



Industry  
Canada

Industrie  
Canada

ECONOMIC RESEARCH AND POLICY ANALYSIS BRANCH



## Working Paper Series

# Management and Productivity in Canada: What Does the Evidence Say?

Nicholas Bloom, Stanford University  
Working Paper 2011-05



This publication is also available online in HTML: [http://ic.gc.ca/eic/site/eas-aes.nsf/eng/h\\_ra02336.html](http://ic.gc.ca/eic/site/eas-aes.nsf/eng/h_ra02336.html)

To obtain a copy of this publication or an alternate format (Braille, large print, etc.), please contact:

Economic Research and Policy Analysis Branch  
Industry Canada  
C.D. Howe Building  
235 Queen Street  
Ottawa, ON Canada  
K1A 0H5

Telephone: 343-291-2627  
Facsimile: 613-991-1261 and  
E-mail: [erpa-reap@ic.gc.ca](mailto:erpa-reap@ic.gc.ca)

### **Permission to Reproduce**

Except as otherwise specifically noted, the information in this publication may be reproduced, in part or in whole and by any means, without charge or further permission from Industry Canada, provided that due diligence is exercised in ensuring the accuracy of the information reproduced; that Industry Canada is identified as the source institution; and that the reproduction is not represented as an official version of the information reproduced, nor as having been made in affiliation with, or with the endorsement of, Industry Canada.

For permission to reproduce the information in this publication for commercial purposes, please contact the:

Web Services Centre  
Industry Canada  
C.D. Howe Building  
235 Queen Street  
Ottawa, ON Canada  
K1A 0H5

Telephone (toll-free in Canada): 1-800-328-6189  
Telephone (Ottawa): 613-954-5031  
Fax: 613-954-2340  
TTY (for hearing-impaired): 1-866-694-8389  
Business hours: 8:30 a.m. to 5:00 p.m. (Eastern Time)  
Email: [info@ic.gc.ca](mailto:info@ic.gc.ca)

© Her Majesty the Queen in Right of Canada,  
represented by the Minister of Industry, 2015  
Cat. No. Iu172-1/2011-5E-PDF  
ISBN 978-1-100-25928-4

Aussi offert en français sous le titre *Gestion et productivité au Canada : Qu'en disent les données?*

# Management and Productivity in Canada: What does the Evidence Say?

The views and opinions expressed in the research paper are those of the author alone and do not represent, in any way, the views or opinions of the Department of Industry or of the Government of Canada.

Nicholas Bloom,  
Stanford University

## **Acknowledgements**

All manufacturing and retail data for Canada was collected with Daniela Scur and James Milway at the Institute of Competitiveness and Prosperity. This research is built on a long-stream of work with John Van Reenen and Raffaella Sadun. I am indebted to Rebecca Homkes for her help in this research project. My partnership with Stephen Dorgan and John Dowdy of McKinsey & Company has been particularly important in the development of this research. Data for Australia was gratefully received from Renu Agarwal and Roy Green at University Technical Sydney, and DIISR. LSE and Stanford funding was gratefully received from the Advanced Institute of Management Research, The Economic and Social Research Council and the Alfred Sloan Foundation. ICP funding was gratefully received from the Ontario Ministry of Economic Development and Trade and the Workplace Skills Initiative from HRSDC.

## Executive Summary

Canada's productivity growth rates have been poor by international standards, and her productivity is now mid-table by OECD (Organisation for Economic Cooperation and Development) standards. Most notably, Canada has a 20% productivity gap with the United States (U.S.). One long-standing question is whether poor Canadian management practices are a factor behind its poor productivity performance? To address this the author presents evidence on Canadian management practices in manufacturing and retailing. This reveals that in fact Canada has generally good management practices, similar to those in firms in Germany, Japan and Sweden and better than firms in most other European countries and the developing world. But Canada's management practices are still not as good as those in the neighboring U.S. The author then discusses the reasons for differences in management practices across firms and countries, and particularly for Canada's gap with the U.S.. The author highlights the importance of product market competition in improving management by thinning the ranks of the badly managed firms. One reason for the predominance of the U.S. in management scores is that better managed firms appear to be rewarded more quickly with greater market share and the worse managed forced to shrink and exit. Lightly regulated labor markets are also important as they enable managers to adopt the best practices for their firms, rather than have these dictated by the government. A third factor is ownership, with publicly quoted and private equity owned firms appearing to be well managed on average, particularly when compared to government and inherited family managed firms who tend to be badly managed on average. Fourth, worker and manager education seems strongly related to better management – in firms with a higher share of university degree educated workers and managers the management practices are significantly better. On the policy front Canada appears to be performing well in terms of promoting product market competition, imposing only light regulation of labor markets and minimizing estate tax distortions in favor of family ownership. The one area that Canada does not perform so well – especially when compared to the U.S. – is the relatively lower share of university degree educated managers and employees.

---

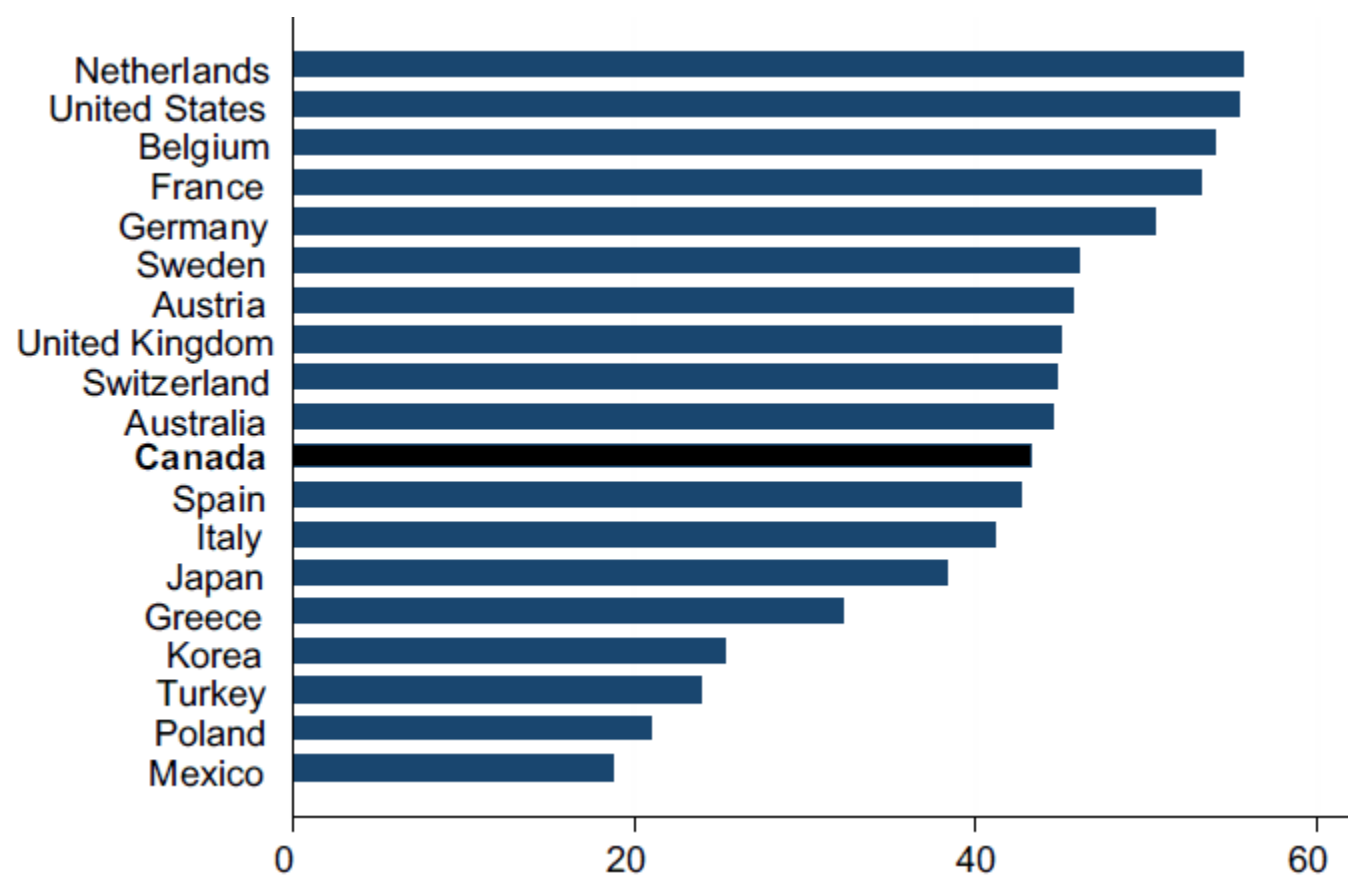
## **Table of contents**

1. Introduction
2. How Can Management Practices Be Measured?
3. Management Practices and Performance in International Comparison
4. What Causes Differences in Management Practices?
5. Conclusions
6. Bibliography

## 1. Introduction

Canadian productivity levels are distinctly mid-table by international standards for developed countries. For example, Figure 1 plots the output per hour worked in 2008 at purchasing power parities. This is the Organisation of Economic Cooperation and Development's (the OECD) preferred internationally comparable measure of productivity. This shows Canadian productivity is similar to other countries in Northern Europe like the UK, Austria and Sweden, but is behind France, Germany the Netherlands, and most notably the United States. Given the economic and geographic proximity to the United States this large productivity difference – of about 20% in 2008 – is clearly somewhat puzzling.

**Figure 1: Canada's GDP per hour worked – a basic measure of productivity - is mid-table for major OECD countries**

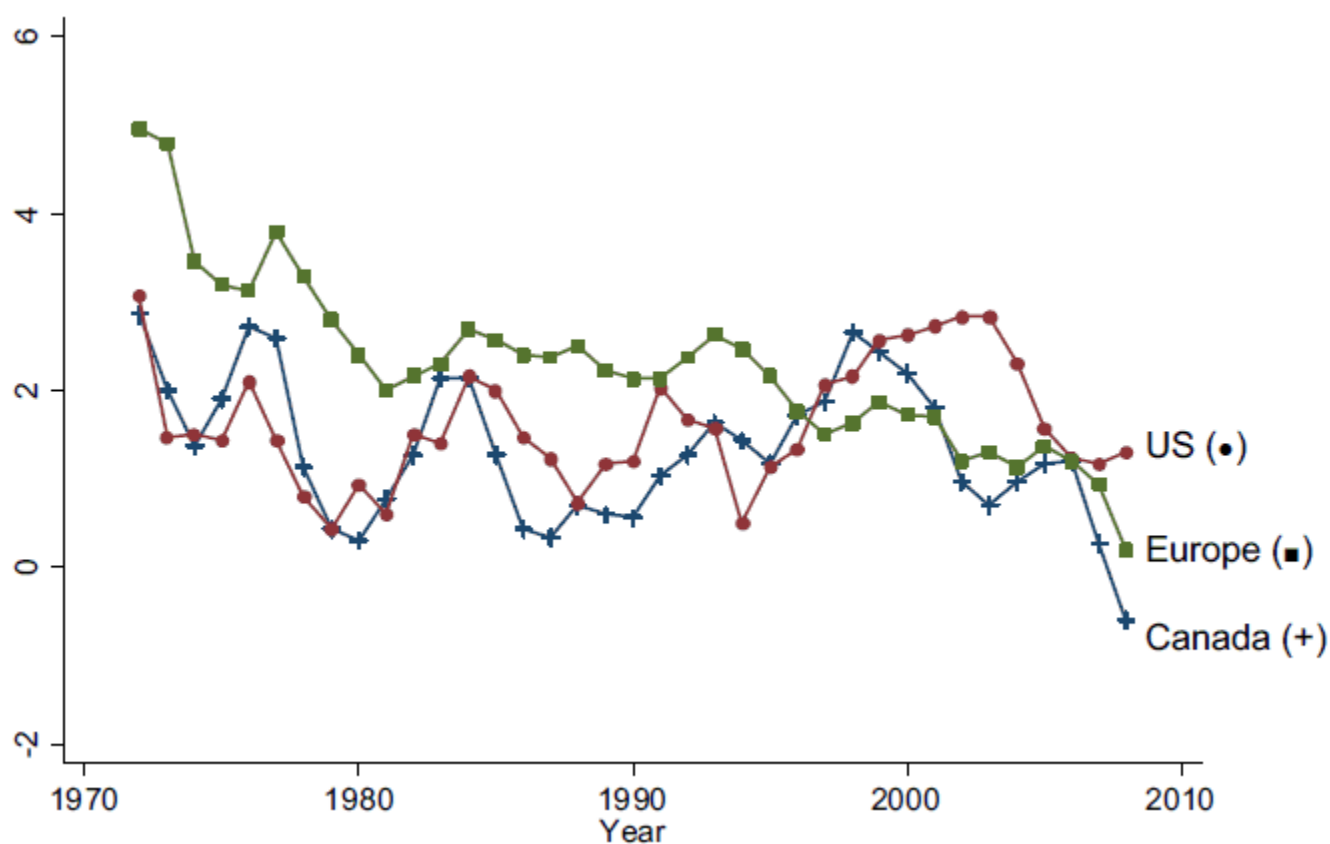


Note: Reported for all OECD countries with 2008 GDP of 30 billion dollars or greater. Purchasing power parities benchmarked at 1 for US dollars.

