

Spatial Gaps in Management Quality

Evidence from a Lagging Region in Croatia

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Abstract

Embedding management and operational practices survey in a broader firm capabilities survey, this report finds that: (i) relative to the rest of Croatia, an average firm in the lagging region of the country (Eastern Croatia) is only slightly behind in the adoption of structured management practices. Nevertheless, overall, Croatia is farther from a frontier economy such as the United States. (ii) There is wide heterogeneity in adoption of management practices in the country, such that a large share of firms in the lagging region are badly managed relative to those in the rest of the country. (iii) Better managed firms in all regions, including

Eastern Croatia, show superior firm performance. What drives better management? Global linkages matter for firms in other countries and in all regions of Croatia except the lagging region. Unlike other countries, firms in Croatia do not upgrade management quality as they age, perhaps due to lack of pro-competitive forces. This report recommends focusing on policies that improve allocative efficiency in the region and help firms establish global linkages, and more direct intervention for improving the management quality of firms.

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Spatial Gaps in Management Quality: Evidence from a Lagging Region in Croatia

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Section 1: Why Do Management Capabilities Matter?

The persistence in productivity differences between firms, within the same industry, is striking and puzzling. For example, labor productivity for plants in the 90th percentile, within narrowly defined four-digit US manufacturing industries, is four times as high as plants in the 10th percentile. Likewise, the difference in Total Factor Productivity (TFP) is twice as high, when controlling for other factors (Syverson, 2011). These differences persist over time and are robust to controlling for plant-specific prices in homogeneous goods industries. Such TFP heterogeneity is not an artifact of the US data; it is also evident in several other countries. It is well-known that variations in productivity trump any other source of heterogeneity in firm performance: in the United States, firms in the 90th percentile of the productivity distribution produce twice as much with the same set of inputs as firms in the 10th percentile, whereas in China and India this gap is 5:1 (Hsieh and Klenow 2009). Often such within-industry productivity differentials are attributed to “hard” technological innovations, as embodied in patents or in adoption of advanced equipment. Bloom et al. (2016a) provide an alternative explanation, which is also the focus of this paper, that is, productivity differences reflect variations in management practices.

Bloom et al. (2016a) propose that some forms of management practices are like “technology”, in the sense that they raise firm productivity. Bloom and co-authors have significantly advanced the empirical foundations for measuring management practices across firms and countries, which has allowed core theories in many fields such as international trade, labor economics, industrial organization and macroeconomics to incorporate firm heterogeneity as a central component. While a frontier topic globally, there exists little evidence on managerial practices of firms in Croatia and the relationship between management and productivity. Nevertheless, there is some evidence on management in countries from the Europe and Central Asia region, where Bloom et al. (2011) find a strong association between managerial practices and firm performance.¹ To quantify the importance of management for the performance of firms in Croatia, and particularly in Eastern Croatia, we conducted a survey on firm capabilities in Croatia, which includes the following modules: (i) Working Time, Employed Personnel and Remunerations; (ii) Training; (iii) Business Capabilities and Entrepreneurship; (iv) Government Programs and Funding; (v) Global Production Chains; (vi) Science, Technology and Innovation and (vii) Access to Finance.

This study analyzes the outcomes for Eastern Croatia along several dimensions of firm performance, including not only labor productivity, total factor productivity (TFP) and profits, but also outcomes relating to average skill intensity, training, innovation and technology adoption. These outcomes are evaluated with management capabilities being the centerpiece, that is, we associate all the measures of firm performance with the adoption of structured management practices.

How are structured management practices measured? The survey module on Business Capabilities and Entrepreneurship includes 15 core questions of the US Census [Management and Organizational Practices Survey \(MOPS\)](#) main module. The survey was deliberately designed to replicate the US Census MOPS to maximize comparability with the United States as well as other countries where this survey has been conducted (e.g., the United Kingdom, Canada, the Russian Federation and Mexico). We exploit the survey data on 585 small and medium enterprises (SMEs) in the manufacturing and services sectors. Of these 585 firms, 145 firms are from Eastern Croatia. The survey was conducted from January 2019 to June 2019. The FINA database provides the sample frame for this survey, where the sample was stratified by region and sector.² Firms were randomly sampled and interviewed face to face. Firm responses to questions on managerial practices are aggregated into a single management score,

¹ 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, Organization and Innovation (MOI) survey.

² The Financial Agency (Fina) is the leading Croatian provider of financial data services. The database comprises of all tax registered firms in Croatia.

following Bloom et al. (2019a). Survey data on managerial practices, mark-ups, technology adoption and innovation are merged with other firm performance data such as profits, sales per employee and TFP from the FINA database.

One objective of this survey is to provide robust evidence on the link between management and firm performance in Croatia and in Eastern Croatia (or Slavonia).³ The overall analysis may not allow to causally relate management capabilities to performance of firms but provides support for specific interventions aimed at improving firm productivity and for piloting policies and programs. For example, our analysis helps benchmark management capabilities in Eastern Croatia and in Croatia overall compared to other countries, the types of management practices that seem more relevant for firms, and the characteristics of enterprises whose management capabilities help explain further differences in performance.

We present some stylized facts for firms in Eastern Croatia and compare them with other regions in Croatia. We find that, *first*, when benchmarking management scores in Slavonia and in Croatia against the United States, it is noteworthy that the average management score, just like TFP, is higher in the United States than it is in Croatia, and even higher than in Slavonia (Tables 1a and 1b). The average manufacturing firm in Eastern Croatia scores 0.532 in adopting advanced management practices, a value very similar to that in the rest of Croatia (0.542) but behind the one in the United States (0.615, Bloom et al., 2019a). Comparing Croatia's management practices with those in Russia (Grover and Torre, 2019) and Mexico (Bloom et al., 2019b), other countries for which comparable data are available, we find that an average manufacturing firm in Croatia is better managed than its counterparts in Russia (average score, 0.43) and Mexico (average score, 0.39).^{4,5}

Second, weaknesses in management practices particularly relating to data-driven performance monitoring cripples the overall management score in Croatia as well as Eastern Croatia. Data-driven performance monitoring includes specific practices that help managers define their key performance indicators (e.g. inventory, sales, absenteeism) and appropriately track them periodically over time, while incentives management practices relate to how managers and non-managers are awarded bonuses and promotion. The result for Croatia regarding the weaknesses of these sub-indices is similar to that in Russian manufacturing, that is, the monitoring aspect of structured management is weaker. By comparison, this finding is different from that in the United States and Mexico, where manufacturing firms are stronger in monitoring vis-à-vis structured management practices relating to workers' incentives and target setting.

Third, an interesting finding of this survey data is that services firms are farther from the frontier when it comes to adoption of structured management practices. Services firms were included in a MOPS framework survey for the first time in Mexico, where, as in the case of Slavonia and Croatia, it was also found that adoption of structured management practices is weaker relative to that in manufacturing (Bloom et al., 2019b). They attribute the lower management score in services to a lack of pro-competitive environment, which lowers the pay-off from adopting better management practices. In Eastern Croatia, an average services firm scores 0.519 on the adoption of the most advanced management practices, compared to 0.535 in manufacturing. As in Bloom et al. (2019b), we also conjecture

³ We use the terms Eastern Croatia and Slavonia interchangeably. 'Slavonia' is used as a shorthand for the region of Slavonija, Baranja & Srijem, consisting of five counties in Eastern Croatia. These five counties are: Brod-Posavina county, Osijek-Baranja county, Požega-Slavonia county, Virovitica-Podravina county, and Vukovar-Srijem county.

⁴ Apart from data availability, it makes sense to compare Slavonia with the federal districts covered in Russia because, in both cases, the regions are part of a transition economy in Europe, although arguably Russian districts are much larger in size as well as in per capita GDP terms than any region in Croatia. Comparison with Mexico is also revealing in the sense that Mexico's per capita GDP is closer to Slavonia (but lower than Croatia), but has a strong manufacturing base, and thus offers another perspective for comparison, apart from the United States, which is the benchmark frontier economy (upper bound). In fact, to minimize error margin, we took advantage of access to Mexican survey data on management capabilities at the sample stratification stage and the count of firms to be interviewed by sector within each region is based on an analogous comparator state in Mexico. For example, the sample distribution across sectors in Dalmatia is based on Quintana Roo, a state in Mexico with similar economic structure and relative income ranking as Dalmatia. Likewise, the target sample distribution of firms in Zagreb is based on Mexico City.

⁵ We are concerned that the higher score in Croatia may be a result of a low response rate and a likely selection bias. However, it should be noted that we did not find a significant selection bias based on observable characteristics of firms such as size, age, sector and export status.

that a lack of market competition in Croatia and particularly so in Slavonia may partly explain poor management among services firms.

Table 1a: Management in Croatia is farther from the frontier, and more so in Slavonia

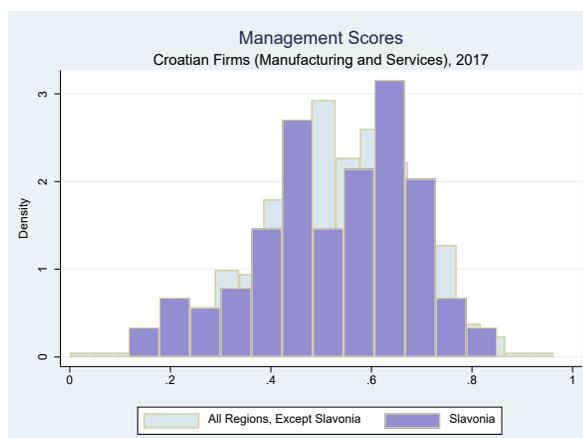
MANUFACTURING							
Croatia							
	Mean	SD	p(10)	p(25)	p(50)	p(75)	p(90)
Management score	0.542	0.15	0.333	0.431	0.558	0.657	0.724
Data driven performance monitoring	0.501	0.163	0.300	0.367	0.483	0.617	0.75
Incentives and targets	0.562	0.191	0.298	0.44	0.595	0.698	0.788
Slavonia							
	Mean	SD	p(10)	p(25)	p(50)	p(75)	p(90)
Management score	0.535	0.165	0.306	0.417	0.565	0.667	0.706
Data driven performance monitoring	0.49	0.168	0.283	0.35	0.467	0.6	0.767
Incentives and targets	0.55	0.217	0.286	0.42	0.605	0.708	0.8
Russia							
	Mean	SD	p(10)	p(25)	p(50)	p(75)	p(90)
Management score	0.432	0.192	0.152	0.306	0.45	0.567	0.675
Data driven performance monitoring	0.323	0.227	0	0.133	0.3	0.5	0.633
Incentives and targets	0.496	0.221	0.167	0.361	0.523	0.663	0.762
Mexico (Bloom et al., 2019b)							
	Mean	SD	p(10)	p(25)	p(50)	p(75)	p(90)
Management score	0.42	0.201	0.125	0.275	0.44	0.576	0.673
Data driven performance monitoring	0.465	0.232	0.133	0.278	0.5	0.639	0.75
Incentives and targets	0.386	0.235	0	0.2	0.398	0.568	0.7
United States (Bloom et al., 2013)							
	Mean	SD	p(10)	p(25)	p(50)	p(75)	p(90)
Management score	0.615	0.172	0.379	0.521	0.648	0.742	0.806
Data driven performance monitoring	0.643	0.199	0.365	0.521	0.677	0.792	0.865
Incentives and targets	0.583	0.215	0.3	0.474	0.623	0.739	0.819

Table 1b: Management score lower in services, particularly for Slavonia

SERVICES							
Croatia							
	Mean	SD	p(10)	p(25)	p(50)	p(75)	p(90)
Management score	0.529	0.148	0.326	0.441	0.536	0.642	0.702
Data driven performance monitoring	0.47	0.159	0.283	0.367	0.467	0.583	0.667
Incentives and targets	0.557	0.195	0.286	0.456	0.583	0.694	0.781
Slavonia							
	Mean	SD	p(10)	p(25)	p(50)	p(75)	p(90)
Management score	0.519	0.147	0.292	0.438	0.533	0.643	0.685
Data driven performance monitoring	0.463	0.147	0.267	0.383	0.467	0.567	0.65
Incentives and targets	0.552	0.191	0.262	0.456	0.581	0.704	0.781
Mexico (Bloom et al., 2019b)							
	Mean	SD	p(10)	p(25)	p(50)	p(75)	p(90)
Management score	0.395	0.204	0.1	0.244	0.404	0.554	0.661
Data driven performance monitoring	0.409	0.226	0.067	0.222	0.444	0.583	0.694
Incentives and targets	0.382	0.243	0	0.188	0.396	0.573	0.717

A *fourth* striking feature of this newly collected data in Croatia is that management shows a wide dispersion across firms in Eastern Croatia as well as in other regions in Croatia (see Figure 1), a finding comparable to other countries. Interestingly, the distribution of management score across firms suggests that management in Slavonia, relative to Croatia, has a thicker left tail and a thinner right tail, that is, relative to Croatia, a larger share of firms in Eastern Croatia are badly managed and a much smaller share is better managed. In particular, 42 percent of firms in Slavonia score below 0.5, as compared to 38 percent in other regions in Croatia, while only 3.5 percent of these firms have a score over 0.75 relative to 6 percent in other regions of Croatia. The heterogeneity in the distribution of management scores in Croatia is even more remarkable compared to countries at the frontier, for example, in the United States, 18 percent of firms have a management score over 0.75. Nonetheless, the finding on the distribution of the management score in Croatia is similar to that noted in Russia (Grover and Torre, 2019) and Mexico (Bloom et al., 2019b).

