise controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firms	1,828	1,821	1,821	1,827	1,820	1,820	1,820	1,820
R-squared	0.149	0.144	0.144	0.141	0.136	0.136	0.155	0.155

Source: MOI survey.

Note: * = significant at the 10% level, ** = significant at the 5% level, * = significant at the 1% level. Dependent variable is management z-score. Omitted categories are firms with zero or one competitor, domestic-owned companies or foreign-owned non-multinational companies and always private or privatized companies. All columns are estimated by OLS, with robust standard errors, clustered by country and 2-digit industry. Extra controls comprise log of firm size (number of employees), indicator for whether the firm is listed, log of average hours worked for production and non-production workers, and indicators for missing information on % of production and non-production employees with a college degree. Noise controls are gender, years working in the position for the respondent, the day of the week the interview was conducted, the time of day the interview was conducted, the duration of interviews, interviewer's perception of the truthfulness of the information and respondent's knowledge about the firm as well as controls for interviewer's age, gender and education.

more precisely. Indeed, the coefficients on the different multinational dummies are effectively the same.

Again these results reflect the results for foreign multinationals using better management practices in other countries (Bloom *et al.*, 2012a) and operating with higher productivity (Syverson, 2011).

5.3 *Management practices and state ownership*

We also look at ownership of firms from another angle: namely we compare currently state-owned firms with firms that were always private or that were privatized. Figure 9 shows that firms that have always been privately owned have on average the best management practices, and firms that have been privatized do not differ much from them (the null hypothesis of no differences between the two groups cannot be rejected at conventional levels of significance), while the still state-owned firms have on average the worst management practices (statistically significantly worse than always private firms at P -value 0.01 and privatized firms at P -value 0.05). This suggests that privatization is an effective medium-term means of improvement – an encouraging result, given the importance of privatization in transition countries. The actual result, however, is likely to depend on the new owners and possibly the transparency of the privatization process. Moreover, it is possible that investors selected the most profitable and well-managed firms during privatization: Brown *et al.* (2006) find that firms that were eventually acquired by foreign investors in Hungary, Romania, Russia and Ukraine had 120–200 percent larger output and were 16–36 percent more productive than those either acquired by domestic investors or remaining state owned. However, even after controlling for selection, they find that privatization had a substantial positive impact on productivity in Hungary and Romania, though not necessarily robustly so in Ukraine.

We look at this in a formal regression format in Table 6, column (4). The estimated coefficient on the indicator for currently state-owned firms is negative, but it is not significant. It is, however, negative and statistically significant at the 5 percent level when we do not control for 2-digit industry fixed effects (not reported here). Estimating each regression by industry, we found that the state ownership variable is negative and statistically significant at the 5 percent level in a large number of sectors.³¹ About 64 percent of currently state-owned firms are in one of the industries where the estimated coefficient is statistically significant (and always negative), and they represent 16 percent of all firms in these industries (compared with

³¹ These sectors were apparel (18), publishing, printing and reproduction of recorded media (22), chemicals and chemical products (24), fabricated metal products, except machinery and equipment (28), machinery and equipment n.e.c. (29), office, accounting and computing machinery (30), medical, precision and optical instruments, watches and clocks (33), radio, television and communication equipment and apparatus (32), other transport equipment (35) and recycling (37), food products and beverages (15) and tobacco products (16).

8 percent in the remaining industries). All these industries taken together have on average a lower management practices score than the other industries. Within this group of industries, currently state-owned firms have on average statistically significantly worse management practices while the same is not true for the group of other industries. Hence, some of the variation in management practices due to state-owned firms is picked up by the industry fixed effects.

5.4 Management practices and human capital

Average education level of employees may also be correlated with the quality of management practices. We have included percentage of employees with a completed college degree among the controls in all of our estimations and the estimated coefficient is always positive and significant at the 1 percent level of significance. This could be because such employees are more familiar with the best practices used in their line of work and are more supportive to implementing them in their workplace.

We have shown that competition, belonging to foreign-owned multinationals and average education level of employees is (positively) associated with management scores on their own. We also estimate the association between management scores and these factors jointly in columns (5) to (8) of Table 6, finding our results robust to this and a variety of samples and controls.

6. Summary and concluding remarks

We have shown that management practices differ across countries and across firms within countries. They are positively associated with various measures of firm performance, such as productivity and profitability. An improvement from the lower to the upper quartile of the management distribution (almost a 1.4 standard deviations increase in the score) is associated with a 7–13 percent increase in productivity and about a 3 percentage point increase in profit margins. Given that management is strongly associated with better firm performance, it may be an important explanation for productivity differences between countries.

Several factors seem important in influencing management quality, in particular, product market competition, ownership and human capital. If interpreted causally, several policy implications can be drawn. Stronger competition appears to drive out poorly managed (and performing) firms, and also change the behaviour of incumbent managers to improve performance in order to survive. Aghion *et al.* (2010) show that levels of product market competition in transition economies have increased substantially since the beginning of the 1990s, but they remain below the OECD average, especially in the more Eastern nations (see also EBRD 2008, 2009). A stronger and more effective competition policy would help here, especially giving less protection to inefficient incumbents and reducing barriers to entry and growth.