Source: the [OECD STAN productivity statistics](#).

To investigate whether the Canadian productivity gap is a recent phenomenon Figure 2 plots this productivity growth measure since 1970. This reveals that while Canadian productivity growth has been slightly lower than the US since about 2000, its performance prior to 2000 was similar to that of the US. Compared to Europe productivity growth in Canada has been persistently low, lagging behind Europe over almost the entire period since 1970 except for a brief period of rapid Canadian productivity growth in the late 1990s.

**Figure 2: Canada's recent productivity growth has lagged behind that the US and Europe**



Note: Productivity growth defined as growth of GDP per hour worked in purchasing power parity. Europe defined as Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Netherlands, Spain, Sweden, United Kingdom.

Source: the [OECD STAN productivity statistics](#).

So an immediate question that arises from these productivity figures is what can explain this difference in productivity between Canada, the US and Europe? Interestingly, the Canadian productivity puzzle is similar in many regards to that of the United Kingdom which has also experienced a long-run productivity gap with Europe and the US. In the case of the UK commentators such as David Landes (1969) and Alfred Chandler (1994) have long argued that

bad British management was the key factor in her slower productivity growth, and the question is whether this is also true of Canada?

So to address this in this article I provide a range of new survey evidence on management practices across firms in Canada, compared internally and to other countries. It focuses primarily on manufacturing firms but some other evidence for retail is also provided. This is built on a long-line of research I have been involved in trying to measure management practices across firms and countries. This attempts to go beyond prior research in the field by moving from a predominantly case-study based approach to using international management surveys to collect data from large samples of firms across countries. In this research I have worked with a number of research colleagues – in particular academic researchers John Van Reenen (London School of Economics) and Raffaella Sadun (Harvard Business School) and management consultants Stephen Dorgan and John Dowdy (both partners in McKinsey & Company) - over the last decade. Recently I have also been working with researchers Daniela Scur and James Milway (both Institute for Competitiveness & Prosperity) to extend this research to Canada. I will start by describing our survey approach, which focuses on aspects of management like systematic performance monitoring, setting appropriate targets and providing incentives for good performance.

## 2. How Can Management Practices Be Measured?

To measure management practices, I have worked with colleagues to develop a new survey methodology described in Bloom and Van Reenen (2007). This uses an interview-based evaluation tool that defines and scores from one ("worst practice") to five ("best practice") 18 basic management practices on a scoring grid from one to five. Table 1 lists the 18 management practices, and also gives some sense of how each is measured on a scale from 1 to 5. In my view, a high score represents a best practice in the sense that a firm which has adopted the practice will, on average, increase their productivity. The combination of many of these indicators reflects "good management" as commonly understood, with my main measure of management practices simply the average of these 18 scores.

This evaluation tool was developed by McKinsey & Company, the international consulting firm, and it can be broadly interpreted as attempting to measure management practices in three broad areas. First, monitoring - how well do companies monitor what goes on inside their firms, and use this for continuous improvement. Second, targets - do companies set the right targets, track the right outcomes and take appropriate action if the two are inconsistent. Third, incentives - are companies promoting and rewarding employees based on performance, and trying to hire and keep their best employees?<sup>1</sup>

---

<sup>1</sup> These practices are similar to those emphasized in earlier work on management practices, by for example Ichinowski, Prennushi and Shaw (1997) and Black and Lynch (2001). Bertrand and Schoar (2003) focus on another important angle – the management style of chief executive officers and chief financial officers—which will capture differences in management strategy (say over mergers and acquisitions) rather than management practices *per se*.



**Table 1: The Management Practice Dimensions**

Categories	Score from 1-5 based on:
1) Introduction of Modern manufacturing techniques	What aspects of manufacturing have been formally introduced, including just-in-time delivery from suppliers, automation, flexible manpower, support systems, attitudes and behavior?
2) Rationale for introduction of Modern manufacturing techniques	Were modern manufacturing techniques adopted just because others were using them, or are they linked to meeting business objectives like reducing costs and improving quality?
3) Process problem documentation	Are process improvements made only when problems arise, or are they actively sought out for continuous improvement as part of a normal business processes?
4) Performance tracking	Is tracking ad hoc and incomplete, or is performance continually tracked and communicated to all staff?
5) Performance review	Is performance reviewed infrequently and only on a success/failure scale, or is performance reviewed continually with an expectation of continuous improvement?
6) Performance dialogue	In review/performance conversations, to what extent is the purpose, data, agenda, and follow- up steps (like coaching) clear to all parties?
7) Consequence management	To what extent does failure to achieve agreed objectives carry consequences, which can include retraining or reassignment to other jobs?
8) Target balance	Are the goals exclusively financial, or is there a balance of financial and non-financial targets?
9) Target interconnection	Are goals based on accounting value, or are they based on shareholder value in a way that works through business units and ultimately is connected to individual performance expectations?
10) Target time horizon	Does top management focus mainly on the short term, or does it visualize short-term targets as a "staircase" toward the main focus on long-term goals?
11) Targets are stretching	Are goals too easy to achieve, especially for some "sacred cows" areas of the firm, or are goals demanding but attainable for all parts of the firm?
12) Performance clarity	Are performance measures ill-defined, poorly understood, and private, or are they well- defined, clearly communicated, and made public?
13) Managing human capital	To what extent are senior managers evaluated and held accountable for attracting, retaining, and developing talent throughout the organization?

**Table 1: The Management Practice Dimensions (CONT'D)**

Categories	Score from 1-5 based on:
14) Rewarding high-performance	To what extent are people in the firm rewarded equally irrespective of performance level, or is performance clearly related to accountability and rewards?
15) Removing poor performers	Are poor performers rarely removed, or are they retrained and/or moved into different roles or out of the company as soon as the weakness is identified?
16) Promoting high performers	Are people promoted mainly on the basis of tenure, or does the firm actively identify, develop and promote its top performers?
17) Attracting human capital	Do competitors offer stronger reasons for talented people to join their companies, or does a firm provide a wide range of reasons to encourage talented people to join?
18) Retaining human capital	Does the firm do relatively little to retain top talent, or do whatever it takes to retain top talent when they look likely to leave?

*Note:* Full set of questions that are asked to score each dimension are included in Bloom and Van Reenen (2006).

I hired mainly graduate business students (e.g. MBA students) to carry out these interviews because they generally had some business experience and training.<sup>2</sup> The survey was targeted at plant 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. The MBA students interviewed these production plant managers using what I call a "double-blind" technique.

One part of this double-blind technique is that managers are not told they are being scored or shown the scoring grid. They are only told they are being "interviewed about management practices." To do this, open questions were used in the survey. For example, on the first monitoring dimension the interview started by asking the open question "tell me how you monitor your production process", rather than closed questions such as "do you monitor your production daily [yes/no]". This continues with open questions focusing on actual practices and examples until the interviewer can make an accurate assessment of the firm's practices. For example, the second question on that performance tracking dimension is "what kinds of measures would you use to track performance?" and the third is "If I walked round your factory what could I tell about how each person was performing?" The combined responses to this dimension are scored against a grid which goes from 1 (out of 5) which is defined as "Measures tracked do not indicate directly if overall business objectives are being met. Tracking is an ad-hoc process (certain processes aren't tracked at all)." up to 5 which is defined as "Performance is continuously tracked and communicated, both formally and informally, to all staff using a range of visual management tools." The full list of dimensions and questions used to score these are given in Bloom and Van Reenen (2006).

<sup>2</sup> Across all the survey waves required to collect the data in this paper 76 different business and economics student interviewers were used. Each interviewer worked for about 12 weeks on average on the project, running about 77 interviews.

The other side of the "double-blind" approach is that the interviewers are not told in advance anything about the firm's performance. They are only provided with the company name, telephone number and industry. The interviewers randomly sample medium-sized firms, employing between 100 to 5,000 workers. These firms are large enough that the type of systematic management practices chosen are likely to matter. However, these firms are small enough that they are not usually reported in the business press, and so the interviewers generally have not heard of these firms before, so should have no preconceptions. By contrast, interviewer preconceptions might be more of a problem if the interviewers knew they were talking to an employee of well-known firms like Bombardier, Alcan or Nortel.

There were a variety of procedures used to obtain a high success rate and to remove potential sources of bias from our estimates. First, government endorsements for the surveys in most countries covered were obtained.<sup>3</sup> Second, the interviewers positioned the surveys as a "piece of work on Lean manufacturing," never using the word "survey" or "research", as telephone switchboards usually block surveys and market research. Third, the interviewers never asked interviewees for financial data, instead obtaining such data from independent sources or company accounts wherever available.<sup>4</sup> Fourth, the interviewers were encouraged to be persistent – so they ran about two interviews a day lasting 45 minutes each on average, with the rest of the time spent repeatedly contacting managers to schedule interviews. These steps helped to yield a 44 percent response rate which was uncorrelated with the (independently collected) performance measures for the firm—thus, we were not disproportionately interviewing successful or failing firms.<sup>5</sup> The interviewers also collected a series of "noise controls" on the interview process itself (such as the time of day and the day of the week), characteristics of the interviewee and the identity of the interviewer. Including these in our regression analysis typically helps to improve the precision of our estimates by stripping out some of the measurement error.

The survey data for most countries was collected from the London School of Economics in the UK during the summers of 2006 to 2008. The slow nature of the survey data collected was due to the high cost of running surveys, which necessitated raising research funding in multiple waves over several years. The Canadian manufacturing data was collected from the Institute of Competitiveness and Prosperity (ICP) in Toronto. In order to ensure the scoring and

---

<sup>3</sup> Note we did not do this in Canada (or in fact in the US) as our view was that Government endorsements would tend not to have as much impact on response rates in North America.

<sup>4</sup> In Canada this was Dunn & Bradstreet if such data was available, although this was rarely the case. In most countries performance data was available though so our performance and management regressions use this data for the global results.