Figure 1: Relative to other regions in Croatia, larger share of firms in Slavonia are poorly managed

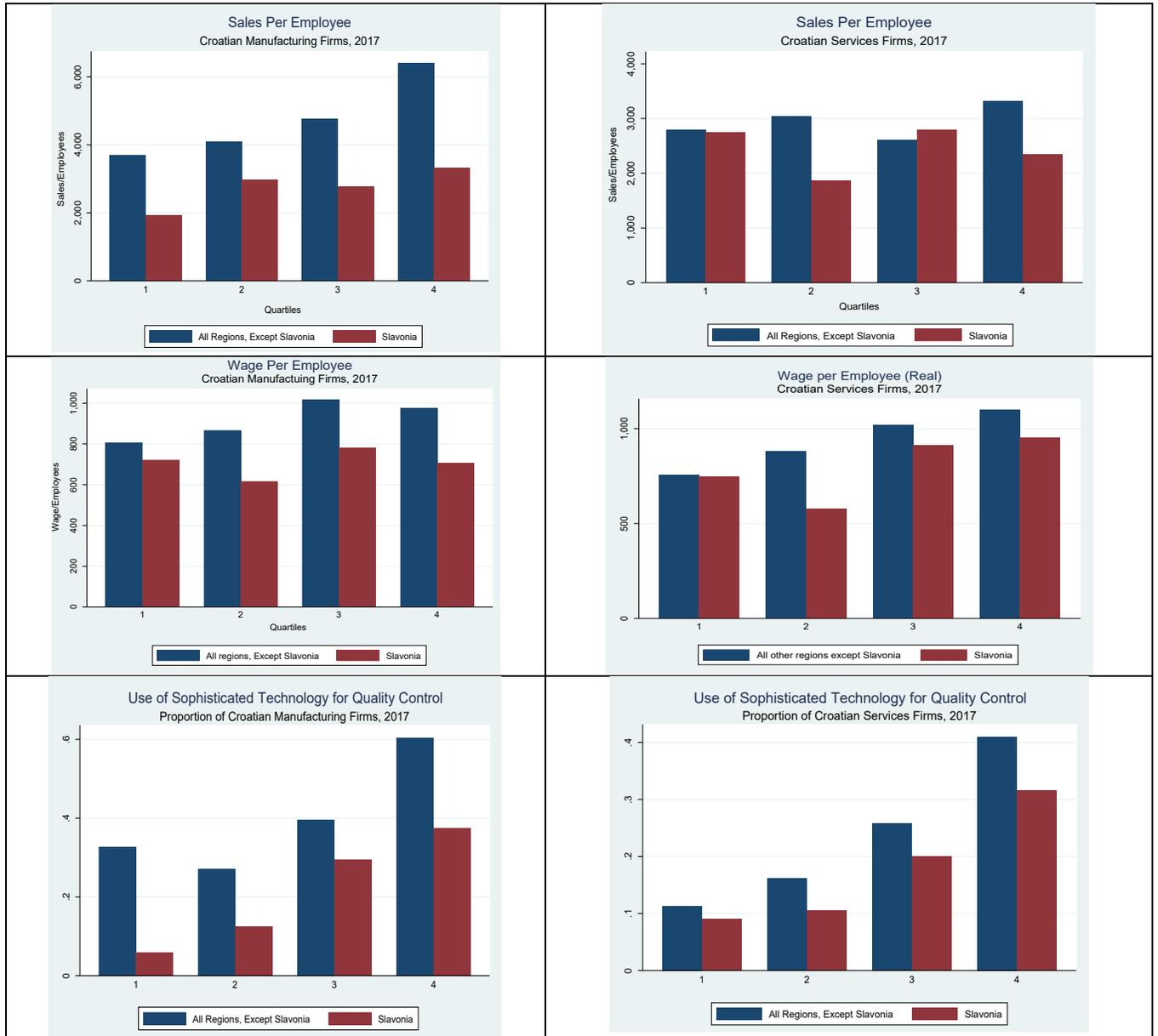


Why does management matter? Across countries, Hall and Jones (1999) show how the stark differences in productivity account for a substantial fraction of the differences in average income. Differences in managerial quality are critical in explaining such cross-country differences in income levels, productivity, innovation and firm dynamism. For example, Bloom and Van Reenen (2010) attribute differences in productivity across firms in Asia, Europe, and North and South America to the heterogeneity in management practices across firms in these regions. Other performance measures, such as profitability and survival rates, are also positively correlated with good management practices. A novel finding of their work is that the cross-country variation in management practices was, in fact, smaller than differences between firms in the same country, suggesting that firm- and sector-specific factors were at least as important as the general business environment in shaping managerial performance. Differences in management are also correlated with competition, labor market flexibility, education and ownership structure.

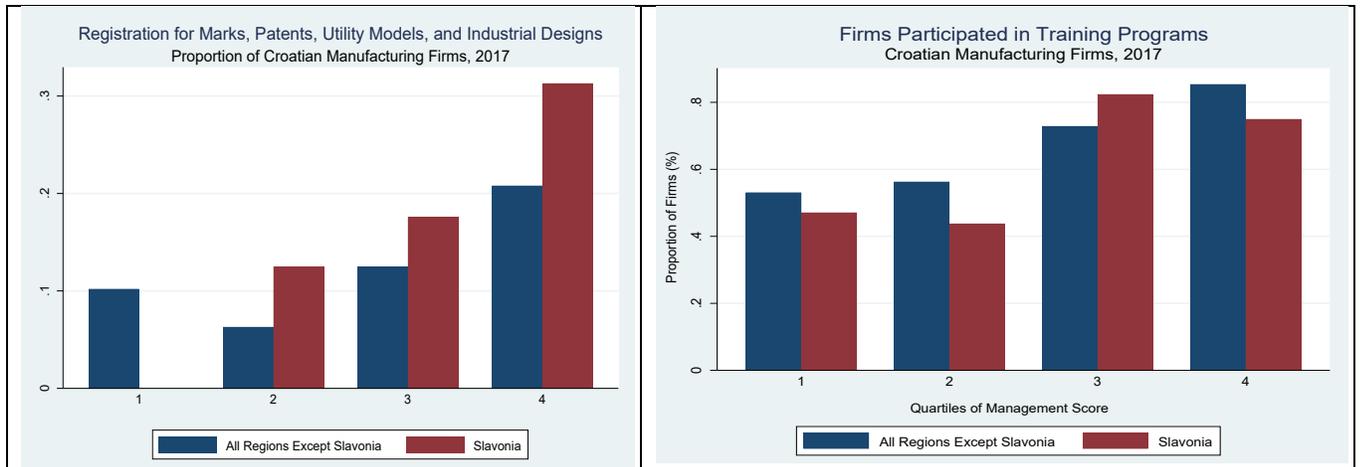
Fifth, consistent with the findings in other countries and data sets, a critical finding of this report is that structured management, that is, more intensive monitoring and more aggressive performance incentives (e.g., hiring, firing, pay and promotions), is associated with superior firm performance (figure 2). Figure 2 shows a clear pattern of higher sales per employee, wage per employee (quality of jobs), the share of firms adopting more sophisticated technology for quality controls, registering for patents, or training staff for their employees. More specifically, if management capabilities improve by magnitudes similar to that experienced in a field experiment on firms in India (that is, about 38 percent, see Bloom et al., 2013), then, conditional on observable factors such as industry, capital intensity, firm age, size and so on, such a change is associated with an increase in profit margin and sales per employee (labor

productivity) for an average firm in Eastern Croatia by 7 percent. Likewise, similar changes in management scores are associated with a 14 percent higher probability for an average firm in Eastern Croatia to introduce new products or processes, register for patents and 17 percent greater likelihood for an average firm to adopt more sophisticated technology, (e.g. for quality control). The analogous associated increase in all other regions is 13 percent in profits, 5 percent in sales per employee, while the probability of innovating and adopting more sophisticated technology increases by 24 and 9 percent respectively.⁶

Figure 2: Management matters for firm performance outcomes



⁶ As illustrated in figure 2, in the absence of controls, the relationship between management and firm performance appears to be weaker for Slavonia than in the rest of the regions. However, regression estimates that control for firm characteristics and fixed effects show that the correlation of firm performance and management is higher for firms in Slavonia for many economic outcomes, such as sales per employee and technology adoption.



How do these results inform firm interventions designed for enhancing aggregate productivity? A simple answer to this question is that management can be improved with concerted effort. For example, an experiment with 17 textile firms in India provides a proof-of-concept that intensive individualized consulting can deliver lasting improvements in the practices of badly managed firms, resulting in productivity improvements by 17 percent (Bloom et al., 2013). Although this intervention improved management and firm performance, it came at a huge cost of approximately \$75,000 per treated firm. This high cost is likely to be prohibitive for many small and medium enterprises (SMEs) to finance themselves, and for governments seeking to scale this up for assisting a large number of firms. To counter this, Iacovone et al. (2019) tested two alternative approaches to improving management among firms producing auto parts in Colombia. The first uses intensive and expensive one-on-one consulting, while the second draws on agricultural extension approaches to provide consulting to small groups of firms at approximately one-third of the cost of the individual consulting services. Their results show that both approaches lead to improvements in management practices of a similar magnitude (8-10 percentage points), so that the new group-based approach dominates on a cost-benefit basis.⁷ This points to the potential of group-based approaches as a pathway to scaling up management improvements.

Finally, given that management can be improved, our analysis of the survey data already points to some of the shortcomings in the incentive system for firms that inhibit adoption of structured management practices. For example, results suggest that management practices are negatively correlated with firm age, and especially so in low-tech manufacturing and non-knowledge intensive services. Moreover, the magnitude of this negative association is larger in Slavonia. This finding is surprising when compared with the United States or Mexico, where firms tend to improve their management practices as they age. The hypothesis is that, as firms grow, their production processes become more complex and, in order to stay in the market, they have to upgrade their management capabilities. However, in Croatia, firms continue to survive without the need to do so. This indicates the possibility that in Croatia learning and market selection are not operating perhaps due to the lack of pro-competitive forces.⁸ Likewise, the finding that exporting firms are better managed confirms that the selection and learning mechanism actually works in Croatia, if firms compete in international markets. More precisely, the management score of a manufacturing exporter in Croatia is likely to be higher by 8 percent than for an average firm. The fact that this result is mainly driven by high-tech manufacturing exporters in the other regions of Croatia, where the management score is likely

⁷ Their results suggest that group-based intervention led to increases in firm size over the next 1.5 years, including a statistically significant increase in employment, while the impacts on firm outcomes are smaller and statistically insignificant for the individual consulting.

⁸ In the United States, it is well-known that “up-or-out” dynamics, in which unsuccessful firms exit or are bought out by more successful competitors who absorb the labor and capital released by exiting firms, drive productivity and business dynamism (Haltiwanger et al., 2013). In the case of Croatia, such selection dynamics do not seem to work in a similar way, and firms that are badly managed continue to survive.

to be 16 percent higher, points to the potential for improving management capabilities among other firms and sectors. By comparison, in Eastern Croatia, exporters are not significantly better managed than the rest of the firms.

The paper beyond this point is organized as follows: Section 2 compares firms in Eastern Croatia with Zagreb and other regions of Croatia on key parameters surveyed, including firm capabilities other than management (e.g. skills, innovation, technology adoption), outcomes on firm performance (e.g. labor productivity), and the constraints that firms face across different regions of Croatia. Section 3 introduces the methodology for computing management scores and compares management capabilities in Eastern Croatia with other regions of the country, and across countries. Section 4 presents some descriptive results on firm characteristics that are associated with management capabilities in Eastern Croatia relative to other regions in Croatia. Section 5 presents a simple regression framework for assessing the association between management practices and firm performance. Section 6 explores the drivers of good management practices. Section 7 concludes with policy recommendations.

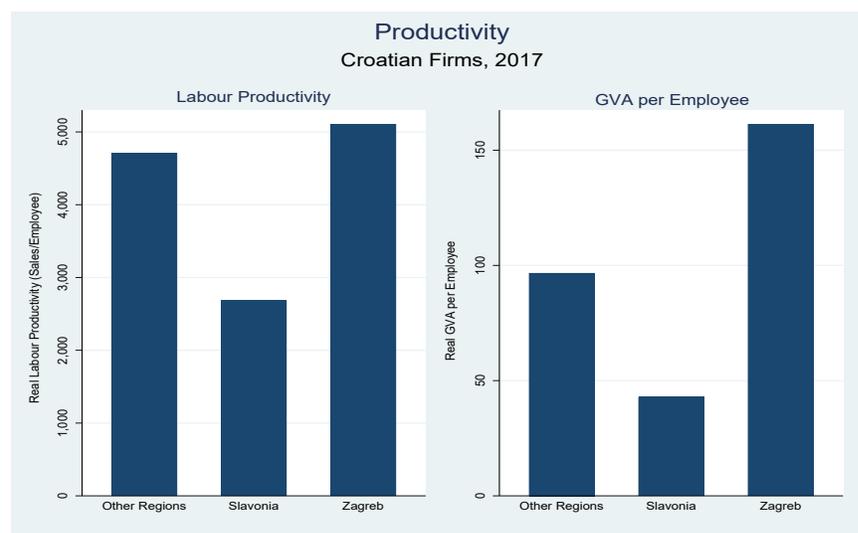
Section 2: Firm Capabilities Survey

In this section, we utilize the firm level survey to understand the differences between firms across regions in Croatia.

2.1 Firm Performance, Technology Adoption and Obstacles – Comparing firms across regions

We compare firms based on three broad categories across Zagreb, Eastern Croatia and other regions in Croatia, excluding Zagreb and Eastern Croatia. The three categories are classified as follows: (1) firm performance – we use sales/employee (labor productivity) and gross value added (GVA) per employee as the two indicators; (2) innovation and technology adoption. For innovation, we assess whether a firm has registered itself for a new trademark, patent, utility model or industrial design and for the latter, we review the use of technology for quality and control management and introduction of new products and processes; and (3) the different types of obstacles the firms face during their operations.

Figure 3: Firm performance in Slavonia is lower than that in Zagreb and other regions

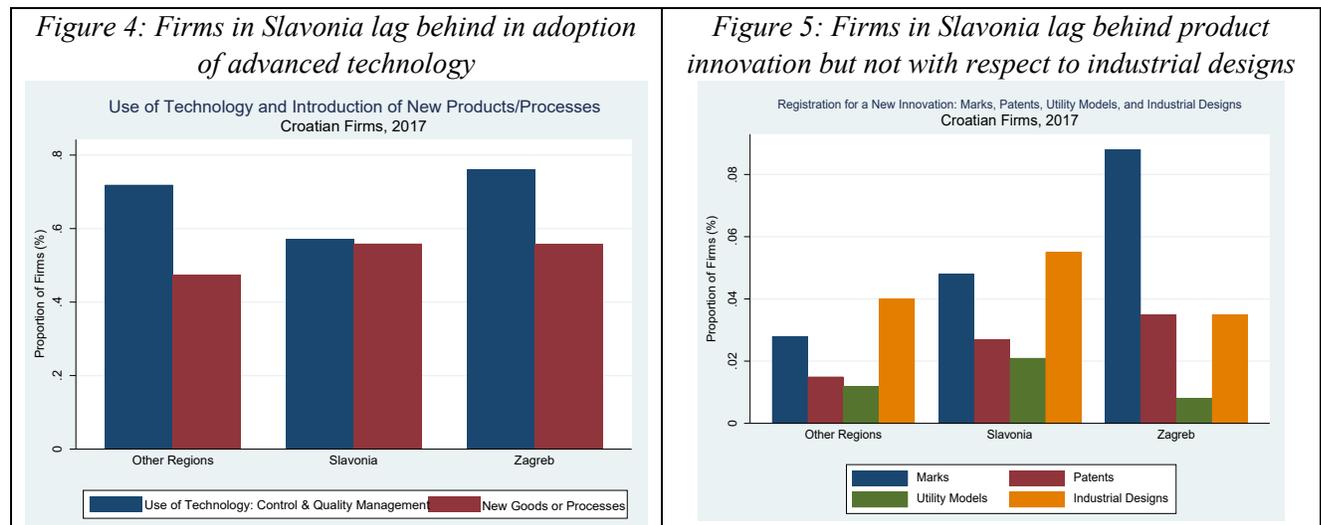


Comparing real labor productivity (sales per employee) and real GVA per employee of firms across Zagreb, Eastern Croatia and other regions of Croatia, we note that both the indicators of performance are highest in Zagreb, and lowest in Slavonia, especially in terms of GVA per employee (Figure 3). Labor productivity in Eastern Croatia is half that of Zagreb and other regions of Croatia; while, in the case of gross value-added it is one-third of that observed in Zagreb and one-half relative to other regions of Croatia.