Ownership also matters. Our analysis shows that firms belonging to foreign multinationals with owners from non-transition countries have the best management practices. There is also some evidence, albeit weaker, that state-owned firms tend to have the worst management practices. The good news is that privatized (formerly state-owned) firms do not differ significantly from firms that were privately owned from the beginning in terms of the quality of management practices. This suggests that privatization is an effective medium-term means of improvement and that openness to foreign investment is important in spreading best practice. The actual result, however, is likely to depend on the new owners and possibly the transparency of the privatization process, as well as the possibility that investors selected the most profitable and well-managed firms during privatization.

Finally, management practices are also positively associated with the level of human capital, as measured by the percentage of employees with a completed college degree. It is plausible that it might be easier to implement the best management practices when the workforce is more knowledgeable and able to improve the operational process. Inadequately educated workers were consistently named as one of the top three business obstacles in virtually all transition countries covered by BEEPS in 2008–2009, which indicates that businesses are becoming more aware of the importance of human capital and are hitting on a serious constraint in developing their businesses further. More basic business education and better, more effective education in general could help to improve management practices and foster growth of the businesses.

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Appendix A: Details of the survey questions and management practice scoring

Operations

Practice 1	
R.1	What normally happens when a process problem arises, for example, machinery breakdown, human errors or failures in communication?
	Management score
	Nothing is done about it. 1
	We fix it but do not take further measures. 2
	We fix it and take measures to make sure that it does not happen again. 3
	We fix it and take measures to make sure that it does not happen again and we also have a continuous improvement process to anticipate problems. 4
	Don't know -
	Refusal -
Practice 2	
R.2a	How many production performance indicators are monitored in this establishment?
	Management score
	None 1
	One or two production performance indicators (e.g. volume and quality) 2
	More than two production performance indicators 3
	Don't know 1
	Refusal -

Practice 3	
R.2b	How frequently are these production performance indicators collected in this establishment?
	Management score
Yearly	1
Quarterly	2
Monthly	3
Weekly	4
Daily	5
Hourly	6
Don't know	1
Practice 4	
R.2c	How frequently are production performance indicators shown to factory managers?
	Management score
Annually	2
Semi-annually	3
Quarterly	4
Monthly	5
Weekly	6
Daily	7
Hourly	8
Never	1
Other	Recorded where possible, otherwise –
Don't know	–

Note: The answers to this question were recoded on the basis of the answers in the 'Other' category.

Practice 5	
R.2d	How frequently are production performance indicators shown to workers?
	Management score
Annually	2
Semi-annually	3
Quarterly	4
Monthly	5
Weekly	6
Daily	7
Hourly	8
Never	1
Other	Recoded where possible, otherwise –
Don't know	–

Note: The answers to this question were recoded on the basis of the answers in the 'Other' category.

Practice 6	
R.2e	Where in the factory building are the production display boards showing output and other production performance indicators located?
	Management score
There are no display boards anywhere	1
They are all located in one place	2
They are located at multiple places	3
Don't know	1

Practice 7		
R.3	How often are production performance indicators reviewed by top or middle managers?	
		Management score
	They are continually reviewed	3
	They are periodically reviewed	2
	They are rarely reviewed	1
	Don't know	-
	Refusal	-
Practice 8		
R.6	Does this establishment use any production performance indicators to compare different teams of employees in the production line, in different shifts, or similar?	
		Management score
	Yes	2
	No	1
	Don't know	-
Practice 9		
R.4	What is the timescale of this establishment's production targets for its main product?	
		Management score
	The main focus is on short-term (less than 1 year) production targets for the main product	2
	There are short- and long-term (more than 3 years) production targets for the main product, but they are set independently	3
	There are integrated short- and long-term production targets for the main product	4
	There are no production targets set for the main product	1
	Don't know	1
	Refusal	-

Practice 10		
R.7	How do you reward this establishment's production target achievement?	
		Management score
	There are no rewards	1
	Only top and middle management is rewarded	2
	All staff is rewarded	3
	Don't know	-
	Refusal	-
Practice 11		
O.14	Which of the following best corresponds to the main way employees are promoted in this establishment?	
		Management score
	Promotions are based solely on individual's effort and ability	3
	Promotions are based partly on individual's effort and ability, and partly on other factors such as tenure (how long they have worked at the firm)	2
	Promotions are based mainly on factors other than on individual's effort and ability, such as tenure	1
	Other	-
	Does not apply	-
	Don't know	-

	Management score
Practice 12	
O.15 Which of the following best corresponds to this establishment's main policy when dealing with employees who do not meet expectations in their position?	
They are rarely or never moved from their position	1
They usually stay in their position for at least a year before action is taken	2
They are rapidly helped and re-trained, and then dismissed if their performance does not improve	3
Other	-
Does not apply	-
Don't know	-

Note: MOI survey materials, including questionnaire and data, are available at <http://www.ebrd.com/pages/research/economics/data/moi.shtml>.