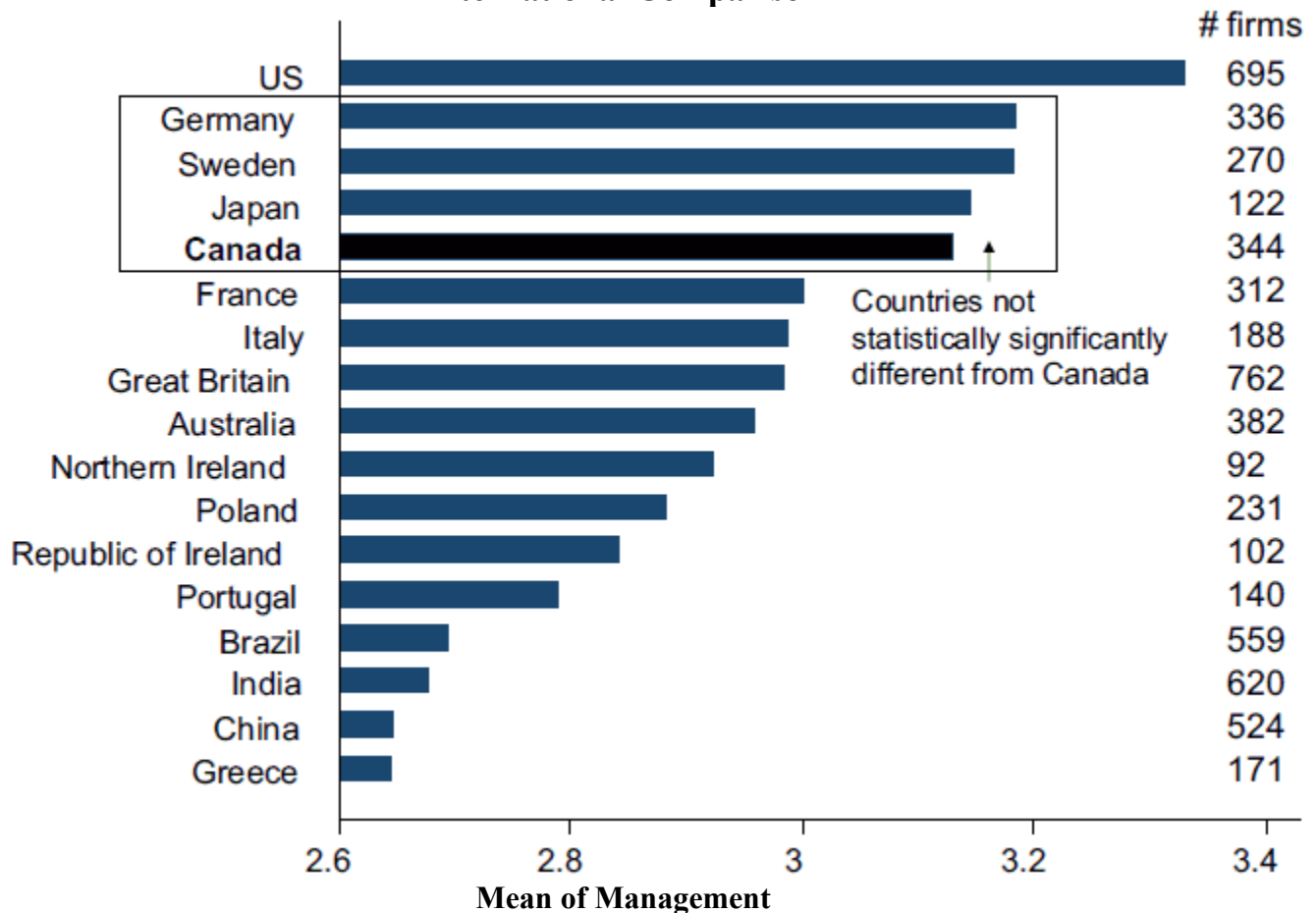
<sup>5</sup> As one step to validate our survey data, we re-surveyed 5 percent of the sample using a second interviewer to independently survey a second plant manager in the same firm. Two independent management interviews on different plants within the same firms should help to reveal how consistently we are measuring management practices. We found that in the sample of 222 additional interviews the correlation between our independently run first and second interview scores was 0.51. Part of this difference across plants within the same firms is likely to be real internal variations in management practices, with the rest presumably reflecting survey measurement error. However, the correlation across the two interviews is highly significant (p-value 0.001), which suggests that while our management score is clearly noisy, it is picking up significant management differences across firms.

methodology was comparable the ICP team hired an experienced interviewer (Rebecca Homkes) from London who had run over 500 interviews to spend 2 weeks in Canada providing training and calibration to the Canadian team at the outset of the interview.

### 3. Management Practices and Performance in International Comparison

The average management practice score across countries from the almost 6,000 interviews on different firms that have been carried out since 2006 appears in Figure 1. These firms were randomly sampled from the population of all public and private firms manufacturing firms with 100 to 5,000 employees. The median firm in every country is privately owned employing 320 workers (300 in Canada) and operating across two production plants.

**Figure 3: Canada's Manufacturing Management Scores Are Relatively Good by International Comparison**



Note: Averages taken across all firms within each country. 5,850 observations in total. Firms per country in the right column. *Germany, Sweden and Japan are not statistically significantly different from Canada.*

As shown in Figure 3 Canada on average has good management practices and is not statically significantly different from a group of other leading countries including Germany, Sweden and Japan. The only country with significantly better management practices than Canada is the United States. A group of countries have significantly worse management practices than Canada, including a block of European countries (France, Italy, Ireland, the United Kingdom, Poland, Greece and Portugal), Australia, and a block of developing countries like Brazil, China and India.

I can separate these overall management scores into three broad categories: scores related to monitoring, targets and incentives, with country level scores shown in Table 2. For ease of comparison, average scores are given in the bottom row of the table. Canada's profile across different practice types is relatively balanced, in that compared to the World average it is about 0.2 points above on each dimension. In contrast some other countries has clear strengths in different areas. For example, U.S. management has by far the largest advantage in incentives, while the Swedish are best at monitoring and the Germans (narrowly) best at targets.

Table 2: Management practice scores by country

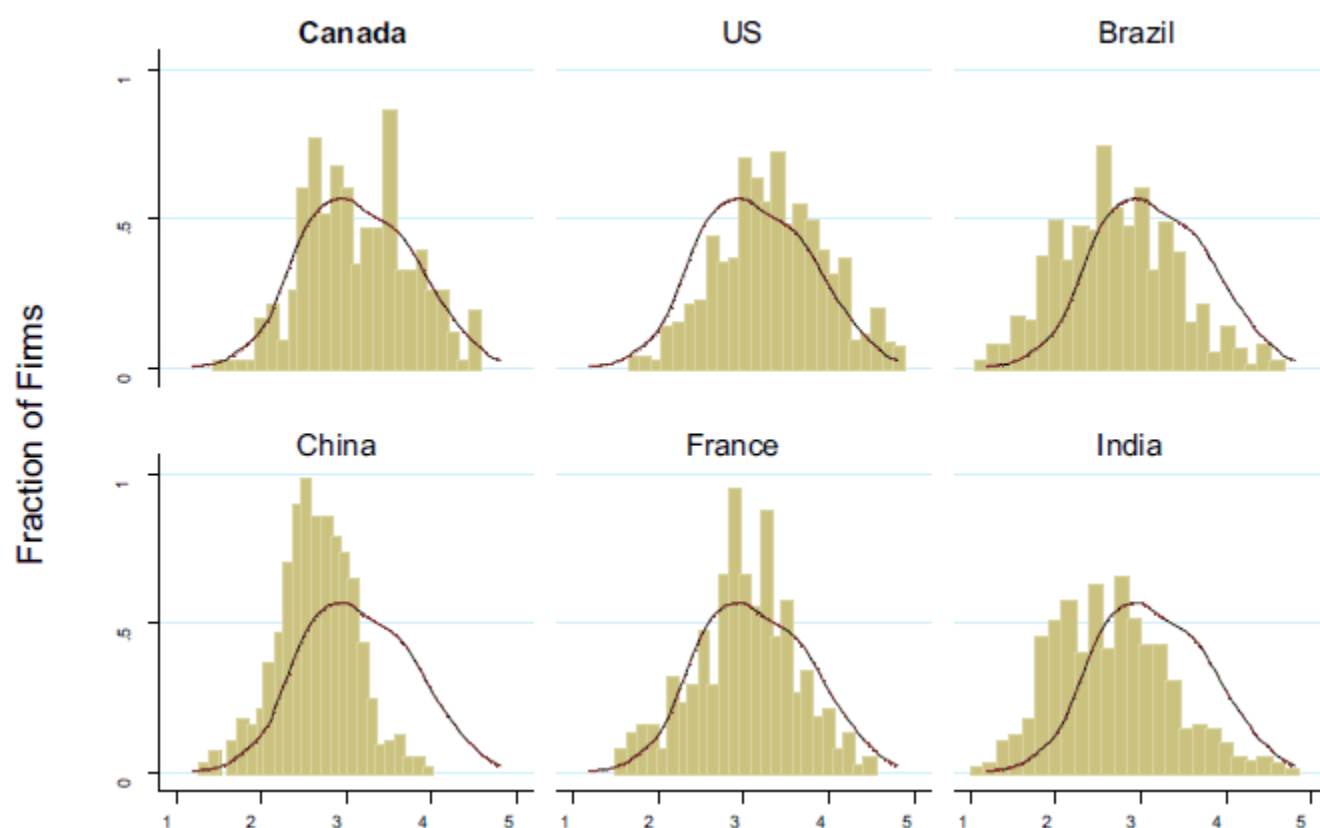
Country	Overall Management	Monitoring Management	Targets Management	Incentives Management	Firms in the sample
Australia	2.99	3.27	2.96	2.76	382
Brazil	2.69	2.81	2.68	2.60	559
Canada	<b>3.13</b>	<b>3.35</b>	<b>3.02</b>	<b>3.02</b>	<b>344</b>
China	2.64	2.72	2.53	2.66	524
France	3.00	3.28	2.98	2.78	312
Germany	3.18	3.40	3.24	2.95	336
Great Britain	2.98	3.16	2.93	2.88	762
Greece	2.65	2.90	2.56	2.50	171
India	2.65	2.62	2.66	2.67	620
Italy	2.99	2.98	2.80	2.73	194
Japan	3.15	3.20	3.25	2.90	188
Northern Ireland	2.91	3.01	2.84	2.86	92
Poland	2.88	2.88	2.93	2.85	231
Portugal	2.79	3.07	2.72	2.61	140
Republic of Ireland	2.84	2.95	2.76	2.81	102
Sweden	3.18	3.54	3.22	2.86	270
US	3.33	3.44	3.23	3.30	695
Average	2.94	3.09	2.91	2.84	344

*Note:* **Overall management** is the average score in across all 18 questions. **Monitoring management** is the average score across questions 1 to 6 in Table 1. **Targets management** is the average score across questions 8 to 12. **Incentives management** is the average score across questions 7 and 13 to 18.

What does the distribution of management practices look like within Canada and compared to other countries? I plot a firm-level histogram of management practices by country, as shown in Figure 4. The first histogram shows this data for Canada, where the bars show the actual data and the dark line is a smoothed (kernel) fit of the data. Other advanced economies in Western Europe, Japan, and Australia all look pretty similar to the Canadian distribution. Next to Canada I plot the US distribution which is similar to Canada except for a mild rightward shift (which can be seen by comparing the US histogram to the solid line which is the approximation for Canada). Histograms for Brazil and India shows that although they both have numerous well managed firms, their average firms have much lower management scores than the Canada. France is plotted as a typically Northern European firm, demonstrating a relatively similar distribution to Canada. Finally, China has a more compressed distribution, possibly because Chinese firms are much younger so have less variation in terms of vintages of management practices.

Of course, while the average management scores in Brazil, China and India are lower than those in Canada, it is clear these developing countries have some firms that are better managed than most Canadian firms. We find that in fact 22% of Canadian firms are actually worse managed than the average firm in Brazil, China and India, suggesting a large tail of Canadian manufacturing is threatened by its poor management practices. So while the average level of management practices in Canada is not a cause for concern the tail of badly managed firms is.

**Figure 4: Canada's high manufacturing management scores reflect its lack of badly run firms**



**Firm level average management scores, from 1 (worst practice) to 5 (best practice)**

Note: Bars are the histogram of the actual density. The line is the smoothed (kernel) of the Canada density for comparison.

In one sense this cross-country ranking is not surprising, since it approximates the cross-country productivity ranking. Although I cannot offer a rigorous argument here about the magnitude of any causal effect, it certainly appears plausible that management practices should be viewed as part of the determinants of national productivity. A regression of GDP per capita on management practices across the sample of 17 countries yields an Rsquared of 0.81. Since some of this is simply a contrast between more and less developed countries, focusing the regression on the 11

OECD nations with good manufacturing productivity data (Inklaar and Timmer, 2008) yields an R-squared of 0.66. Either way, management practices appear quantitatively important.

Canada could improve average management practices and therefore aggregate productivity in two distinct ways. The first is by promoting factors that increase average management quality in *each firm* (say through better business education) and therefore raising productivity within the average firm. The next sub-section relates to this mechanism.