2.2 Technology adoption and innovation

Why is firm performance in Eastern Croatia lower relative to other parts of the country? One reason for the observed poor performance could be lower firm capabilities. This may manifest itself in the form of efforts to undertake innovation (process or products) and the adoption of sophisticated technology, for example for improving business processes, such as procurement or for tracking quality. The survey suggests that, while the share of firms that introduced new products and processes are similar in Slavonia relative to the rest of the regions, a much smaller share uses advanced technology for procurement and quality management (Figure 4).

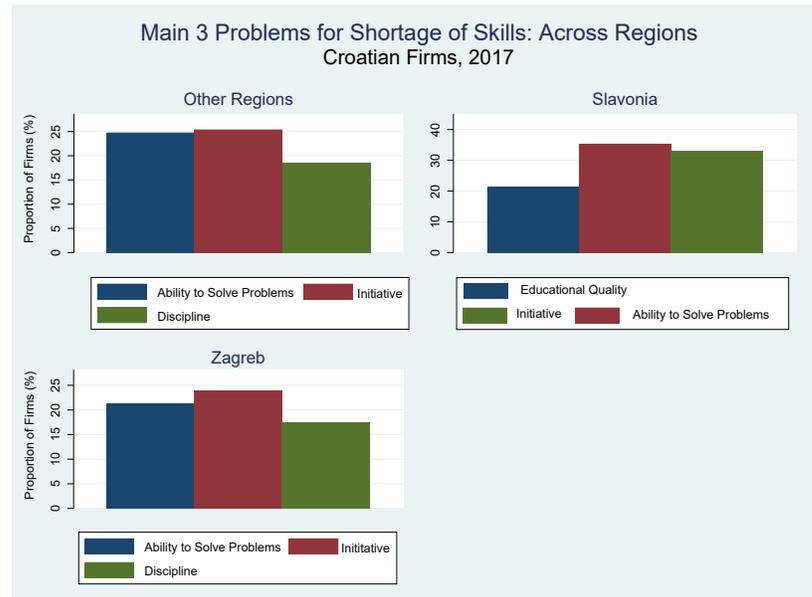
When splitting the share of firms that introduced new processes versus products, firms in Eastern Croatia are more active in introducing new processes rather than innovative products. To this end we consider the count of firms that have registered for trademarks, patents, utility models and industrial designs. Firms in Eastern Croatia are doing worse than their counterparts in Zagreb in introducing trademarks and patents. Impressively, firms in Slavonia are registering more for industrial designs than any other place in Croatia (Figure 5).



2.3 Skills

Another reason why firm performance in Eastern Croatia could be lower than the rest of the regions is perhaps found in the availability and quality of skills. One of the main problems, which has been identified by the firms across regions is the issue of skill shortage. We consider the top three shortage challenges with respect to skills among firms in Eastern Croatia, Zagreb and other regions. Ability to solve problems and initiative to participate in the job market are the two major problems cited by the firms for skill shortage across regions. The proportion of firms that perceive that the ability to solve problems is one of the core reasons for the skill shortage is highest in Eastern Croatia. Firms in Eastern Croatia additionally cite educational quality as the third most important problem, whereas firms in Zagreb and other regions do not perceive this as a big challenge; rather, problems relating to employees' attitudes (e.g., discipline) could be a bigger constraint.

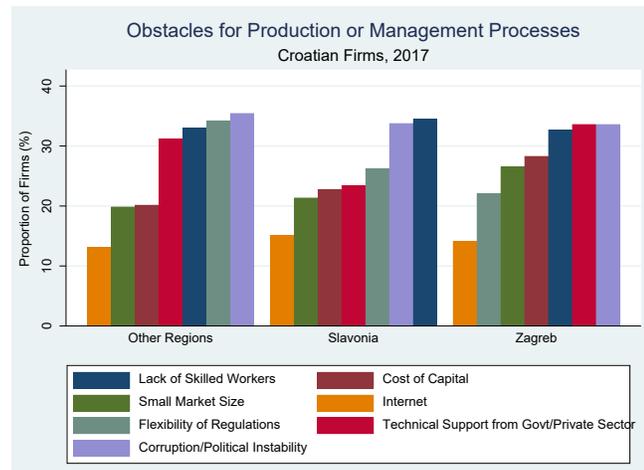
Figure 6: Firms in Slavonia perceive education quality to be a top challenge for worker's skills



2.4 Business Environment

External factors such as enabling conditions for businesses to flourish can also significantly influence firm performance. We investigate the obstacles for firms' motivation to upgrade to better production or management processes. Figure 7 lists seven different problems in order of their importance reported by the firms. Most firms in Eastern Croatia (and in other regions, including Zagreb) perceive lack of skilled workers and political instability and corruption as the two main obstacles affecting their operations.

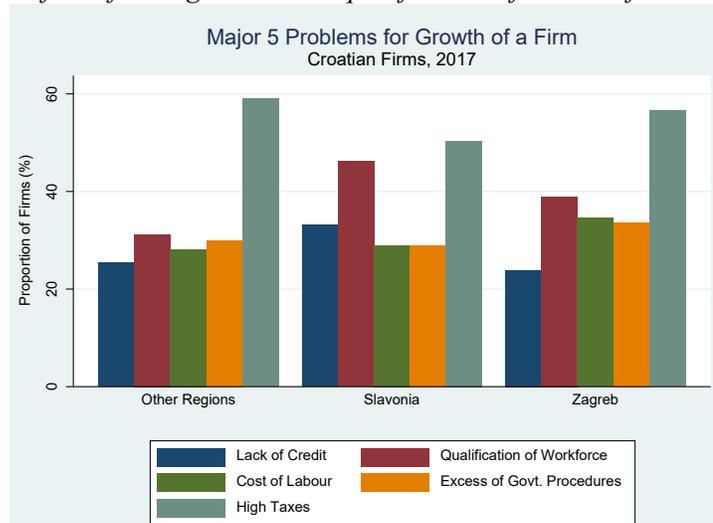
Figure 7: Lack of skilled workers, political instability are among the top obstacles for firms in Croatia



Among the major economic problems that a firm perceives as binding constraints to their growth, Figure 8 suggests that Slavonian firms find taxes and qualification of the workforce to be a major roadblock. This is similar to the problems faced by firms in Zagreb and other regions.⁹

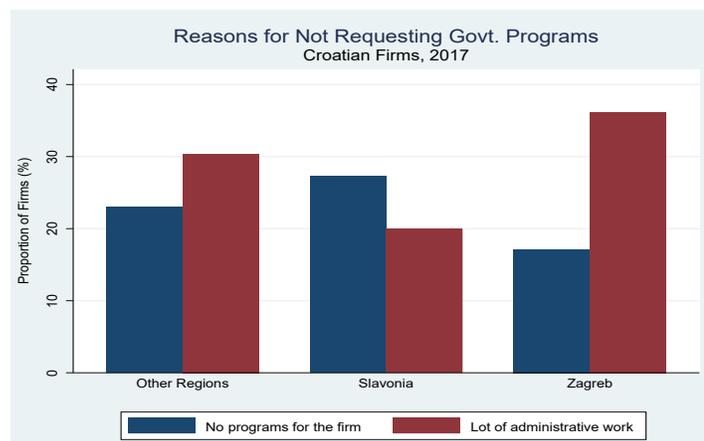
⁹ The survey asks firms to rank the top problems in their growth and operations. This does not necessarily imply that taxes, for example, vary sub-nationally but that firms in a given region perceive the noted problem as a bigger constraint.

Figure 8: Slavonian firms find high taxes and qualification of the workforce to be a major hurdle



With firms facing multiple constraints, there are several government programs that are available to help firms. In fact, of the 585 surveyed firms, nearly 59 percent of these firms have applied for some government program in the last three years, with the largest share being in Eastern Croatia (62 percent), relative to Zagreb (58 percent) and other regions (59 percent).¹⁰ Nonetheless, nearly 40 percent of the firms do not participate in government programs. Why? Among the programs that are available, a large share of firms in Eastern Croatia do not find it appropriate to their needs, while others find it administratively burdensome to fulfill the application requirements (Figure 9).

Figure 9: Customizing programs to firm's needs and reducing administrative burden may encourage participation in government programs



Section 3: Critical Firm Capabilities: Management in Focus

3.1 Why do we need a management survey?

Although managerial and organizational practices have been conceived to be critical in affecting firm outcomes since the time of Adam Smith's pin factory and Walker's 1887 paper on business performance, these practices are not well measured in administrative data on firms or the commercial data on companies' accounts. Some studies have used

¹⁰ The lowest participation rate was observed in Dalmatia (47 percent).

information on publicly traded firms to link managerial style of senior managers and company performance (e.g. Bertrand and Schoar, 2003). These data are rather limited to a country such as the United States, and there is evidence that suggests a company is far more than simply the identity of its most senior employee (Bender et al, 2015). Furthermore, this type of data on its own does not tell much about how firms are managed or organized. Therefore, over the last decade, Bloom and his co-authors have attempted to fill this gap in data by collecting comprehensive information on management practices (see Bloom et al., 2014).

In general, three broad management and organizational capabilities are generally recognized to be important for firm productivity (Bloom et al., 2016b): (i) performance monitoring: collecting and analyzing information, on daily activities of the firm for continuous improvement, (ii) target setting: using and stretching short and long run targets, tracking outcomes, and taking appropriate action, and (iii) performance incentives: rewarding high-performing employees, and retraining or moving underperformers and careful hiring. To collect information on these practices, two alternative strategies could be deployed: (i) Open-Ended questions (e.g. world management survey, WMS)¹¹ and (ii) Closed-Ended questions (e.g. Management and Organizational Practices Surveys, MOPS).¹² Table 2 summarizes the comparison of the two approaches on a number of dimensions.

Table 2 – Comparing open-ended versus closed-choice methods for collecting information on management practices

Aspect	Open (e.g. WMS)	Closed (e.g. MOPS)
Accuracy of responses	<u>High</u> : Interview format gives opportunity to probe and ask for examples. Possible to implement “double blind” method to reduce preconception bias.	<u>Medium</u> : Harder to elicit truthful answers if respondents have preconceptions. Greater risk that respondents might misinterpret questions or rush through the survey.
Cost per survey	<u>High</u> : High quality trained interviewers needed to run survey. Training includes one week initial training and ongoing debriefing and calibration. Interviewers’ time primarily spent recruiting managers to take part in the survey (rather than just running interviews).	<u>Low</u> : Initial design and execution costs, but this fixed cost can be spread over a very large number of respondents, so cost per survey is low. Costs can be higher in poorer countries where enumerators administer surveys onsite because of unreliable mail and e-mail networks.
Response rates	<u>Medium</u> : Interview is interactive and managers more engaged. We obtained an average response rate of 40%.	<u>High</u> : Co-operation with a National Statistics Agency can enable the survey to be mandatory. Given this response rates of around 80%. Without such co-operation, response rates will be low.
Replicability	<u>Medium</u> : Training needed to ensure the survey is delivered in same way. Useful to have some individuals who have worked in previous survey waves as trainers for other surveys foster comparability. Training and survey material is available on-line.	<u>High</u> : Questionnaire essentially the same across countries and already available pre-tested from by US Census Bureau.
International comparability	<u>High</u> : Multiple countries can be interviewed from same location. Using bilingual interviewers means makes it is easier to cross-check responses.	<u>Medium/High</u> : Easier to implement but there is a risk of differential interpretation if this is not carefully translated across languages.
Speed of delivery	<u>High</u> : Can complete a full survey wave in about 10 weeks. So including recruitment and set-up time possible to complete a survey wave from scratch in about 4 months.	<u>Medium</u> : Involves cooperation with national statistical agencies, so more planning work in advance. The survey period typically is around 3 months plus 1 to 3 months of data cleaning.

Source: Bloom et al. (2016b)

Being interactive in nature, WMS elicits better quality of responses, MOPS, on the other hand, is cheaper and scalable. Conducting WMS requires highly trained interviewers, which is expensive and often difficult to organize.

¹¹ Designing these surveys take some expertise in terms of selecting questions and response grids and hence intense training and monitoring of the interview team. The full questionnaire is available on www.worldmanagementsurvey.com.

¹² The full questionnaire is available on <http://bhs.econ.census.gov/bhs/mops/form.html>.

Based on Bloom and Van Reenen (2007), MOPS uses a multiple choice based evaluation tool that defines 16 key management practices in the above mentioned three areas –monitoring, setting targets and talent management. For each management practice, the responses are bounded by the choices in the questionnaire.

3.2 Sample and firm capabilities survey in Croatia

To collect data on managerial practices, we follow the exact questionnaire of management practices module of the MOPS framework for a survey in Croatia. The reason for replicating the MOPS framework is to maximize the comparability of firm management practices in Croatia to the United States¹³ and other countries where such a survey has been conducted (e.g. Russia and Mexico). In addition, we also included other modules on firm capabilities to collect more information on the drivers and consequences of structured management practices. The survey was targeted at company managers, who are senior enough to have an overview of management practices but not so senior as to be detached from day-to-day operations.

3.3 FINA as sampling frame and stratification

The sample was stratified according to the following characteristics:

- Sector:
 - (i) High-tech manufacturing (NACE codes: 20, 21, 26, 27, 28, 29, 30)
 - (ii) Low-tech manufacturing (NACE codes: 10, 11, 13, 14, 16, 17, 18, 22, 23, 25, 31, 32, 33)
 - (iii) Knowledge intensive services (NACE codes: 50, 58, 60, 61, 62, 63, 64, 66, 69, 70, 71, 72, 73, 74)
 - (iv) Non-knowledge intensive services (NACE codes: 45, 46, 47, 49, 52, 55, 56, 68, 79)
- Regions: Counties in Croatia are mapped to five broad regions. These include: (i) Zagreb and Zagreb county (ii) Northern Croatia (iii) Dalmatia (iv) Croatian Coast and Istria (v) Slavonia or Eastern Croatia. Below is the mapping of counties and Zagreb to the five regions.

<u>Zagreb</u>	<u>Slavonia</u>	<u>Dalmatia</u>
Zagreb	Virovitica-Podravina	Zadar
City of Zagreb	Požega-Slavonia	Šibenik-Knin
<u>Northern Croatia</u>	Slavonski Brod-Posavina	Split-Dalmatia
Krapina-Zagorje	Osijek-Baranja	Dubrovnik-Neretva
Varaždin	Vukovar-Sirmium	
Koprivnica-Križevci	<u>Croatian coastline and Istria</u>	
Bjelovar-Bilogora	Lika-Senj	
Međimurje	Primorje-Gorski kotar	
Sisak-Moslavina	Istria	
Karlovac		

Although firms were not stratified by size, the survey was conducted only for small and medium firms (10-250 employees in manufacturing and 6-250 in services).¹⁴ The rationale for the chosen size category is the following: For smaller firms, adopting identified areas of management practices, as measured by MOPS, does not make much sense. By comparison, for larger firms, the distinction between establishments becomes blurred. This is critical

¹³ MOPS is comprised of 36 multiple choice questions about the establishment. The survey is split in three broad sections: management practices (16 questions), organization (13 questions) and background characteristics (7 questions).

¹⁴ The distribution of services firms is comparable to that of manufacturing firms with 10 or more employees in terms of the sector's contribution to firm count, employment and sales when the lower threshold is set to 6 employees.

because performance information from the FINA database is available at the firm level, while for larger firms there may be vast differences in management scores across plants.

Of a total of 122,111, active firms recorded in FINA for the year 2017, a total of 13,905 firms meet the above criterion and have non-missing values of employment and sales such that a basic measure of firm performance, sales per employee, can be computed. The data on firm performance in Croatia are basic, substantially limiting the ability of researchers to apply the latest techniques for measuring and understanding firm productivity. These data sets allow for analysis of productivity using measures such as output per worker or TFP (e.g., using the Levinsohn and Petrin methodology). Due to unavailability of product-level price information by firms, total factor productivity (TFP) is often measured in revenue (known as TFPR) rather than quantity terms (known as TFPQ). This is not ideal because firms may charge higher prices—and therefore appear to be more productive in TFPR terms—for reasons that are unrelated to technical efficiency.¹⁵ Up to date, a total of 585 firms have been surveyed for which information is available. The information on the distribution of the surveyed firms is shown in table 3.

Table 3: Distribution of firm count by region and sector

Region	Services (by knowledge intensity)		Manufacturing (by technology intensity)		Total
	knowledge	Non-knowledge	High	Low	
Croatian coastline and Istria	34	26	12	30	102
Dalmatia	25	20	4	26	75
Northern Croatia	51	34	29	36	150
Slavonia	41	38	17	49	145
Zagreb	34	23	26	30	113
Total	185	141	88	171	585

3.4 Computing the management score

Firm responses to questions on managerial practices are aggregated into a single management score following Bloom et al. (2019a) in two steps. First, the responses to each of the management practice question are normalized on a 0-1 scale: the response which is associated with the most structured management practice is normalized to 1, and the one associated with the least structured is normalized to zero. More structured management practices are those that are more specific, formal, frequent or explicit.¹⁶ Second, the management score is calculated as the unweighted average of the normalized responses. Thus, the final score on a firm's management practice is scaled from 0 to 1. Firms with the extreme score 0 are those that selected the options that show little structure around performance monitoring, targets and incentives in the firm, while those with perfect score of 1 represent an establishment that selected the top category revealing an explicit focus on performance monitoring, detailed targets and strong performance incentives.

¹⁵ Foster et al. (2008) show that TFPR is positively correlated with TFPQ but confounds the “true” measure with idiosyncratic demand and factor prices effects. For a set of 11 highly homogeneous manufactured products in the United States (for example, ready-mixed concrete, raw cane sugar, boxes, and the like), the authors report a correlation of 0.75 between the two measures.

¹⁶ Some examples are in Bloom et al. (2019a) while detailed instructions for assigning scores are available on the US census website. Available on http://bhs.econ.census.gov/bhs/mops/SUR766_9.html.

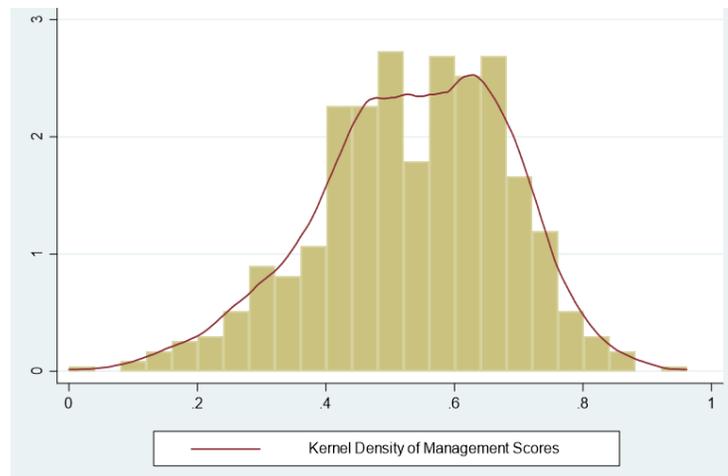
We also separate the overall management index into two sub-indexes separately assessing monitoring practices and practices relating to incentives and targets.

Section 4: Management in Croatia: Some descriptive results

4.1 Do firms in Croatia adopt structured management practices? How different are firms in Eastern Croatia?

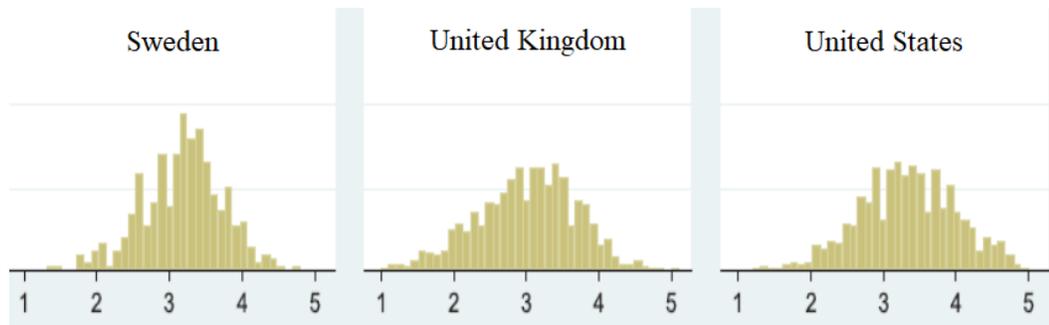
Similar to the findings in other countries such as Russia (Grover and Torre, 2019), and Mexico (Bloom et al., 2019b), adoption of structured management practices across Croatian firms is quite heterogeneous. The average management score for firms in Croatia was 0.535 – that is, on an average the surveyed firms adopted 54% of overall structured management practices (Figure 10a).¹⁷

Figure 10a: Croatia has a lot of badly managed firms, and fewer of the better managed ones, relative to advanced countries



Although the correlation between management scores collected via open-ended methodology, viz., WMS versus closed-ended questionnaire such as MOPS is positive but low, we present the results from WMS on the distribution of management scores in countries such as Sweden, the United Kingdom and the United States to contrast the thick left tail in Croatia (figure 10b).

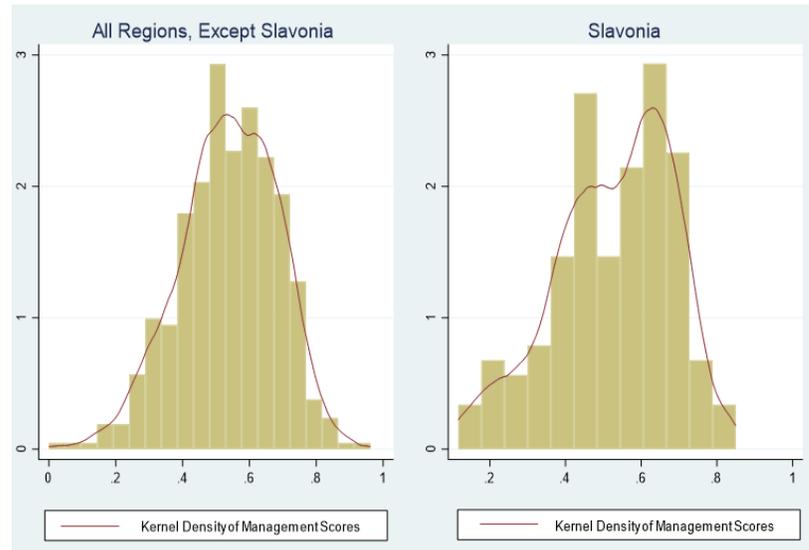
Figure 10b: Advanced countries have a large share of better managed firms and fewer of the poorly managed ones



¹⁷ Of the 585 manufacturing firms surveyed in the five regions in Croatia, all of them have more than 10 non-missing responses that allows for computing a more precise management score (Bloom et al., 2019a).

When comparing Eastern Croatia with the rest of Croatia, it also becomes apparent that the spread of management practices is large and more so for Slavonia (Figure 11). In particular, 42 percent of firms in Eastern Croatia score below 0.5, as compared to 38 percent in other regions in Croatia, while only 3.5 percent of these firms have a score over 0.75 relative to 6 percent in other regions of Croatia. By comparison, 18 percent of firms in the United States have a management score of over 0.75.¹⁸

Figure 11: Relative to other regions in Croatia, larger share of firms in Slavonia are poorly managed firms

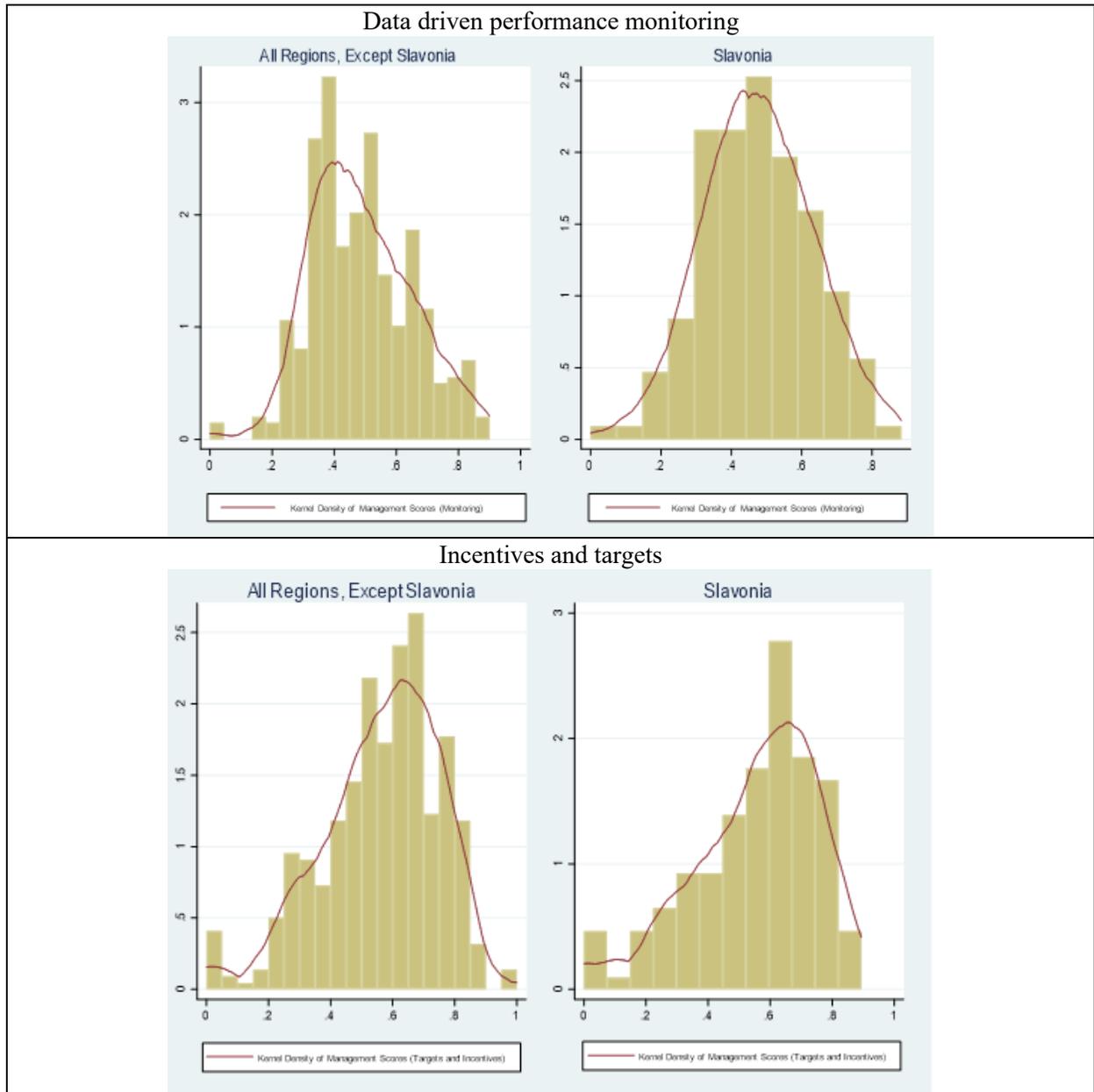


4.2 On which management practices is Slavonia doing better? Which practices are worse?

Although adoption of structured management practices relating to data driven performance monitoring is less popular among firms in Croatia, the problem is slightly more acute in Eastern Croatia, as is evident from the heavy left tail (Figure 12). Said differently, a higher proportion of firms in Slavonia score poorly on data-driven performance monitoring and on the use of incentives and targets than elsewhere in Croatia. In fact, 95.2 percent of Slavonian firms score less than 0.75 on data-driven performance monitoring, while this figure is 84 percent with respect to practices relating to incentives and targets. The figures are marginally better for other regions in Croatia, that is, 92 percent of firms in other regions have a management score on data-driven performance monitoring below 0.75, while this share is 83 percent with respect to the index on incentives and targets.

¹⁸ See detailed statistics presented in Annex table A.1a and A.1b. In particular, table A.1b presents the average score for each question.