The second is through *improved reallocation across firms*. Empirically this turns out to be important in explaining cross-country differences in aggregate productivity. High productivity countries like the US appear to be better at getting efficient firms to grow larger, while low productivity countries like China and India are not (Hsieh and Klenow, 2007). The implication is that factors like product market competition should generate a stronger relationship between management quality on the one hand and firm size and growth on the other, and therefore lead to higher aggregate productivity. I discuss this later when we turn to the determination of management practices.

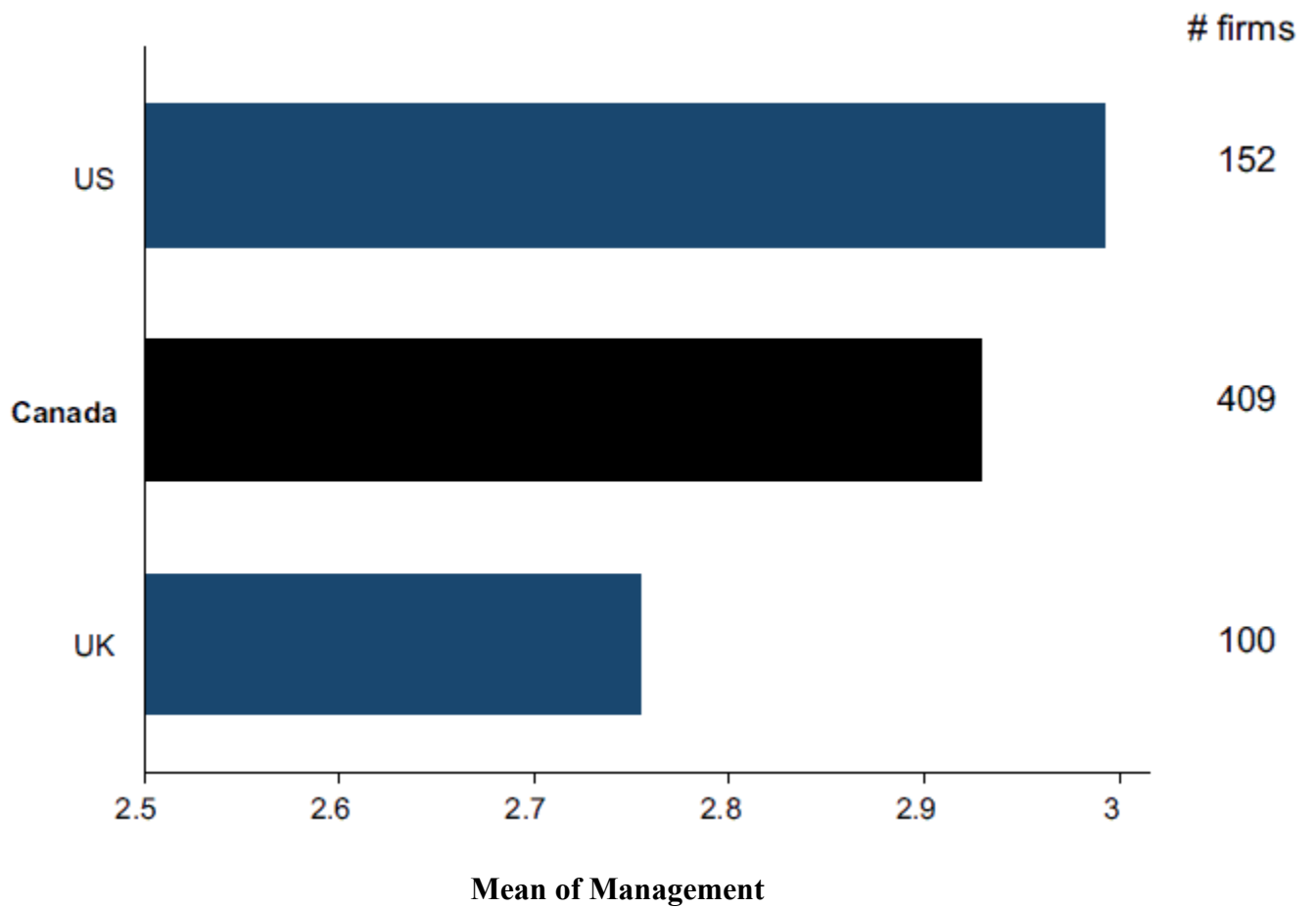
Recently we have also been extending our research to look at other sectors. One sector that I have been looking at jointly with the Institute for Competitiveness and Prosperity (ICP) in Canada is the retail sector. In the summer of 2009 the ICP surveyed 661 retail firms, including groceries, general merchandise, clothing, food, apparel and home furnishing stores.<sup>6</sup> Interestingly the cross-country comparison for retail plotted in Figure 5 show that Canada is slightly behind the US, but clearly ahead of the UK, which is very similar to the manufacturing picture (see Institute for Competitiveness and Prosperity, 2010 for more details). Most recently during the Fall of 2009 we have also run hospital and school interviews across countries, including around 150 interviews in each industry in Canada. The extremely preliminary results show poor management practices in Canadian hospitals (behind the US, UK, Germany and Sweden and ahead of only Italy and France), and in Canadian schools (to be completed with final data).

---

<sup>6</sup> Formally this was defined as USSIC 1987 codes 50 to 59, where these codes can be found.



**Figure 5: Canada's Retail Management Appear to be Similarly Good, at Least Compared to the United States and the United Kingdom**



Note: Averages taken across all firms within each country. 661 observations in total. Firms per country in the right column. Note the retail scores are not directly comparable to manufacturing so absolute scores should not be compared across industries

### **Associations Between Management Quality and Firm Performance**

I examined the correlation between our measure of management practices and firm performance in terms of productivity, profitability, growth rates, survival rates and market value.

Unfortunately there is almost no accounts data on the Canadian firms as the population sampling frame from Dunn & Bradstreet contains mainly private firms, reflecting the fact that Canadian manufacturing firms are almost all privately held. In Canada privately held firms do not report accounts information. However, the results I will report do show a strong relationship between better management practices and performance in every one of the countries we do have data for, suggesting this should also be the case in Canada. That is, if better managed firms perform significantly better in the UK, France, Germany, Japan, Ireland, Brazil, Greece, China, Portugal, Sweden, the US and Australia then I think it is very likely they will also perform better in Canada given the basic nature of the management practice measure.

So to evaluate the relationship between firm performance and management practices I used company accounts data, which were available for 3,380 of the firms globally. I found that for my sample of manufacturing firms, higher management scores are robustly associated with better performance.

Table 3 reports the results of some ordinary least squares regressions. My dependent variables are different measures of firm performance, including sales per employee, profitability, Tobin's q (the ratio of a firm's stock market value to its capital stock), the growth of sales and survival. My key explanatory variable is the measure of the company's management quality. In some of the regressions, I also adjust for capital per employee, and the share of the workforce with a college degree. I also employ other control variables including country and industry dummy variables, firm-level control variables for hours worked and firm age, and a set of "noise controls" that (as discussed earlier) take include a dummy variables for our interviewers, as well as for the job tenure of the manager, the day of the week the interview was conducted, the time of day the interview was conducted, the length of the interview, and a judgment from the interviewer on the reliability of the information collected.

**Table 3: Estimates of firm performance equations**

Dependent variable	(1) Ln (Sales/employee)	(2) Ln (Sales/employee)	(3) Ln (Sales/employee)	(4) Profitabil- ity (ROCE)	(5) Ln (Tobin's Q)	(6) Sales growth	(7) Survi- val
Management	0.450 <sup>***</sup> (0.028)	0.208 <sup>***</sup> (0.021)	0.172 <sup>***</sup> (0.024)	1.804 <sup>***</sup> (0.668)	0.150 <sup>**</sup> (0.062)	0.044 <sup>***</sup> (0.014)	0.53 <sup>a</sup> (0.30 <sup>a</sup> )
Ln (Capital/Employee)			0.106 <sup>***</sup> (0.014)				
% College Degree			0.076 <sup>***</sup> (0.014)				
Country & industry dummies	No	Yes	Yes	Yes	Yes	Yes	Yes
General controls	No	No	Yes	Yes	Yes	Yes	Yes
Noise Controls	No	No	Yes	Yes	Yes	Yes	Yes
Firms	3,380	3,380	3,380	2,369	524	2,298	3,627
Observations	29,390	29,390	29,390	20,141	3,505	19,568	3,627

Note: All columns estimated by OLS with standard errors are in parentheses under coefficient estimates clustered by firm, except for column (7) which is estimated by Probit (we report marginal effects at the sample mean). Survival is defined as firms who are still in operation in Spring 2009 (including if they have been taken over by another firm). Sample of all firms with available accounts data at some point between 2000 and 2008. Management score has a mean of 2.973 and a standard-deviation of 0.664. "Country and industry dummies" includes a full set of 17 country and 162 SIC 3-digit dummies. "General controls" comprise of firm-level controls for ln(average hours worked) and ln(firm age). "Noise controls" are 78 interviewer dummies, the seniority and tenure of the manager who responded, the day of the week the interview was conducted, the time of the day the interview was conducted, the duration of the interviews and an indicator of the reliability of the information as coded by the interviewer. All regressions include a full set of time dummies. "Management" is the firm-level management score. "% College Degree" is the share of employees with a college degree (collected from the survey). "Profitability" is ROCE which is "Return on Capital Employed" and "Sales growth" is the 5-year growth of sales. Survival is equal to zero if a firm exited due to bankruptcy/liquidation by the end of 2008 and one otherwise.

*Footnotes:*

\*\* denotes 5% significance

\*\*\* Denotes 1% significance

<sup>a</sup> a marginal effect and standard error multiplied by 100. The sample mean of non-survival is 2.64% so the marginal effect of -0.53 implies one management point is associated with 20.1% (=0.53/2.64) lower exit rate.

In Column 1, the dependent variable is the logarithm of sales per employee, a very basic measure of firm productivity. The management score is an average across all 18 questions. The coefficient suggests that firms with one point higher average management score have about 45 log points (about 57 percent) higher labor productivity. So a onestandard deviation change in management (of 0.664) is associated with about a 38 percent increase in sales holding employment constant. Column 2 controls for country and industry to reflect different accounting standards and prices across countries and industries. The management coefficient drops in magnitude to 0.208, but remains highly significant. Column 3 adds controls for capital per employee, the percentage of the workforce with a college degree, and my controls for survey "noise". These additions slightly reduce the coefficient on the management variable to around 0.172, because better managed firms tend to have more fixed capital and human capital. These correlations are not simply driven by the "Anglo-Saxon" countries, as one might suspect if the measures were culturally biased. The relationship between productivity and management is strong across all regions in the data.

In Column 4 of Table 3 I look at profitability as measured by return on capital employed (defined as profits over equity plus debt capital before tax) and find that this is about 1.8 percentage points higher for every one point increase in the management score. In Column 5 I look at Tobin's q for the subsample of publicly quoted firms (where Tobin's q is calculated as the stock market value of the firm divided by the book value of the firm) and find a one-point increase in management is associated with a 15 log point increase in Tobin's q. Column 6 uses the five-year sales growth rate as the outcome. Here, a unit improvement in the management practice score is associated with 4.4 percent higher annual sales growth. Finally, Column 7 looks at the post-survey survival rates and shows that better managed firms are more likely to survive, while worse managed firms are more likely to go bankrupt.

Another key measure of performance is firm size; in equilibrium, better-managed firms should be larger (Lucas, 1978). This is partly because the market will allocate these firms a greater share of sales, but also because larger firms have the resources and incentives to employ better management. When I plotted average management score against the number of employees in a firm (as a measure of firm size) I found that firms with 100-200 employees had average management scores of about 2.7. The management score then rose steadily with firm size, so that firms with 2000–5000 employees—the largest firms in our sample—had average management scores of about 3.2.

A project I have been involved with in India attempts to test the causal impact of management on performance from another angle by taking a sample of textile firms and providing a randomly sub-group with free management consulting and comparing this to a control group without assistance (see Bloom, Eifert, Mahajan, McKenzie and Roberts, 2009). I find changes in management practices are associated with significant improvement in performance – increases of productivity of more than 10% within the first six months – from improvements in monitoring, targets and incentives.