Figure 12: Poor managerial practices in monitoring performance acute in Croatia, and more so in Slavonia



4.3 Which sectors have better management practices?

a. Manufacturing versus services

For both manufacturing and services, the mean management score for other regions is higher than that of Slavonia, but not significantly. Nonetheless, manufacturing firms are better managed than services firms, and significantly so. These differences are starker in Slavonia (Table 4).

Table 4: Relative to manufacturing, services in Croatia poorly managed and more so in Slavonia

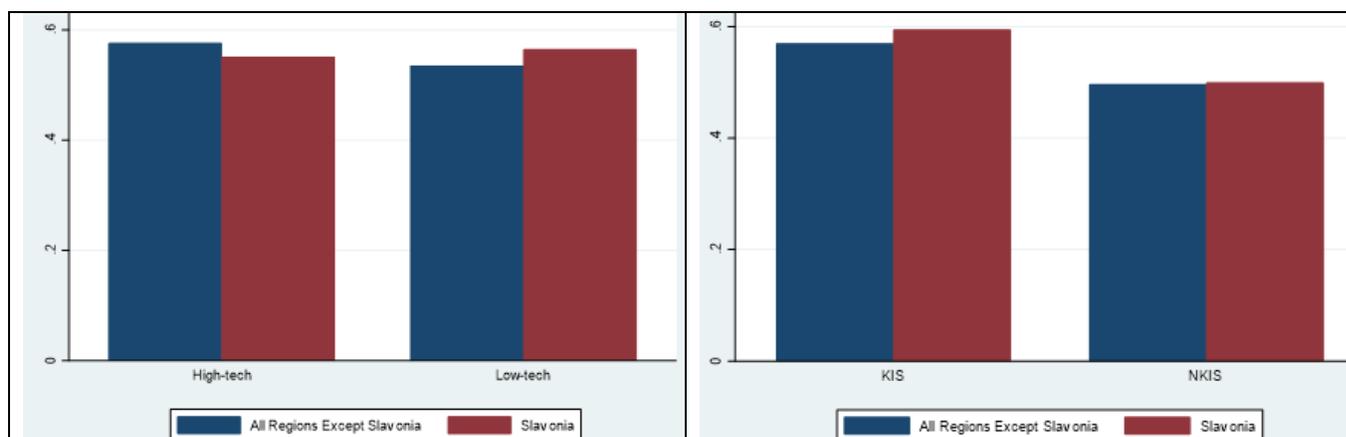
	Mean	Std. Dev.	p(5)	p(10)	p(50)	p(90)	p(95)	No of Obs (N)
<i>All Regions, Except Slavonia</i>								
Manufacturing	0.545	0.145	0.289	0.351	0.555	0.724	0.758	193
Services	0.532	0.149	0.278	0.326	0.538	0.712	0.750	247
<i>Slavonia</i>								
Manufacturing	0.535	0.165	0.217	0.306	0.565	0.706	0.774	66
Services	0.519	0.147	0.229	0.292	0.533	0.685	0.726	79

Notes: 'Management Score' is calculated following MOPS (See Bloom et al., 2018).

b. Technology and knowledge intensity

The average management score for firms in the low-technology sector in Slavonia is similar to that in the rest of Croatia.¹⁹ By comparison, an average Slavonian firm in the high-technology sector has a 7% lower management score than that of firms in other regions (Figure 13, left panel). Firms in non-knowledge intensive services are poorly managed relative to those in knowledge intensive services. Management capabilities within services are similar across regions, with firms in Eastern Croatia not necessarily being any worse than those in other parts of the country (Figure 13, right panel).²⁰

Figure 13: High-tech manufacturing in other Croatian regions better managed, while not so in Slavonia



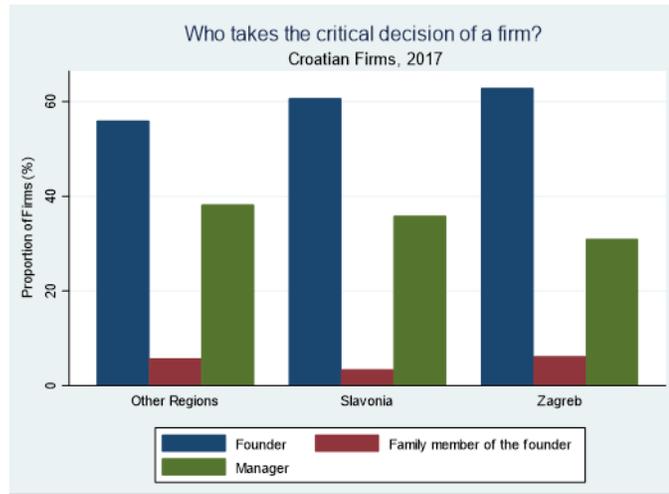
c. By ownership

In general, firms are overwhelmingly run and controlled by founders or family members of the founders (Figure 14b). This is true not only Eastern Croatia but also for Zagreb; in fact, this share is higher for firms in Zagreb. The fact that critical decisions are made by founders or family members rather than profit maximizing managers has implications on the quality of management practices adopted by firms.

¹⁹ In fact, the management score is marginally higher, although this difference is not statistically significant.

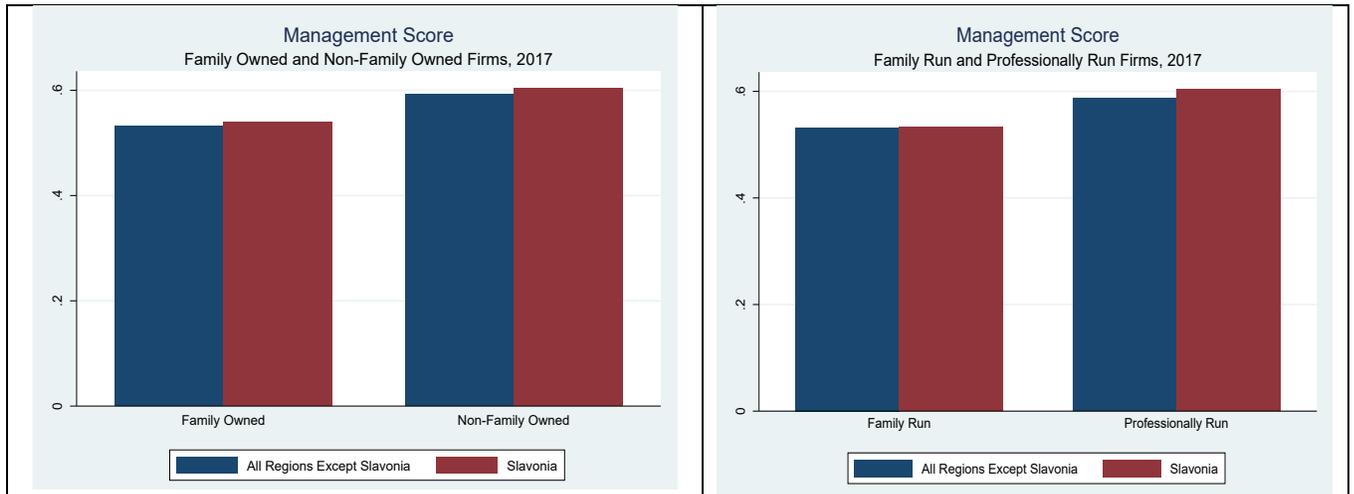
²⁰ See Annex Table A.2.

Figure 14a: Most firms in Croatia are run by founders or their family members



In manufacturing, family owned firms have lower management capabilities and this difference between family owned and non-family owned is larger in Slavonia. Professionally run firms are better managed in general and more so in Slavonia (Figure 14b).²¹

Figure 14b: Relative to family firms, professionally run firms are better managed and more so in Slavonia



d. Across regions

Management practices are higher in the case of Zagreb and lowest for Northern Croatia. Slavonia and Croatian Coastline have similar median scores for management practices (Figure 15). This may be driven by selection bias across regions, which will be evaluated in the follow-up report.

²¹ Annex Table A.3 shows results on services, where relative to family owned/run firms, the ones that are owned/run professionally are not better managed in all regions, including Slavonia.

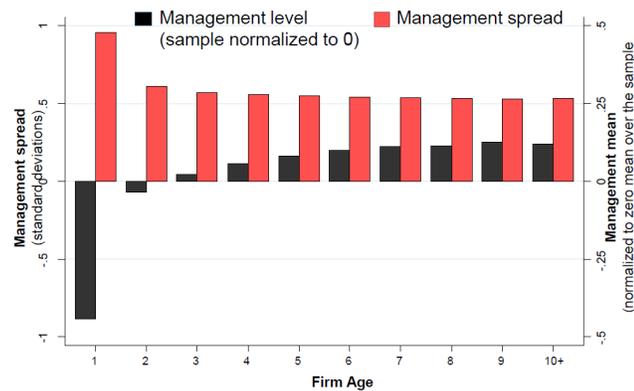
Figure 15: Firms in Zagreb are better managed but some regions similar to Slavonia



e. Age

In the case of the United States, Bloom et al. (2014) show that firms’ management score rises with age, as poorly managed firms either improve or exit the market. Over time, this leads the dispersion of management practices to fall within any age cohort, because of the exit of poorly managed firms (Figure 16). By comparison, firms in Croatia and in Eastern Croatia do not seem to improve their management capabilities as they age. In fact, the average management score of older firms in Eastern Croatia (and in other regions of Croatia) is lower than those of young ones (Figure 17).

Figure 16: In the US, firms’ management score rises with age and spread falls



Notes: Plots ln(management) scores weighted by age. Results from simulating 5,000 firms per year in the steady state taking the last 10 years of data and defining age based on the number of observed years. Management normalized to zero on the sample. Replication file on <http://web.stanford.edu/~nbloom/MAT.zip>

Figure 17: In Croatia and in Slavonia, firms' management score falls with age



f. Size

In the United States, Bloom et al. (2014) show that better managed firms are significantly larger than poorly managed firms: In the United States, their work shows that a one standard deviation of management is associated with a 40 log point increase in employment size. We find similar results in Croatia and in Slavonia, where firm size is significant and positively correlated with management score.

Figure 18: In Croatia and in Slavonia, firms' management score rises with size

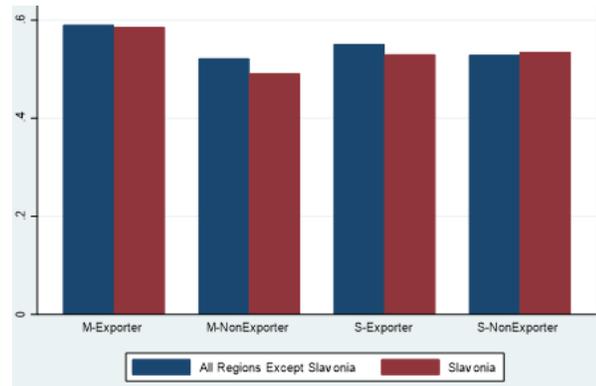


g. Exporters

In manufacturing, the exporters have adopted significantly higher management practices, especially in Slavonia. On average, an exporter in Slavonia has adopted 60% of the management practices, whereas a non-exporter has only 51%. However, in the case of services, the difference is not very clear whether exporters are better managed, especially in Slavonia (Figure 19).²²

²² See Annex Table A.4 for detailed results.

Figure 19: Exporters are better managed, in both Croatia and Slavonia



Section 5: Do management capabilities matter for firm performance?

Differences in management practices are meaningful, from an economy-wide point view, insofar as they make a difference on firm performance. Recent evidence in countries such as the United States, Russia and Mexico has established that management practices are tightly linked to firm performance in these countries, it is therefore imperative to explore such a connection in the context of Croatia as well.

The introduction to this paper motivates the analysis by plotting the unconditional correlations of firm performance measures such as sales per employee, innovation, and technology adoption by each quartile of management scores. Relative to other firms, those in the 3rd and 4th quartiles of the management score distribution are more likely to be the ones which have higher sales per employee, a greater likelihood of introducing new products/processes and also adopting more sophisticated technology. While many of these results are crucial for manufacturing firms, services firms do not seem to respond, at least in an unconditional setting. This section analyzes the relationship between management and firm performance measures in a more robust way, controlling for observable firm characteristics as well as sector and region dummies. For simplicity, we present the most interesting results using rope ladder plots in Figure 20 and relegate detailed regression tables to the Annex.

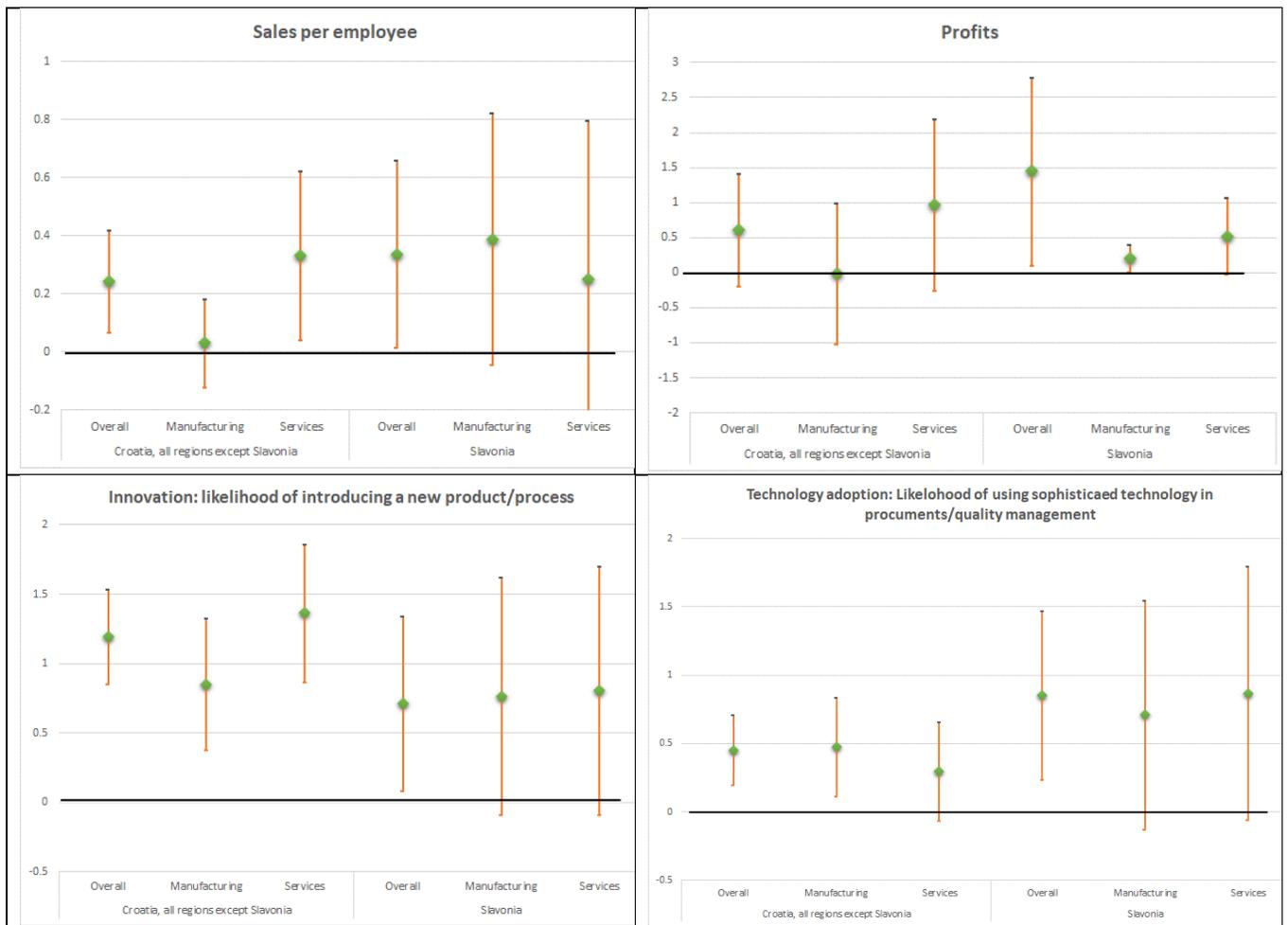
Estimates of a regression of sales per employee in all regions, excluding Eastern Croatia, suggest that the management score is positively and significantly correlated with firm performance (Figure 20, top left panel). If management capabilities improve by magnitudes similar to that experienced in a field experiment on firms in India (that is, about 38 percent, see Bloom et al., 2013, we call this change a realistic improvement in management capabilities expected in a 12-month period), the associated increase in sales per employee will be around 21 percent (Tables A.5). The positive and significant association of management with firm sales per employee holds for services (and less so for manufacturing) in all regions other than Eastern Croatia. These results hold for a range of specifications and firm controls, and also when including region and sector fixed effects.

For Slavonia the relationship between management and sales per employee is not significant, unconditionally. However, in a regression that controls for firm's input intensities, that is, when comparing firms that are similar in their production technique, we find management capabilities to have a significant association with sales per employee (Figure 20, top left panel). With these conditional estimates, a realistic improvement in management score by 38 percent is associated with an increase in sales per employee by 7 percent in Slavonia as compared to 5 percent in the rest of Croatia (Tables A.5).

With respect to other measures of firm performance, similar positive association is observed in both Eastern Croatia as well as in other regions. For example, a realistic improvement in management score by 38 percent is expected to increase profits by 12 percent in Slavonia in a setting that only controls for industry fixed effects, while in a

conditional specification controlling for firm size and input intensity this increase is 7 percent. Management capabilities of a firm is strongly and positively correlated with the probability of innovation and adoption of sophisticated technology. The result is true for Eastern Croatia as well as other regions except Eastern Croatia. In a conditional regression controlling for firm and industry factors, a realistic improvement in management score by 38 percent is associated with a 14 percent higher probability for an average firm in Slavonia to introduce new products or processes, register for patents and 17 percent greater likelihood for an average firm to adopt more sophisticated technology, (e.g. for quality control). The analogous associated increase in all other regions is 13 percent in profits, 5 percent in sales per employee, while the probability of innovating and adopting more sophisticated technology increases by 24 and 9 percent respectively.

Figure 20: Management capabilities tightly linked to firm performance, for all regions of Croatia, including Slavonia

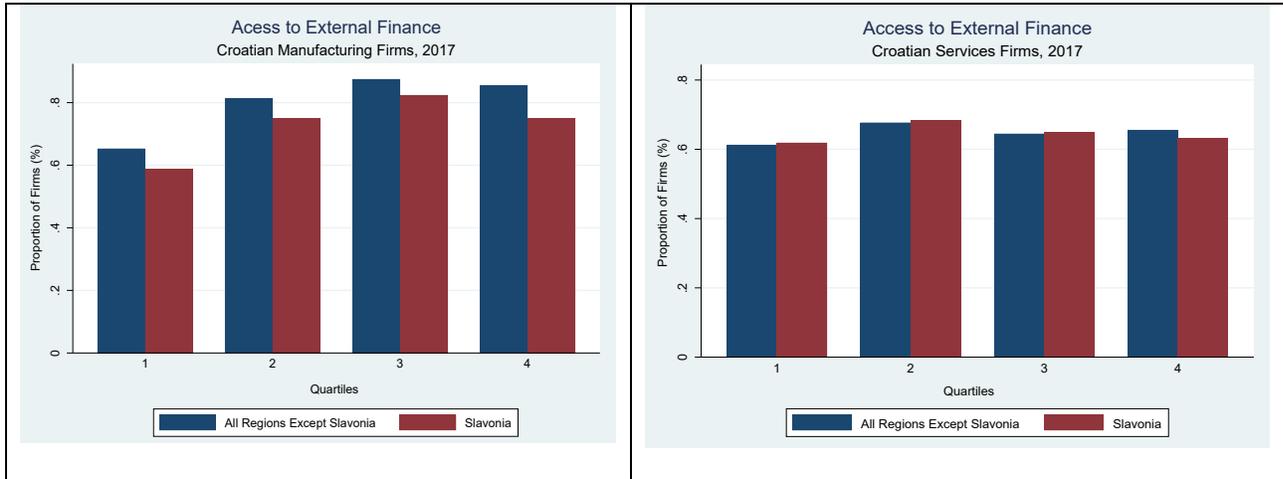


Notes: The figure is a rope-ladder representation of estimated coefficients and 90 percent confidence bands from regressions of the observed firm performance measure on management score controlling for employment, intensity of inputs used, exporter status, education of the managers, sector and region fixed effects. Estimates are presented separately for all regions in Croatia, excluding Slavonia. Within these regional categories, estimations are run for the full sample, and then separately for manufacturing and services.

Besides innovation and technology adoption, management practices may also be associated with a greater likelihood of accessing external finance. As banks evaluate firms before lending, better managed firms are likely to stand out in their potential to achieve their proposed business plans and hence have a greater probability of gaining access to bank loans, grants, equity or other forms of borrowing from formal credit markets, relative to badly managed firms

(Figure 21). These descriptive results also hold in a regression framework that accounts for firms' regions, sectors and other firm traits (Annex Table A.5), which suggests that better managed firms have a higher probability of accessing external finance, and more so in manufacturing (relative to services) and importantly, this distinction is clearly more visible in Slavonia. This result does not seem to hold for firms in services sectors.

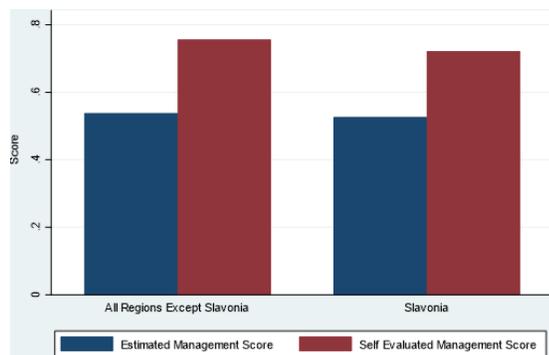
Figure 21: Better management is associated with greater likelihood of access to external finance



Section 6: Why don't firms adopt better management? And what drives firm-level differences in management practices?

If management matters for firm performance, then why don't firms adopt better management practices? Our survey also includes a question relating to the firm's own perception of its management practices, which was originally a part of WMS survey questionnaire. More specifically, we ask the following question: "Excluding yourself, how well managed is your firm on a scale of 1 to 10, where 1 is worst practice, 10 is best practice and 5 is average?" Prior studies using WMS data that compared self-perception of management capabilities with the objective management score found a huge divergence between observed management capabilities and perceived one. In line with these findings, we uncover that firms in Croatia also have a higher perception on their management practices (Figure 22). Given that firms do not realize that there is a problem with respect to their management practices, it does not get the required attention. Our survey objectively measures management capabilities among firms, and also provides an understanding of the capabilities in which these firms are weak.

Figure 22: Firms perceive their management to be better than it actually is



The realization that firms in Croatia and particularly those in services sector (non-knowledge intensive services, specifically for Eastern Croatia) are far from the frontier in adoption of structured management practices, what can we really do about this? Next, we analyze the factors that matter for management capabilities, with the objective of building on these capabilities to bridge the gap in firm upgrading.

Firm characteristics play a key role in explaining variations in management score. Annex Tables A.6 presents the detailed regression results for all regions, excluding Slavonia, and Slavonia. In Figure 23 we present rope ladder plots from the specification including all controls and fixed effects, for all sectors, top panel, and for manufacturing (bottom, left panel) and services (bottom, right panel). *First*, both unconditional and conditional correlations suggest that, in line with prior studies, firm size plays a key role in adoption of management practices. This is true for both regions excluding Slavonia and Slavonia, especially for manufacturing industries. Doubling the firm size is associated with an increase in the management score of about 0.1. The significance of the relationship between firm size and management score in Slavonia is mainly driven by mainly the manufacturing sector, while this relationship is insignificant in services. This implies that management capabilities are weaker for services sector across all the range of the size of distribution. Although it is true that management practices are crucial for the performance of medium and large firms, the link of management with performance usually extends throughout the size distribution in the United States and Mexico (Bloom et al., 2019a; 2019b).²³

Second, in Croatia age is negatively correlated with management score. Adoption of structured management practices are lower among older firms. Following similar analysis in Bloom et al. (2019b) on Mexico and the work of Hsieh and Klenow (2014) regarding the life cycle of firms, this finding appears to be indicative of poor allocative efficiency among firms in Croatia where clearly, market selection is not operating perhaps due to the lack of pro-competitive conditions, especially in services. Nevertheless, the finding in Croatia is somewhat similar to that in Russia, where firms also do not improve with age (Grover and Torre), although in Croatia it is very clear that this negative association is driven by the services sector.

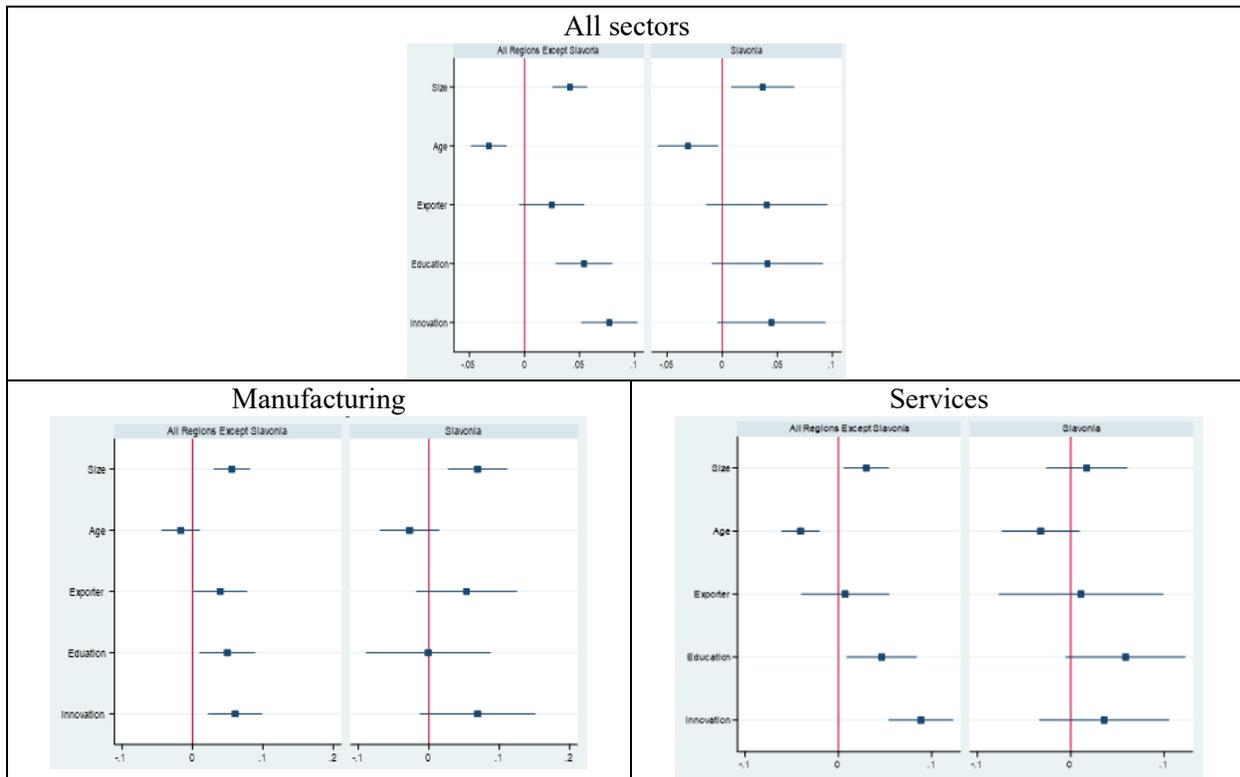
Third, exporters have higher scores in adopting structured management practices, and significantly so in manufacturing. More precisely, the management score of a manufacturing exporter in Croatia is likely to be higher by 8 percent than an average firm. The fact that this result is mainly driven by high-tech manufacturing exporters in regions other than Croatia, where management score is likely to be 16 percent higher, points to the potential for improving management capabilities among other firms and sectors. In Eastern Croatia, this relationship between exporting and higher managerial capabilities is not significant even for manufacturing. To design interventions for improving management capabilities in Eastern Croatia, it may be crucial to examine the export composition and destination markets for firms in Slavonia and more specifically in understanding why exporters do not find it worthwhile to improve management capabilities.

Fourth, firms with more than 20% of their employees having a college degree are more likely to adopt structured management practices. Education of employees matters for managerial score in all regions except in Slavonia. This is a surprising finding and may need to be explored further. It may perhaps be related to the quality of education among workers in Slavonian firms.²⁴

²³ In Bloom et al. (2019b), only four questions from the U.S. MOPS were selected for microenterprises. The correlation between the management score calculated with this subsample of questions and the overall management score for SMEs and large firms is 0.86, indicating that this short score is a good measure of management practices. This result is similar to McKenzie and Woodruff (2017) who find an important role for management in micro-firms in developing countries.

²⁴ As annex table A.6 shows, the overall explanatory power of firm characteristics in explaining the management score is still quite limited: the most complete specification (column 8) explains only 21% of the overall variation in the management score, implying that nearly 80% of the variation in management practices is explained by idiosyncratic, firm-specific factors.