The international data revealed some patterns of specialization by country in management style, in term of whether management in certain countries places a higher relative weight on monitoring and target-setting or on incentives. Although, a firm which is good at one dimension

of management tends to be good at all (that is, the answers to the individual questions tend to be positively correlated), a pattern of specialization in different styles of management is also observable at the firm level. However, the relative specialization in incentives tends to be stronger for firms and industries that are more human capital intensive (Bloom and Van Reenen, 2007). So firms operating in industries like pharmaceuticals that are relatively human-capital intensive, tend to have better incentive management practices than firms operating in textiles and apparel industries that have more unskilled workers.

The association of management with firm performance is also clear in other sectors outside manufacturing. In Bloom, Propper, Seiler and Van Reenen (2009), I interviewed 181 managers and physicians in the orthopedic and cardiology departments of UK hospitals. I found that management scores were significantly associated with better performance as indicated by improved survival rates from emergency heart attack admissions and other kinds of general surgery as well as shorter waiting lists. Might better management also be associated with worse outcomes for workers and for the environment? In an earlier 2004 survey wave I also collected information on aspects of work-life balance such as child-care facilities, job flexibility and self-assessed employee satisfaction. Well-managed firms actually tended to have better facilities for workers along these dimensions (Bloom, Kretschmer and Van Reenen, 2009). I also found that energy efficiency is strongly associated with better firm-level management, because good management practices (like Lean manufacturing) tend to economize on energy use (Bloom, Genakos, Martin, and Sadun, 2008).

## **4. What Causes Differences in Management Practices?**

Management practices vary substantially across countries and across firms, which raises a difficult question. If improved management offers profitability gains, why would firms not adopt better management practices? To address this I focus on product market competition, labor regulation, multinational status, ownership and education. Of course, some of these reasons may be better suited to explaining differences within countries or across industries, while other reasons may be better-suited to explaining difference between countries. In this examination of the evidence I will also focus on the areas where Canada is performing well and the areas that Canada can improve on.

### **Product Market Competition**

When product market competition is not very intense, some low productivity firms will be able to survive. This insight is consistent with the earlier argument that the United States, which often has the most competitive product markets by international standards, does not have as much of a tail of badly-managed firms as some other countries. Syverson (2004b) showed that in a very homogeneous industry in the US (ready mix concrete); more competitive geographic markets had a smaller tail of less productive plants.

In the surveys, the interviewers asked managers how many competitors they faced, and found the average management score was significantly higher when firms reported facing more competitors. Using other measures of competition not reported by managers, like the import

penetration rates (measured by imports as a share of domestic production) or Lerner indices of competition yields a similar general result that management quality tends to increase with competitive intensity.<sup>7</sup>

In general, I interpret this finding as showing that competitive product markets are associated with better management practices. This result could arise through a variety of channels. For example, one route for competition to improve management practices may be through selection, with badly run firms exiting more speedily in competitive markets. A second route may be through incentives to improve practices, which could be sharper when competition "raises the stakes" either because efficiency improvements have a larger impact on shifting market share or because managers are more fearful of losing their jobs. Comparisons of competition data across countries is hard, in part because two of the three measures (Lerner indices of competition and import penetration levels) are not comparable across countries due to differences in accounting definitions and country size. The third measure – the number of competitors reported in the survey – is comparable across countries, but is not ideal because of the aggregated response categories. Using this measure I find that the median Canadian firm reports facing "10 or more" competitors, similar to firms in the US, Japan, Germany and Sweden. Based on this and other evidence from papers like Trefler (2004) I think levels of Canadian competition are pretty high, and not an area of policy concern. But nevertheless, this is an area that needs constant attention because of the ongoing demands from domestic producers for trade protection. Given the fact that the top 22% of Chinese and Indian firms are better than the bottom 50% of Canadian firms continuing to ensure Canadian markets are open to foreign competition should maintain the pressure to continuously improve Canadian management.

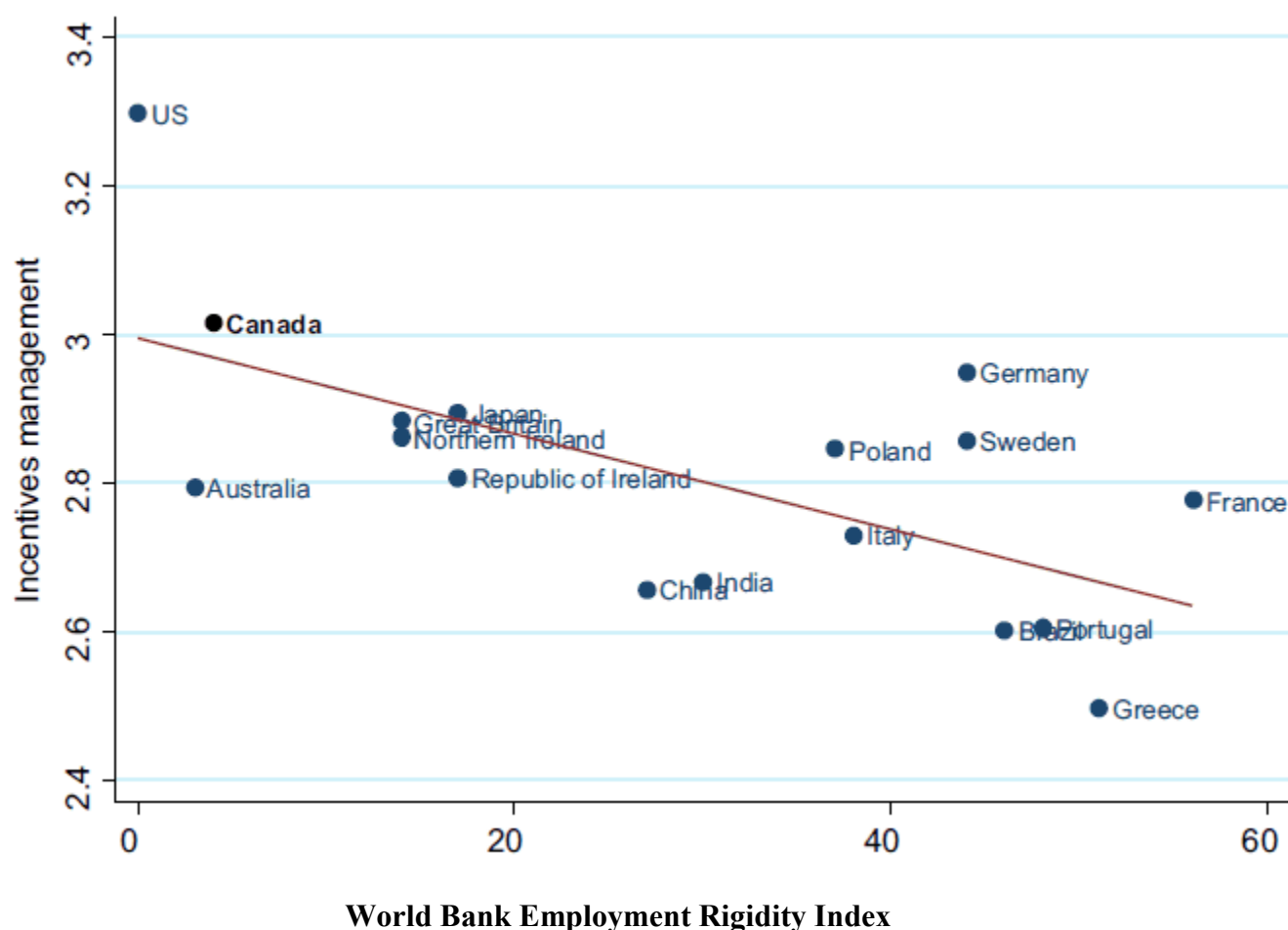
### **Labor Market Regulation**

Labor market regulations that constrain the ability of managers to hire, fire, pay and promote employees could reduce the quality of management practices. Figure 6 plots each country's average management scores on incentives management (questions 7 and 13 to 18 on hiring, firing, pay and promotions) against an employment rigidity index from the World Bank, which focuses on the difficulties that firms face in hiring workers, firing workers and changing their hours and pay. Tougher labor markets regulation is significantly negatively correlated with the management scores on incentives. In contrast, more restrictive labor market regulations are not significantly correlated with management practices in other dimensions like monitoring or targets.

---

<sup>7</sup> The Lerner index is one minus the average profits/sales ratio of all other firms in the country industry cell over the last 5 years. High values suggest low long-run profits, suggestive of tough competition. When we used this and the import measure data I add country and industry dummies to control for things like country size and different reporting requirements – see Bloom and Van Reenen (2007) for details.

**Figure 6: Labor market regulation is light in Canada, a factor which is likely to support its good management practices**



Note: [World Bank index](#) from the *Doing Business* database.

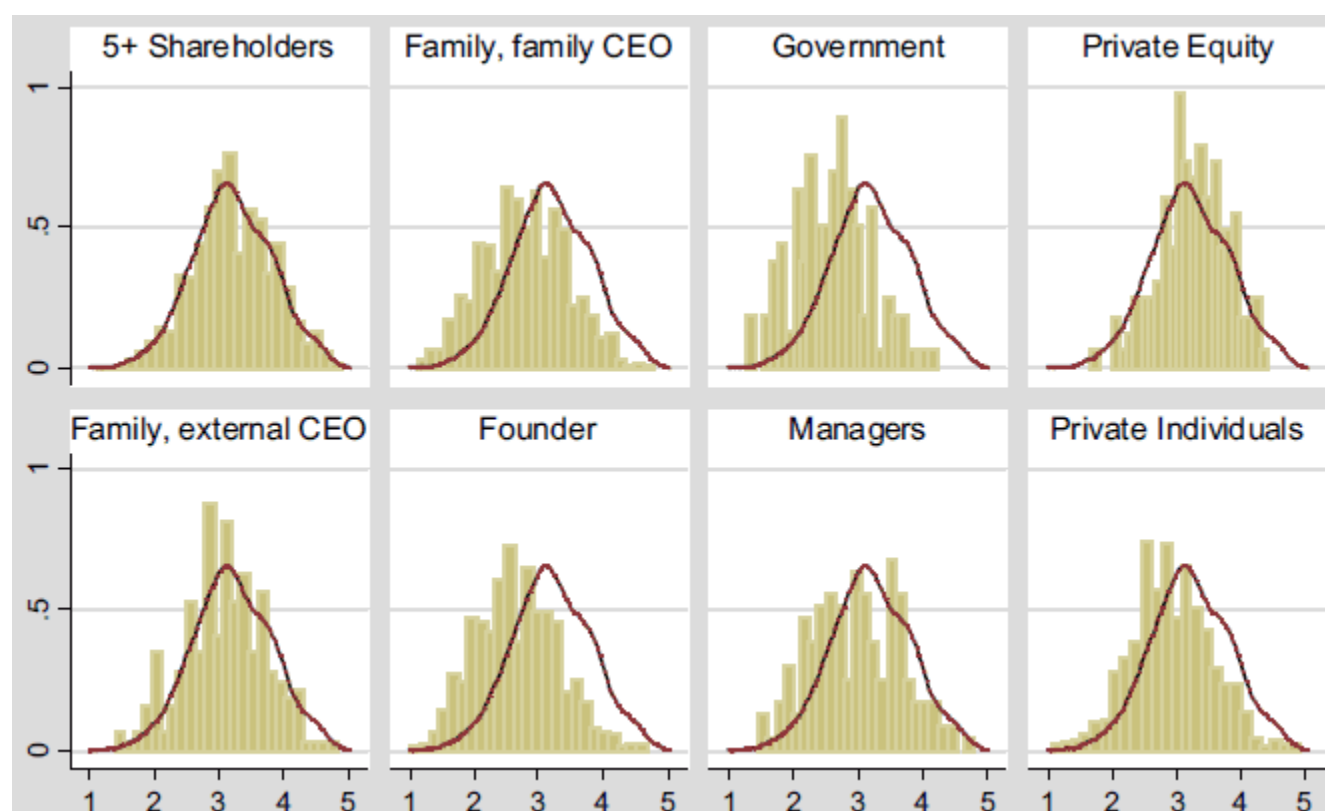
Obviously a number of other factors also vary across countries, so the pattern shown in Figure 6 does not conclusively demonstrate labor market regulations constrain some forms of management practices — but it is certainly supportive of this effect.