Figure 23: Larger firms and those with more educated workers have better management



Section 7: Policy conclusions and discussion

This paper presents novel evidence on managerial capabilities of firms in Croatia, and more critically compares Slavonia with other regions within the country and beyond. Early survey results from nearly 600 firms stratified by five regions and four broad sectors suggest that: *first*, an average firm in all regions in Croatia, excluding Slavonia, has a score of 0.538 on structured management practices, while this score for Slavonia is 0.526. Although this score is higher than that observed in Mexico, it is farther from the frontier, United States (0.615). *Second*, the weaknesses in management practices particularly relating to data driven performance monitoring pull down the overall score in Croatia, and more so in Slavonia. *Third*, there is much heterogeneity in adoption of structured management practices among firms in Croatia and more so in Eastern Croatia. As in Russia and Mexico, the distribution of the management score among firms in Croatia and Slavonia has a thick left tail, implying that a large share of firms in Croatia and these countries are badly managed, when compared with advanced countries such as Sweden, the United Kingdom and the United States. *Fourth*, the management score is lower for services relative to manufacturing, implying that there is much potential to improve the management among services firms, especially those in non-knowledge intensive services in Slavonia.

Fifth, our work confirms that better management practices is associated with superior firm performance. Firms with more structured management practices have higher sales per employee, profitability, are more innovative and more likely to adopt sophisticated technology. The tight link between management and firm performance is validated not only for other regions in Croatia but also for Slavonia. This result is highly robust to numerous checks and controls as well as varying measures of firm performance.

Finally, while explaining the differences in management practice across firms, it becomes apparent that among the firm characteristics that explain at least a portion of the variation in management practices, firm size, foreign linkages

and the education level of non-managers are the most relevant. Surprisingly firm age is negatively associated with better management practices, especially in services. This implies that, unlike in the United States and Mexico, firms do not learn to be better managed as they age. Thus, it is possible that a lack of pro-competitive forces in Croatia and more so in the services sectors does not promote learning and possibly hinders market selection. Equally important in explaining the lack of upgrading among firms is the finding that firms do not realize that there is a problem with respect to their management practices. Firms in Eastern Croatia and in the rest of the regions perceive their management quality to be much higher than it actually is and hence do not feel the need to improve it.

Following the ABC framework for firm growth proposed in Grover, Medvedev and Olafsen (2019),²⁵ we make the following recommendations for enhancing productivity and business dynamics in Eastern Croatia and other regions in the country:

1. **Allocative efficiency:** The fact that management capabilities are negatively associated with firm age is an indication of a lack of a learning and selection mechanism operating in Croatia, especially in the services sector. Policies to support healthy business dynamics need to establish the basic enabling conditions: facilitate reallocation of resources (e.g., labor, capital, land) across firms, and ease the business environment for entry and exit of firms. Such policies will increase competition and the market will ensure that firms are motivated to upgrade and invest in their capabilities.
2. **Business-to-business linkages:** Our paper finds that firms with foreign linkages, that is, exporters, are more likely to be better managed. In this context, policies to connect firms to export markets can encourage learning and hence better management practices. Such firms are more likely to engage in quality upgrading, leading to higher productivity and firm growth. The finding that such a link does not exist for Slavonia is surprising and is at odds with the existing literature. Thus, a more detailed analysis of the product composition and destination markets of exporters in Slavonia may be warranted.
3. **Capabilities of firms:** More critically, our work confirms the tight association of managerial capabilities with firm performance for firms in Croatia as well as Slavonia. Management matters not only for productivity, but also for profits and innovation. Thus, firms in Croatia and also more so in Slavonia are more likely to benefit from training on structured management relating to these practices.

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²⁵ This framework proposes that policies for improving firm dynamism and supporting job creation should steer away from picking potential winners and focus on improving Allocative efficiency, strengthening Business-to-business spillovers, and building firm Capabilities. These policies rely on encouraging innovation, network and agglomeration economies, global linkages, worker skills and managerial capabilities, and financial development to rebalance growth/productivity policies.

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Annex

Table A.1a – Management Score Across Croatia

	Mean	Std. Dev.	p(5)	p(10)	p(50)	p(90)	p(95)	No of Obs (N)
<i>All Regions, Except Slavonia</i>								
Management Score	0.538	0.147	0.285	0.338	0.542	0.717	0.756	440
Monitoring	0.487	0.163	0.267	0.300	0.467	0.717	0.775	440
Targets and Incentives	0.562	0.190	0.226	0.295	0.589	0.787	0.814	440
<i>Slavonia</i>								
Management Score	0.526	0.155	0.222	0.306	0.557	0.690	0.737	145
Monitoring	0.475	0.157	0.233	0.283	0.467	0.667	0.733	145
Targets and Incentives	0.551	0.203	0.179	0.286	0.596	0.781	0.813	145

Notes: 'Management Score' is calculated following MOPS (See Bloom et al., 2018). 'Monitoring' includes responses from Questions 21-25, whereas 'Targets and Incentives' includes responses from Questions 26-35.

Table A.1b – Score by all dimensions of structured management

		All Regions Except Slavonia	Slavonia	Difference
		(1)	(2)	(3)
1	What happens when a problem arise?	0.753 (0.255)	0.717 (0.264)	0.036
2	# of key performance indicators (KPI)	0.559 (0.257)	0.588 (0.285)	-0.029
3	Frequently KPI reviewed by managers	0.569 (0.202)	0.524 (0.203)	0.045
4	Frequently KPI reviewed by non-managers	0.359 (0.323)	0.356 (0.306)	0.003
5	Display boards location	0.205 (0.344)	0.197 (0.329)	0.008
6	Time frame of operational targets	0.857 (0.279)	0.828 (0.286)	0.029
7	Difficulty to achieve operational target	0.710 (0.318)	0.714 (0.332)	-0.004
8	Awareness of operational targets	0.244 (0.254)	0.281 (0.266)	-0.037
9	What are non-managers' bonus based on?	0.499 (0.419)	0.471 (0.432)	0.028
10	Percent of non-managers receiving bonuses	0.695 (0.284)	0.718 (0.289)	-0.023
11	What are managers' bonus based on?	0.415 (0.413)	0.345 (0.410)	0.070
12	Percent of managers receiving bonuses	0.743 (0.300)	0.776 (0.288)	-0.033
13	Criteria for non-managers' promotion	0.687 (0.435)	0.699 (0.438)	-0.012
14	Criteria for managers' promotion	0.511 (0.485)	0.545 (0.486)	-0.034
15	When is under-performing non-manager reassigned or dismissed?	0.182 (0.357)	0.172 (0.340)	0.010

Notes: 'Management Score' is calculated following MOPS (See Bloom et al., 2018). The table compares the average score for each of the 15 questions that are used to compute the management score between All Regions in Croatia except Slavonia and Slavonia. Standard deviations included in parentheses. Column (3) is the point difference of Column (1) and Column (2).

Table A.2 – Management Score by technology and knowledge intensity of sectors

	Mean	Std. Dev.	p(5)	p(10)	p(50)	p(90)	p(95)	No of Obs (N)
<i>All Regions, Except Slavonia</i>								
High Technology	0.560	0.124	0.361	0.403	0.576	0.709	0.741	71
Low Technology	0.536	0.155	0.285	0.314	0.535	0.741	0.768	122
<i>Slavonia</i>								
High Technology	0.523	0.193	0.183	0.217	0.551	0.799	0.850	17
Low Technology	0.539	0.157	0.222	0.326	0.565	0.696	0.768	49

Notes: 'Management Score' is calculated following MOPS (See Bloom et al., 2018). 'High Technology' and 'Low Technology' sectors are as defined by EUROSTAT indicators based on NACE Rev. 2.

	Mean	Std. Dev.	p(5)	p(10)	p(50)	p(90)	p(95)	No of Obs (N)
<i>All Regions, Except Slavonia</i>								
Knowledge Intensive	0.552	0.139	0.326	0.370	0.570	0.717	0.750	144
Not-Knowledge Intensive	0.504	0.158	0.215	0.285	0.497	0.699	0.738	103
<i>Slavonia</i>								
Knowledge Intensive	0.537	0.153	0.281	0.333	0.595	0.690	0.737	41
Not-Knowledge Intensive	0.501	0.141	0.229	0.264	0.500	0.673	0.687	38

Notes: 'Management Score' is calculated following MOPS (See Bloom et al., 2018). 'Knowledge Intensive' and 'No-Knowledge Intensive' services are as defined by EUROSTAT indicators based on NACE Rev. 2.

Table A.3: Management score by ownership type in manufacturing and services

	Mean	Std. Dev.	p(5)	p(10)	p(50)	p(90)	p(95)	No of Obs (N)
<i>Manufacturing - All Regions, Except Slavonia</i>								
Family-Owned	0.535	0.153	0.285	0.314	0.532	0.724	0.758	153
Non Family-Owned	0.582	0.101	0.417	0.438	0.593	0.707	0.749	40
<i>Manufacturing - Slavonia</i>								
Family-Owned	0.523	0.164	0.217	0.264	0.539	0.705	0.768	49
Non Family-Owned	0.567	0.169	0.183	0.306	0.604	0.774	0.799	17
<i>Manufacturing - All Regions, Except Slavonia</i>								
Family Run	0.538	0.146	0.289	0.339	0.532	0.724	0.758	110
Professionally Run	0.554	0.143	0.303	0.354	0.587	0.709	0.756	83
<i>Manufacturing - Slavonia</i>								
Family Run	0.511	0.173	0.217	0.222	0.533	0.706	0.819	39
Professionally Run	0.569	0.149	0.306	0.361	0.604	0.737	0.774	27

	Mean	Std. Dev.	p(5)	p(10)	p(50)	p(90)	p(95)	No of Obs (N)
<i>Services - All Regions, Except Slavonia</i>								
Family-Owned	0.535	0.155	0.265	0.326	0.537	0.718	0.768	178
Non Family-Owned	0.524	0.131	0.285	0.344	0.538	0.695	0.725	69
<i>Services - Slavonia</i>								
Family-Owned	0.524	0.143	0.250	0.292	0.536	0.685	0.726	55
Non Family-Owned	0.509	0.160	0.148	0.318	0.520	0.667	0.696	24
<i>Services - All Regions, Except Slavonia</i>								
Family Run	0.540	0.155	0.269	0.326	0.551	0.718	0.768	141
Professionally Run	0.521	0.140	0.285	0.336	0.515	0.695	0.725	106
<i>Services - Slavonia</i>								
Family Run	0.534	0.134	0.281	0.361	0.557	0.687	0.726	45
Professionally Run	0.500	0.163	0.148	0.229	0.503	0.660	0.696	34

Notes: 'Management Score' is calculated following MOPS (See Bloom et al., 2018). 'Family-Owned' is a firm, where the majority of the shares are held by the founder and/or family member of the founder. 'Non Family-Owned' is a firm where it is owned by anybody else (where the majority of the shares are held by private individuals, managers, dispersed shareholders, private capital or risk capital, etc. and run by managers). 'Family Run' is a firm, where it is run by the founder or a family member of the founder. 'Professionally Run' is a firm where it is run by other than the founder and/or family member of the founder.

Table A.4: Management score by export status

	Mean	Std. Dev.	p(5)	p(10)	p(50)	p(90)	p(95)	No of Obs (N)
<i>Manufacturing - All Regions, Except Slavonia</i>								
Exporter	0.573	0.125	0.300	0.403	0.590	0.724	0.750	75
Non-Exporter	0.527	0.153	0.285	0.314	0.522	0.741	0.768	118
<i>Manufacturing - Slavonia</i>								
Exporter	0.591	0.110	0.375	0.424	0.586	0.700	0.752	20
Non-Exporter	0.510	0.180	0.217	0.222	0.491	0.737	0.774	46
<i>Services - All Regions, Except Slavonia</i>								
Exporter	0.539	0.169	0.183	0.311	0.551	0.717	0.840	55
Non-Exporter	0.530	0.143	0.278	0.336	0.529	0.699	0.744	192
<i>Services - Slavonia</i>								
Exporter	0.516	0.160	0.148	0.281	0.530	0.737	0.738	19
Non-Exporter	0.520	0.145	0.240	0.313	0.535	0.679	0.693	60

Notes: 'Management Score' is calculated following MOPS (See Bloom et al., 2018).

Table A.5: Management and firm performance

	Sales Per Employee													
	All Regions Except Slavonia							Slavonia						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
MScore	1.044 ^a (0.340)		0.818 ^a (0.214)	0.272 ^b (0.109)	0.869 ^a (0.226)	1.143 ^a (0.306)	0.243 ^b (0.107)	0.585 (0.429)		0.328 (0.441)	0.347 ^c (0.193)	0.575 (0.422)	0.462 (0.303)	0.338 ^c (0.197)
MScore _{Z-Score}		0.153 ^a (0.033)							0.091 (0.067)					
Log(Age)			0.006 (0.049)							0.031 (0.077)				
Log(Employees)			0.105 ^b (0.051)	0.051 (0.037)			0.062 ^c (0.038)			0.217 ^a (0.071)	0.101 ^b (0.042)			0.104 ^b (0.041)
Log(Cap/Employees)				0.039 ^a (0.013)			0.034 ^a (0.013)				0.028 (0.019)			0.028 (0.019)
Log(Mat/Employees)				0.587 ^a (0.052)			0.579 ^a (0.053)				0.604 ^a (0.061)			0.601 ^a (0.062)
D _{HighEdu}					0.398 ^a (0.096)		0.142 ^a (0.033)					0.173 (0.173)		0.102 ^c (0.063)
MScore*D _{Exporter}						-0.409 (0.443)								0.372 (0.972)
D _{Exporter}						0.302 (0.233)								-0.061 (0.532)
R-Square	0.38	0.38	0.40	0.86	0.42	0.38	0.86	0.51	0.51	0.55	0.90	0.51	0.51	0.70
N	440	440	438	439	440	440	439	145	145	144	144	145	145	144
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes						

Notes: Columns (1) – (14) use sales per employee of a firm as the dependent variable. 'MScore' is the management score of a firm as calculated following Bloom et al. (2018). 'MScore_{Z-Score}' is the z-score of management scores. 'Age' is the age of a firm. 'Employees' is the total employees of a firm. 'Cap/Employees' is the capital per employee of a firm. We use fixed assets of a firm as an indicator for capital. 'Mat/Employees' is the per employee materials consumed by a firm. 'D_{HighEdu}' takes a value 1 if more than 20% workers of a firm have a higher education degree. 'D_{Exporter}' is an exporter dummy. It takes a value 1 for a firm being an exporter in 2017. Robust standard errors corrected for clustering at the sector-region level are in the parenthesis. Intercepts included but not reported. ^{c, b, a} denotes 10%, 5% and 1% level of significance, respectively.