Canadian labor markets are pretty unregulated, with only the US having notably less regulated labor market according to the World Bank numbers. So labor market regulation again does not look to be an area for policy concern for Canada. Interestingly, one related area where Canada was distinct from the US was over trade-union presence. Only 16.6% of employees in the US firms we interviewed were covered by trade unions compared to 38.4% in Canada. The anecdotal evidence from the surveys was that trade unions have restricted some of the management practices in Canadian firms, so that policies that reduce the power of trade unions to control management practices may be helpful in improving Canadian management practices.

## Ownership and Meritocratic Selection of the Chief Executive Officer

The firms in our sample can be divided up by ultimate ownership: including dispersed shareholders, family ownership with an external chief executive officer, family ownership with a family chief executive officer; owned by the founder, the government or the managers of the firm; and owned by private equity or private individuals. Figure 7 plots a firm-level histogram by ultimate ownership category. The bars display the distribution of management practices within ownership group. The dotted line is the kernel density for dispersed shareholders – which is a common ownership category in Canada and the most common ownership category in the United States – for comparison. The differences shown across the categories are not primarily explained by differences in countries or in type of industry.

**Figure 7: External Owners and Professional (Rather than Family) Chief Executive Officers Typically are Associated with Better Management Practices**



Distribution of firm management scores by ownership. Overlaid dashed line is the kernel density for dispersed shareholders, a common Canadian and the most common US ownership type.

One interesting group are the family firms, which is defined in our research as firms owned by the descendants of the founder (so sons, daughters, grandsons etc.). Those that are family owned and also family managed ("Family, family CEO") have a large tail of badly managed firms, while the family owned but externally managed ("Family, external CEO") look very similar to dispersed shareholders. The reason appears to be that many family firms typically adopt a rule of

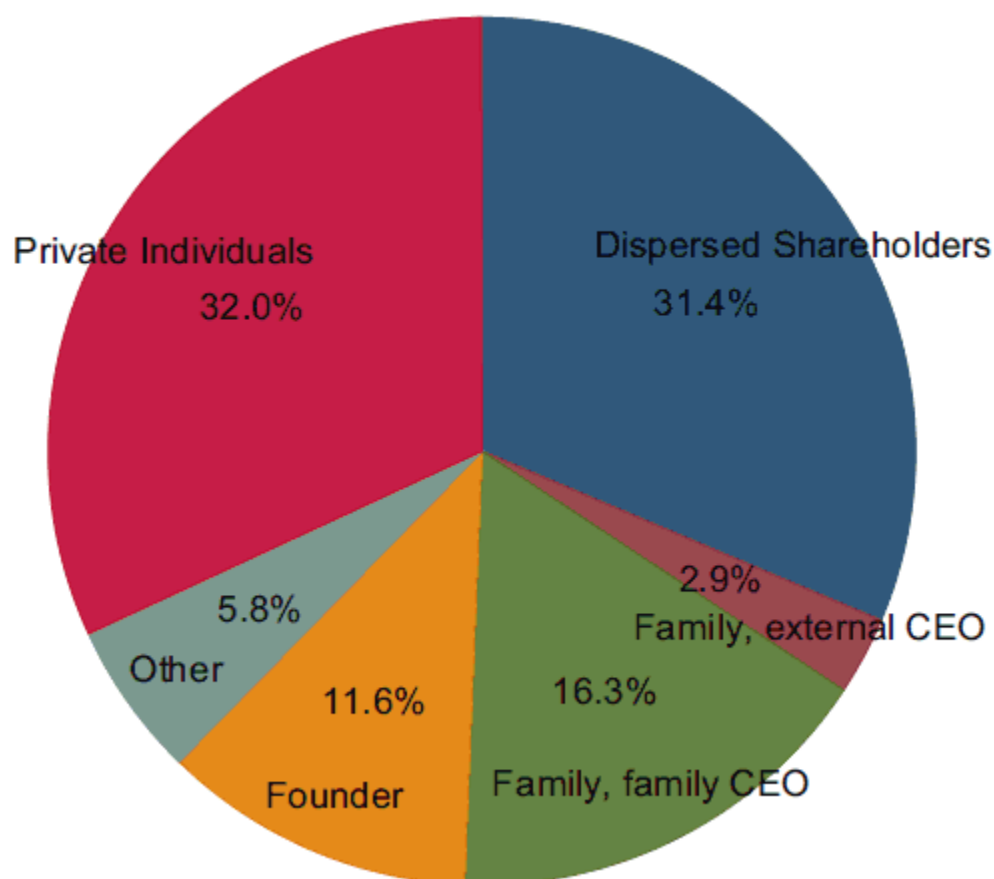


primogeniture, so that the eldest son becomes the chief executive officer, regardless of talent considerations.

Since family firms typically have less debt, product market competition may not be as effective in driving them out of business if they are badly managed. Without debt firms only have to cover operating costs (e.g. salaries and wages) but not capital costs (e.g. the rent on property or equipment since these were typically bought outright many years ago). Hence, family firms can continue to generate positive cash-flow while generating economic losses, because their family owners are subsidizing them through cheap capital. Firms owned by private equity appear well managed, in particular when compared to family and government-owned firms (Bloom, Sadun and Van Reenen, 2009b). Thus, the pattern in recent years of private equity firms purchasing firms in Europe and Asia that were previously under family or government management makes some economic sense. A perhaps surprising result is that "Founder firms"—where the current chief executive officer founded the firm—are also badly managed. We are still trying to understand this phenomenon, but one potential explanation is that the entrepreneurial skills required of a start up (e.g. creativity and risk taking) are not the primary skills required when a firm grows large enough to enter our sample (at least 100 employees). A mature firm needs to move beyond informal rules and these may be implemented more effectively by a professional manager.

In Figure 8 I present a pie-chart of the distribution of these ownership categories within Canada. This shows that "Dispersed Shareholder" (typically publicly listed) and "Private Individual" (typically held by a couple of key investors) firms are the most common. There is a moderately large number of family owned and family CEO firms and a smaller number of founder firms. The general ownership pattern is also similar to the US except that the US has more dispersed ownership firms (45.1%) and less fewer privately held firms (15.7%). But since both these categories tend to be reasonably well managed this should not lead to big differences in management practices between the countries.

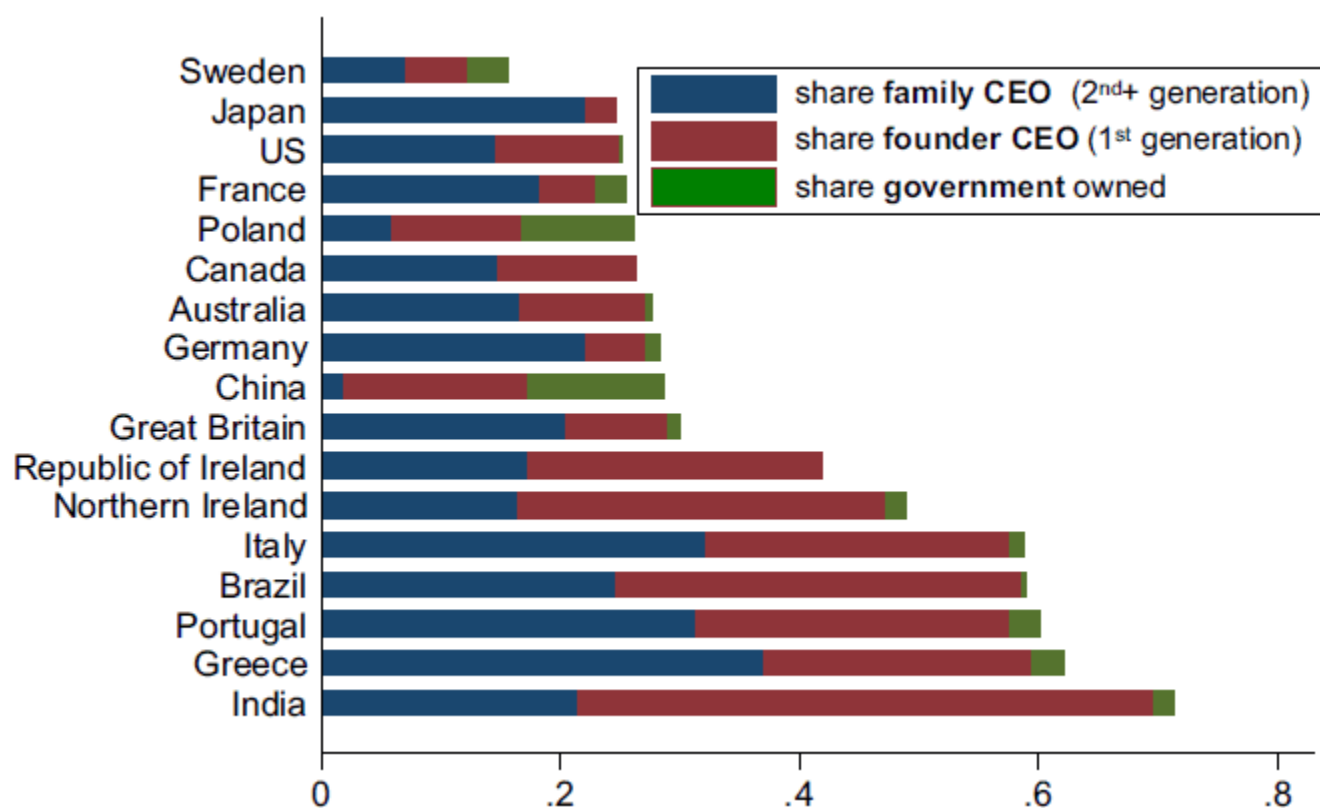
**Figure 8: Canadian Firms are Typically Externally Owned with Professional (Rather than Family) Chief Executive Officers**



**Shares of ownership in the 344 Canadian manufacturing firms interviewed**

Figure 9 shows the ownership shares of the badly managed types of firms – family CE, founder CEO and Government owned – by country. As shown in Figure 8 Canada has a relatively small (about 28%) ownership share of family CEO and founder CEO firms, and no Government owned firms in our survey. By contrast, around three-quarters of the Indian firms are owned either by the firm's founder or one of his descendants, categories that Figure 7 shows typically adopt rather poor management practices. In Italy, Brazil, Portugal, and Greece, the share of firms in the sample that fall into these three categories is roughly 60 percent. One likely explanation for this difference is that the underdevelopment of financial markets and poor rule of law in many developing countries makes the separation of ownership and control extremely difficult.

**Figure 9: Canada's Ownership Patterns are Similar to Other Developed Countries**



**Share of ownership (for types associated with low management scores) in our data**

The Canadian results look in line with those for the US and other developed countries and suggest no major policy concerns. However, it does highlight that any moves to promote family firm ownership – for example through introducing estate tax breaks for family firms – comes with a potential productivity cost.<sup>8</sup> It also suggests that other ownership groups – like private equity – seem associated with superior management practices, suggesting these might potentially be encouraged through Government policy. Other evidence on private equity has also found some evidence for a beneficial impact on productivity (Davis et al. 2008).

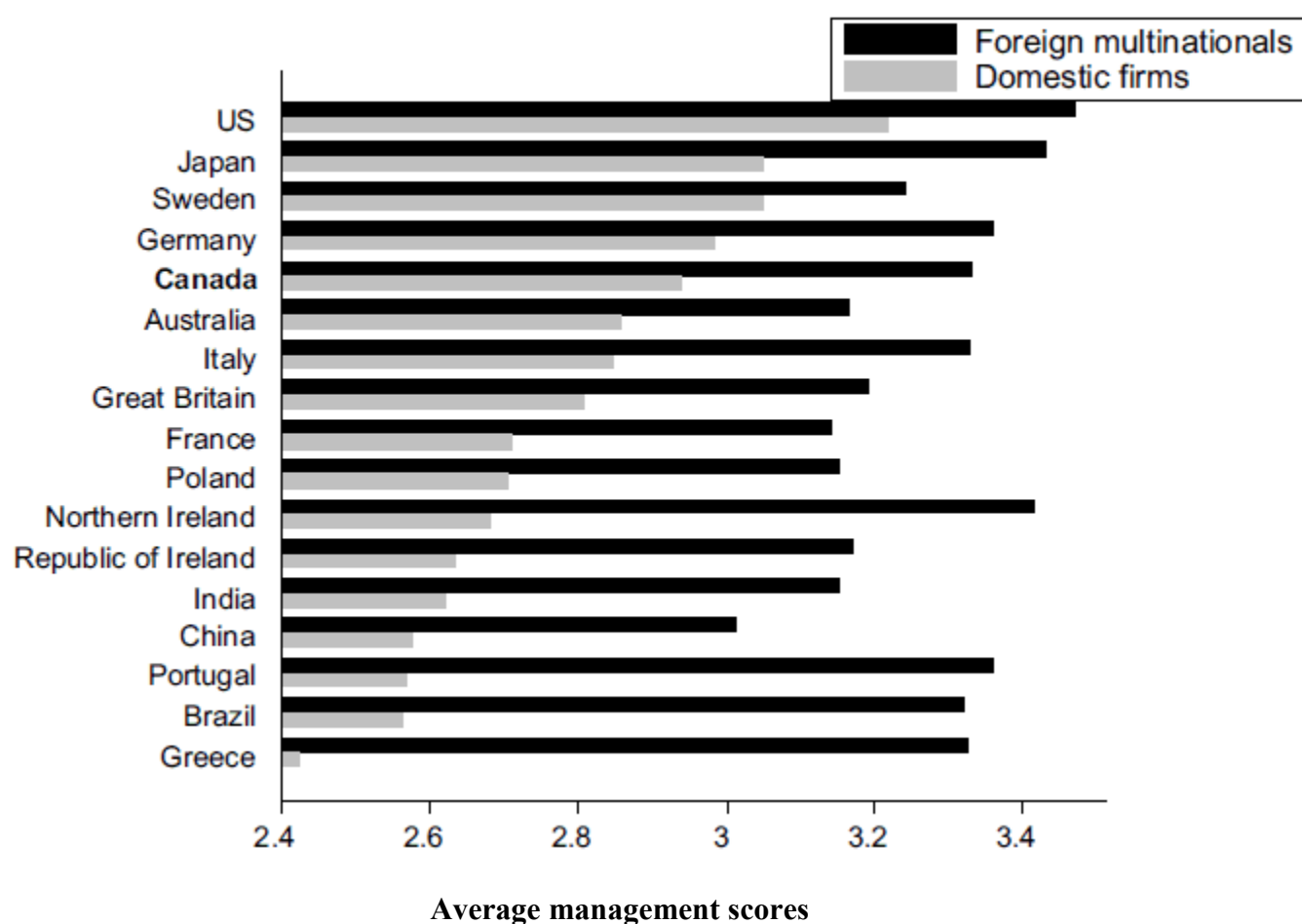
**Multinationals and Exporters**

Figure 10 plots the management scores by country for domestic firms (those with no production facilities abroad) and foreign multinationals (those with a global headquarters abroad). Two

<sup>8</sup>Other work on family ownership has found a negative causal effect of family ownership and control on firm productivity, such as Pérez González (2006) and Bennedsen et al (2007).

results stand out. First, foreign multinationals are better managed than domestic firms, presumably reflecting the selection on management in becoming a multinational. Second, foreign multinationals seem able to partially "transport" their better practices abroad despite often difficult local circumstances. We also find that multinationals transplant other features of their organizational form overseas such as the average degree of decentralization (Bloom, Sadun and Van Reenen, 2009a). We also distinguished by export status. Consistent with the predictions of papers such as Helpman, Melitz and Yeaple (2004) there is a pecking order: average management scores were lowest for non-exporters (2.6), next lowest for non-multinational exporters (2.8) and highest for multinationals (3.2).

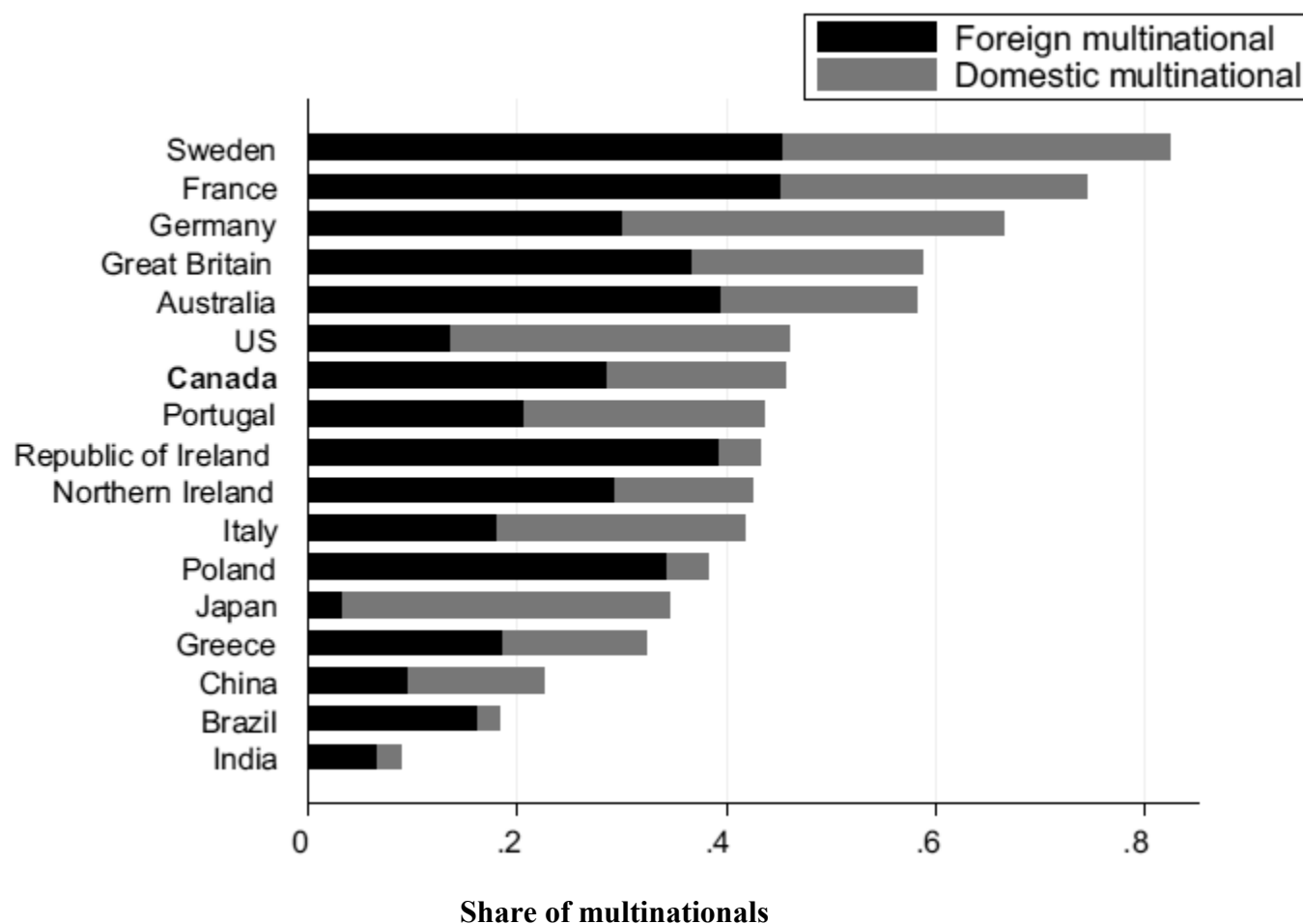
**Figure 10: Multinationals are Well Managed in Canada, as in all Countries**



Canadian results look very much in line with those for other countries with foreign multinationals being significantly better managed than domestic firms. This suggests one clear policy prescription for improving management practices in Canada is to encourage foreign multinationals to locate in Canada. These should increase Canadian management practices and productivity both directly through a composition effect, and also indirectly through spillovers effects arising from the spread of better management practices, from for example worker mobility (see e.g. Poole 2009). Figure 11 reports the current ownership share in our data of

multinationals among medium sized manufacturing firms (our sampling frame of 100 to 5,000 employees). We have shown ownership shares both for foreign multinationals and also domestic multinationals, where the latter are the subsidiaries of Canadian multinationals (like Bombardier in Canada) which also tend to have very good management practices. As can be seen Canada has a high share of foreign multinationals, although this could potentially be increased further towards figures for similarly sized Northern European countries like Germany and the UK.

**Figure 11: Canada has a High Share of Multinationals, Many of Which are U.S. Multinationals**



Foreign multinationals are multinationals with a foreign global headquarters (e.g. Boeing in Canada) while domestic multinationals are multinational firms with a domestic global headquarters (e.g. Bombardier in Canada).

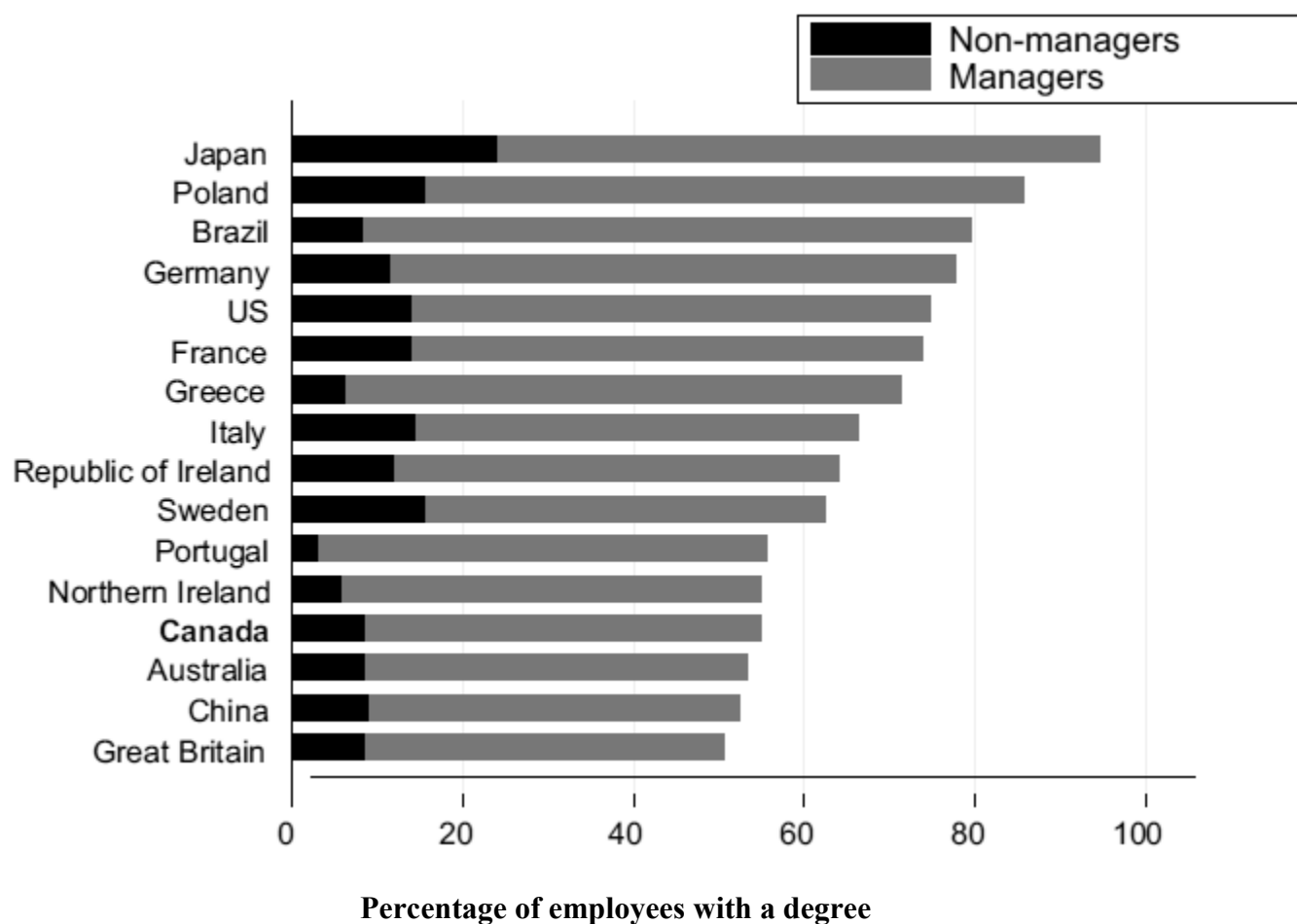
### **Human Capital**

Education is strongly correlated with high management scores is the education levels of the workers and managers. I cannot infer a causal relationship from this association, of course, but it is plausible that managers with formal business education (such as an MBA) or college education are more likely to be aware of the benefits of modern management practices like Lean manufacturing. More surprisingly perhaps, is that worker level education is also positively associated with management scores, suggesting that implementing many of these practices may be easier when the workforce is more knowledgeable. Many of the best practices in [Table 1](#) require significant initiative from workers, such as the Japanese inspired lean manufacturing techniques and higher powered incentives.