	Sales Per Employee					
	All Regions Except Slavonia			Slavonia		
	Manu- facturing		Services	Manu- facturing		Services
(1)	(2)	(3)	(4)	(5)	(6)	
MScore	0.243 ^b (0.107)	0.032 (0.093)	0.333 ^c (0.175)	0.338 ^c (0.197)	0.390 (0.264)	0.250 (0.334)
Log(Employees)	0.062 ^c (0.035)	0.001 (0.022)	0.119 ^c (0.063)	0.104 ^b (0.041)	0.097 (0.071)	0.123 ^b (0.052)
Log(Cap/Employees)	0.034 ^a (0.013)	0.054 ^a (0.015)	0.027 (0.018)	0.028 (0.019)	0.032 (0.033)	0.022 (0.023)
Log(Mat/Employees)	0.579 ^a (0.053)	0.668 ^a (0.026)	0.529 ^a (0.072)	0.601 ^a (0.062)	0.510 ^a (0.094)	0.693 ^a (0.081)
<i>D_{HighEdu}</i>	0.142 ^a (0.053)	0.015 (0.034)	0.262 ^a (0.082)	0.102 ^c (0.065)	0.190 ^c (0.098)	0.097 (0.104)
R-Square	0.86	0.93	0.84	0.70	0.88	0.92
N	439	193	246	144	65	79
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) – (6) use sales per employee of a firm as the dependent variable. ‘MScore’ is the management score of a firm as calculated following Bloom et al. (2018). ‘Employees’ is the total employees of a firm. ‘Cap/Employees’ is the capital per employee of a firm. We use fixed assets of a firm as an indicator for capital. ‘Mat/Employees’ is the per employee materials consumed by a firm. ‘*D_{HighEdu}*’ takes a value 1 if more than 20% workers of a firm have a higher education degree. Robust standard errors corrected for clustering at the firm level are in the parenthesis. Intercepts included but not reported. ^{c, b, a} denotes 10%, 5% and 1% level of significance, respectively.

	Profit Margin					
	All Regions Except Slavonia			Slavonia		
	Manu- facturing		Services	Manu- facturing		Services
(1)	(2)	(3)	(4)	(5)	(6)	
MScore	0.613 (0.492)	0.041 (0.093)	0.062 (0.102)	0.369 ^b (0.183)	0.201 ^c (0.119)	0.522 (0.333)
Log(Employees)	-0.065 (0.109)	-0.009 (0.032)	-0.027 (0.022)	0.013 (0.028)	0.019 (0.048)	0.016 (0.032)
Log(Cap/Employees)	0.035 (0.053)	-0.017 (0.025)	-0.007 (0.017)	-0.006 (0.014)	-0.020 (0.019)	0.008 (0.019)
<i>D_{HighEdu}</i>	-0.197 (0.194)	-0.067 ^b (0.029)	-0.025 (0.039)	0.101 ^c (0.064)	0.019 (0.047)	0.165 (0.117)
R-Square	0.25	0.08	0.17	0.57	0.44	0.61
N	320	193	247	145	66	79
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) – (6) use profit margin of a firm as the dependent variable. ‘MScore’ is the management score of a firm as calculated following Bloom et al. (2018). ‘Employees’ is the total employees of a firm. ‘Cap/Employees’ is the capital per employee of a firm. We use fixed assets of a firm as an indicator for capital. ‘Mat/Employees’ is the per employee materials consumed by a firm. ‘*D_{HighEdu}*’ takes a value 1 if more than 20% workers of a firm have a higher education degree. Robust standard errors corrected for clustering at the firm level are in the parenthesis. Intercepts included but not reported. ^{c, b, a} denotes 10%, 5% and 1% level of significance, respectively.

	Innovation						Technology Adoption					
	All Regions Except Slavonia			Slavonia			All Regions Except Slavonia			Slavonia		
	Manu- facturing		Services	Manu- facturing		Services	Manu- facturing		Services	Manu- facturing		Services
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
MScore	1.194 ^a (0.207)	0.851 ^a (0.289)	1.365 ^a (0.302)	0.715 ^c (0.353)	0.766 (0.521)	0.805 (0.546)	0.452 ^a (0.156)	0.475 ^b (0.221)	0.298 (0.220)	0.853 ^b (0.375)	0.710 (0.509)	0.868 (0.566)
Log(Employees)	0.053 (0.044)	0.063 (0.062)	0.047 (0.062)	0.020 (0.053)	-0.106 (0.113)	0.163 (0.116)	0.065 (0.042)	0.058 (0.050)	0.045 (0.059)	0.006 (0.080)	0.157 (0.131)	-0.094 (0.117)
Log(Cap/Employees)	0.029 (0.019)	0.039 (0.035)	0.028 (0.024)	0.063 ^b (0.031)	0.078 ^c (0.046)	0.043 (0.043)	-0.085 (0.016)	0.005 (0.025)	-0.021 (0.021)	0.044 (0.037)	0.013 (0.044)	0.093 (0.062)
Log(Mat/Employees)							0.045 ^c (0.025)	0.099 ^a (0.037)	0.012 (0.031)	0.001 (0.054)	-0.210 ^b (0.091)	0.175 ^c (0.090)
<i>D_{HighEdu}</i>	-0.054 (0.073)	-0.015 (0.098)	-0.090 (0.105)	0.219 (0.148)	0.155 (0.179)	0.258 (0.204)	-0.003 (0.059)	-0.030 (0.074)	-0.007 (0.087)	-0.152 (0.130)	-0.271 (0.208)	0.138 (0.188)
R-Square	0.17	0.15	0.19	0.16	0.14	0.18	0.12	0.19	0.10	0.17	0.23	0.26
N	428	190	238	117	50	67	409	170	239	124	55	69
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) – (6) use innovation of a firm as the dependent variable. It takes a value 1 if a firm introduced products (goods or services) or processes (including methods) that were new or significantly improved or carried out organizational and marketing innovations in 2017. Columns (7) – (12) takes a value 1 if a firm uses computer for quality control system and sophisticated technology for quality control. ‘MScore’ is the management score of a firm as calculated following Bloom et al. (2018). ‘Employees’ is the total employees of a firm. ‘Cap/Employees’ is the capital per employee of a firm. We use fixed assets of a firm as an indicator for capital. ‘Mat/Employees’ is the per employee materials consumed by a firm. ‘*D_{HighEdu}*’ takes a value 1 if more than 20% workers of a firm have a higher education degree. Marginal effects are reported. Robust standard errors corrected for clustering at the firm level are in the parenthesis. Intercepts included but not reported. ^{c, b, a} denotes 10%, 5% and 1% level of significance, respectively.

	External Access to Finance						Internal Access to Finance	
	All Regions Except Slavonia			Slavonia			All Regions Except Slavonia	Slavonia
	Manu- facturing	Services		Manu- facturing	Services			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Mscore	1.803 ^b (0.879)	2.879 ^c (1.531)	1.440 (1.106)	3.131 ^b (1.577)	5.370 ^b (2.655)	1.045 (2.290)	-1.407 (0.947)	-0.331 (1.532)
Log(Employees)	0.244 (0.242)	-0.037 (0.375)	0.442 (0.307)	-0.139 (0.381)	0.001 (0.756)	-0.295 (0.504)	0.254 (0.207)	0.302 (0.288)
Log(Cap/Employees)	0.269 ^a (0.098)	0.205 (0.194)	0.297 ^b (0.116)	0.452 ^a (0.163)	0.750 ^a (0.283)	0.267 (0.224)	-0.126 (0.089)	-0.220 (0.161)
$D_{HighEdu}$	-0.555 (0.397)	-0.810 (0.545)	-0.450 (0.453)	-0.894 (0.610)	-0.547 (0.852)	-1.008 (0.842)	0.519 (0.327)	0.614 (0.573)
R-Square	0.13	0.14	0.12	0.23	0.34	0.17	0.10	0.12
N	410	170	240	113	51	62	409	130
Region Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) – (6) use access to external finance of a firm as the dependent variable. It takes a value 1 if a firm has used the following types of finance for its business activities: (a) bank loans, overdrafts and other credit lines, (b) loans from HBOR or HAMAC, (c) Newly issued bonds, (d) Newly issued equity, (e) leasing, (f) factoring or invoice discounting, and (g) EU grants. Columns (7) and (8) use the internal access to finance as the dependent variable. It takes a value 1 if a firm has used the following types of finance for its business activities: (a) loans from family/friends/business partner and (b) internal funds or retained earnings. ‘MScore’ is the management score of a firm as calculated following Bloom et al. (2018). ‘Employees’ is the total employees of a firm. ‘Cap/Employees’ is the capital per employee of a firm. We use fixed assets of a firm as an indicator for capital. ‘ $D_{HighEdu}$ ’ takes a value 1 if more than 20% workers of a firm have a higher education degree. Robust standard errors corrected for clustering at the firm level are in the parenthesis. Intercepts included but not reported. ^{c, b, a} denotes 10%, 5% and 1% level of significance, respectively.

Tables A.6: Drivers of management

	Management Score (All Regions, Except Slavonia)													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	Manu- facturing (9)	Services (10)	High- Tech (11)	Low- Tech (12)	Know- Inten (13)	NKnow- Inten (14)
Log(Emp)	0.048 ^a (0.010)							0.046 ^a (0.010)	0.054 ^a (0.015)	0.032 ^b (0.013)	0.050 ^b (0.023)	0.070 ^a (0.019)	0.033 ^c (0.017)	0.026 (0.020)
Log(Age)		-0.013 (0.010)						-0.025 ^a (0.009)	-0.017 (0.016)	-0.028 ^b (0.011)	-0.004 (0.028)	-0.034 ^c (0.019)	-0.024 ^c (0.015)	-0.032 ^c (0.015)
$D_{Exporter}$			0.028 ^c (0.017)					0.019 (0.017)	0.042 ^b (0.021)	-0.007 (0.025)	0.084 ^a (0.027)	0.048 ^c (0.029)	-0.015 (0.034)	-0.005 (0.035)
$D_{HighEdu}$				0.028 (0.020)				0.039 ^b (0.018)	0.046 ^c (0.025)	0.037 (0.027)	0.015 (0.036)	0.075 ^c (0.040)	0.052 (0.042)	0.024 (0.034)
$D_{F-Owned}$					-0.010 (0.016)			-0.007 (0.022)	-0.017 (0.033)	0.004 (0.029)	0.052 (0.047)	-0.049 (0.042)	0.014 (0.038)	0.007 (0.045)
D_{P-Run}						-0.001 (0.015)		-0.010 (0.020)	-0.015 (0.029)	-0.003 (0.026)	0.012 (0.039)	-0.027 (0.039)	-0.002 (0.036)	0.022 (0.037)
$D_{Innovation}$							0.088 ^a (0.014)	0.078 ^a (0.014)	0.059 ^a (0.021)	0.084 ^a (0.020)	0.045 (0.030)	0.078 ^a (0.025)	0.076 ^a (0.025)	0.110 ^a (0.033)
R-Square	0.16	0.12	0.12	0.12	0.11	0.11	0.19	0.25	0.24	0.30	0.31	0.28	0.22	0.41
N	440	438	440	440	440	440	440	438	192	246	71	121	143	103
Industry D	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Region D	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

	Management Score (Slavonia)													
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	Manu- facturing (9)	Services (10)	High- Tech (11)	Low- Tech (12)	Know- Inten (13)	NKnow- Inten (14)
Log(Emp)	0.048 ^a (0.018)							0.047 ^b (0.020)	0.072 ^a (0.029)	0.021 (0.025)	0.172 (0.117)	0.056 ^b (0.029)	0.006 (0.037)	0.021 (0.035)
Log(Age)		-0.023 (0.017)						-0.031 ^c (0.018)	-0.034 (0.036)	-0.016 (0.025)	-0.078 (0.138)	-0.029 (0.044)	0.019 (0.045)	-0.039 (0.029)
$D_{Exporter}$			0.044 (0.034)					0.040 (0.037)	0.058 (0.058)	-0.011 (0.052)	-0.094 (0.233)	-0.050 (0.058)	-0.052 (0.083)	0.032 (0.061)
$D_{HighEdu}$				0.009 (0.038)				0.021 (0.039)	-0.004 (0.065)	0.089 ^c (0.049)	-0.179 (0.246)	0.016 (0.064)	0.067 (0.069)	0.114 (0.076)
$D_{F-Owned}$					-0.0004 (0.036)			-0.007 (0.047)	-0.027 (0.067)	0.007 (0.063)	0.222 (0.498)	-0.065 (0.072)	0.016 (0.084)	0.053 (0.143)
D_{P-Run}						0.0002 (0.032)		-0.014 (0.023)	0.035 (0.068)	-0.083 (0.060)	0.022 (0.500)	0.035 (0.071)	-0.113 ^c (0.069)	-0.044 (0.137)
$D_{Innovation}$							0.062 ^c (0.033)	0.045 (0.035)	0.070 (0.060)	0.033 (0.043)	0.257 (0.305)	0.071 (0.054)	-0.001 (0.071)	0.072 (0.058)
R-Square	0.20	0.17	0.17	0.16	0.16	0.16	0.19	0.25	0.35	0.28	0.59	0.36	0.32	0.48
N	145	144	145	145	145	145	145	144	66	78	17	49	40	38
Industry D	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Columns (1) – (14) use management score of a firm as the dependent variable. Columns (9) and (10) run the regressions for firms belonging to manufacturing and services sector, respectively. Columns (11) and (12) further divides manufacturing into ‘high-tech’ and ‘low-tech’. Columns (13) and (14) divide the services sector into ‘knowledge-intensive’ and Not knowledge-intensive’ sectors. ‘Log(Emp)’ is the total number of employees of a firm. ‘Log(Age)’ is the age of a firm. ‘ $D_{Exporter}$ ’ takes value 1 when a firm’s export values are greater than zero. ‘ $D_{HighEdu}$ ’ takes value 1 if more than 20% workers of a firm have a higher education degree. ‘ $D_{F-Owned}$ ’ takes value 1 if a firm is family-owned and 0 for others. ‘ D_{P-Run} ’ takes value 1 if it is professionally run. ‘ $D_{Innovation}$ ’ takes a value 1 if a firm introduced products (goods or services) or processes (including methods) that were new or significantly improved or carried out organizational and marketing innovations in 2017. Robust standard errors corrected for clustering at the firm level are in the parenthesis. Intercepts included but not reported. ^{c, b, a} denotes 10%, 5% and 1% level of significance, respectively.