My belief is that more basic business education – for example around capital budgeting, data analysis, and standard human resources practices – could help improve management in many countries. This holds particularly true in developing countries, and recent field work I have been doing with firms in India (Bloom et al. 2009) has provided supportive evidence on this.

Interestingly, in the data Canadian education levels are not that good with a relatively low level of employees or managers with a degree compared to similar countries like the US. Figure 12 plots the share of managers and non-managers with a degree in our sample, highlighting a large gap in education levels of Canadian employees in our survey with those in the US and many other advanced countries.

**Figure 12: In Our Sample, Canadian Education Levels are Relatively Poor by International Standards**



### Information

The slow evolution of management practices across the US, Europe and Japan - from Taylor's "Scientific Management", to Ford's mass production, Sloan's M-form corporation, Deming's quality movement, and Toyota's "Lean production" – suggest management practices do have a resemblance to process technologies that diffuse slowly over time. Slow technological diffusion can have many causes (e.g. see Hall, 2003, for a survey), but a well-studied factor is *information*. New management practices are often complex and hard to introduce without the assistance of employees or consultants with prior experience of these. Firms learn from the experiences (good and bad) of others in experimenting with different practices, so not all will adopt immediately. An example is the two decade struggle of US automotive firms to replicate the Japanese Lean manufacturing system.

In the survey we directly asked managers the question "*Excluding yourself, how well managed would you say your firm is on a scale of 1 to 10, where 1 is worst practice, 10 is best practice and 5 is average*". I find firms in Canada have an average score of 7.45 (compared to 7.11 for

other countries) - well above what should be the average – and this score is uncorrelated with either the management score I give them or their firm's own performance on the dimensions in Table 3 such as productivity and profitability. Hence, this suggests that some Canadian managers may not be well informed about how good their own management practices are and which areas need improvement. This is particularly likely to be a problem for smaller Canadian firms – say those with 10 to 50 employees – that have been operating for many years (i.e. family firms). These would be the types of firms that would potentially benefit from Government programs to improve management practices, such as Lean manufacturing advice schemes. This is an area where further research would definitely be helpful.

## 5. Conclusions

Canada's productivity is moderate by international standards, and only 80% of that in the US. One possible reason for this is poor management practices in Canada. I presented evidence here on Canadian management practices, primarily in manufacturing, with some additional evidence on retailing. These figures suggest Canada in fact has good practices, similar to those in firms in Germany, Japan and Sweden and better than firms in most other European countries and the developing world. But Canada's management practices are still not as good as those in the neighboring US.

Studying the reasons for difference in management practices across firms and countries I highlight the critical influence of product market competition in increasing aggregate management by thinning the ranks of the badly managed. Indeed, much of the cross country variation in management appears to be due to the presence or absence of this tail of bad performers. One reason for the high US management scores is that better managed firms appear to be rewarded more quickly with greater market share and the worse managed forced to shrink and exit. Lightly regulated labor markets are also important as they enable managers to adopt the best practices for their firms, rather than have these dictated by Government regulations. Canada should be similar in this dimension to the US with open product markets and light labor market regulation.

A third factor is ownership, with publicly quoted and private equity owned firms appearing to be well managed on average, in particular when compared to Government and inherited family managed firms, with again Canada being similar to the US in terms of ownership patterns. Fourth, worker and manager education seems strongly related to better management – in firms with a higher share of college degree educated workers and managers the management practices are significantly better. This is the one area in our survey where Canada seems to lag behind the US, with lower levels of worker and manager education in our manufacturing sample. We think more investigation of the extent to which Canadian firms are able to recruit suitable trained employees is important.



## Bibliography

- Abramovitz, Moses. 1956. "Resource and Output Trends in the US since 1870." *American Economic Review*, 46(2): 5-23.
- Atkeson, Andrew, and Patrick Kehoe. 2005. "Modeling and Measuring Organization Capital." *Journal of Political Economy*, 113(5): 1026-53.
- Bartelsman, Erik, John Haltiwanger, and Stefano Scarpetta. 2008. "Cross Country Differences in Productivity: The Role of Allocative Efficiency." University of Maryland mimeo.
- Bennedsen, M. Nielson, K. Pérez-González, F and Wolfenzon, D. 2007 Inside the Family Firm: The Role of Families in Succession Decisions and Performance. *Quarterly Journal of Economics*, 122(2): 647-691.
- Bertrand, Marianne, and Antoinette Schoar. 2003. "Managing with Style: The Effect of Managers on Firm Policies." *Quarterly Journal of Economics*, 118 (4): 1169-1208.
- Bertrand, Marianne, and Antoinette Schoar. 2006. "The Role of Family in Family Firms." *Journal of Economic Perspectives*, 20(2): 73-96.
- Black, Sandra, and Lisa Lynch. 2001. "How to Compete: The Impact of Workplace Practices and Information Technology on Productivity." *Review of Economics and Statistics*, 88(3): 434-45.
- Bloom, Nicholas, Benn Eifert, Aprajit Mahajan, David McKenzie, and John Roberts. 2009. "Management as a Technology: Evidence from India." Stanford mimeo.
- Bloom, Nicholas, and John Van Reenen. 2006. "Measuring and Explaining Management Practices Across Firms and Countries." Centre for Economic Performance Discussion Paper 716.
- Bloom, Nicholas, and John Van Reenen. 2007. "Measuring and Explaining Management Practices Across Firms and Countries." *Quarterly Journal of Economics*, 122(4): 1341-1408.
- Bloom, Nicholas, Christos Genakos, Ralf Martin, and Raffaella Sadun. 2008. "Modern Management: Good for the Environment or Just Hot Air." NBER Working Paper 14394.
- Bloom, Nicholas, Christos Genakos, Raffaella Sadun, and John Van Reenen. 2009. "Management Practices around the Globe", Stanford mimeo.

- Bloom, Nicholas, Tobias Kretschmer, and John Van Reenen. 2009. "Work-life balance, Management Practices and Productivity." forthcoming in R. Freeman and K. Shaw, eds. *International Differences in the Business Practices and Productivity of Firms*.
- Bloom, Nicholas, Raffaella Sadun, and John Van Reenen. 2007. "Americans do IT Better: American Multinationals and the Productivity Miracle." NBER Working Paper 13085.
- Bloom, Nicholas, Raffaella Sadun, and John Van Reenen. 2009a. "The Organization of Firms across Countries." NBER Working Paper 15129.
- Bloom, Nicholas, Raffaella Sadun, and John Van Reenen. 2009b. "Do Private Equity Owned Firms Have Better Management Practices?" Centre for Economic Performance Occasional Paper 24.
- Bresnahan, Timothy, Erik Brynjolfsson, and Lorin Hitt. 2002. "Information Technology, Workplace Organization and the Demand for Skilled Labor: Firm-level Evidence." *Quarterly Journal of Economics*, 117(1): 339-76.
- Burstein, Ariel, and Alexander Monge-Naranjo. 2009. "Foreign Know-how, Firm Control, and the Income of Developing Countries." *Quarterly Journal of Economics*, 124(1): 149-195.
- Chandler, Alfred, *Scale and Scope: The Dynamics of Industrial Capitalism* (Cambridge, MA: Belknap Press, 1994).
- Davis, S., Haltiwanger, J., Jarmin, R., Lerner, J. and Miranda, J. Private Equity and Employment In Gurung, A. and Lerner, J. (eds.) *Globalization of Alternative Investments Working Papers Volume 1: Global Economic Impact of Private Equity 2008*, New York: World Economic Forum, 2008: 43-64.
- Foster Lucia, John Haltiwanger, and Chad Syverson. 2009. "Reallocation, Firm Turnover and Efficiency: Selection on Productivity or Profitability." *American Economic Review*, 98(1): 394-425.
- Griliches, Zvi. 1996. "The Discovery of the Residual: A Historical Note." *Journal of Economic Literature* 34(3): 1324-30.
- Hall, Bronwyn. 2003. "Innovation and Diffusion.", p 459-483 *Handbook of Innovation*, in Fagerberg, Jan, Davis Mowery, and Richard Nelson, eds. Oxford: Oxford University Press.
- Hall, Robert, and Charles Jones. 1999. "Why Do Some Countries Produce So Much More Output Per Worker Than Others?" *Quarterly Journal of Economics*, 114(1): 83-116.

- Helpman, Elhanan, Marc Melitz, and Stephen Yeaple. 2004. "Export versus FDI with Heterogeneous Firms." *American Economic Review*, 94(1): 300-16. 245
- Hopenhayn, Hugo. 1992. "Entry, Exit, and Firm Dynamics in Long Run Equilibrium." *Econometrica*, 60(5): 1127–50.
- Hsieh, Chiang-Tai, and Pete Klenow. 2007. "Misallocation and Manufacturing TFP in China and India." NBER Working Paper 13290.
- Ichniowski, Casey, Kathryn Shaw, and Giovanna Prenushi. 1997. "The Effects of Human Resource Management: A Study of Steel Finishing Lines." *American Economic Review*, 87(3): 291-313.
- Inklaar, Robert, and Marcel Timmer. 2008. "GGDC Productivity Level Database: International Comparisons of Output, Inputs and Productivity at the Industry Level." Groningen Growth and Development Centre Research Memorandum GD-104. Institute for Competitiveness and Prosperity, 2010, "Management matters in Canada's retail industry", forthcoming ICP Working Paper 13, April 2010.
- Jones, Chad, and Paul Romer. 2009. "The New Kaldor Facts: Ideas, Institutions, Population, and Human Capital.", NBER working paper 15094.
- La Porta, Rafael, Florencio Lopez-de-Silanes, Andrei Shleifer, and Vishny, Robert. 1997. "Legal Determinants of External Finance." *Journal of Finance*, 52(3): 1131-50.
- Landes, David, *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present* (Cambridge, UK: Cambridge University Press, 1969).
- Lazear, Edward, and Paul Oyer. 2009. "Personnel Economics." in Robert Gibbons and John Roberts, eds. forthcoming in *Handbook of Organizational Economics*.
- Lileeva, Alla and Trefler, Daniel (2010), "Improved Access to Foreign Markets Raises Plant-Level Productivity ... for Some Plants," forthcoming *Quarterly Journal of Economics*.
- Lucas, Robert. 1978. "On the Size Distribution of Business Firms." *Bell Journal of Economics*, 9(2): 508-23.
- Melitz, Marc. 2003. "The Impact of Trade on Intra-industry reallocations and Aggregate Productivity Growth." *Econometrica*, 71(6): 1695-1725.
- Pérez-González F. 2006 *Inherited Control and Firm Performance*. *American Economic Review*, 96(5): 1559–1588.

- Poole, Jennifer, 2009, "Knowledge Transfers from Multinational to Domestic Firms: Evidence from Worker Mobility", UCSC mimeo.
- Prescott, Edward C., and Michael Visscher. 1980. "Organization Capital." *Journal of Political Economy*, 88(3) 446-61.
- Syverson, Chad. 2004a. "Product Substitutability and Productivity Dispersion." *Review of Economics and Statistics*, 86(2): 534-50.
- Syverson Chad. 2004b. "Market Structure and Productivity: A Concrete Example." *Journal of Political Economy*, 112(6): 1181-1222.
- Trefler, Daniel 2004, "The Long and Short of the Canada-U.S. Free Trade Agreement." *American Economics Review* 94 (September 2004): 870-895.
- Van Reenen, John. 1996. "The Creation and Capture of Economic Rents: Wages and Innovation in a Panel of UK Companies." *Quarterly Journal of Economics*, 111 (443): 195-226.
- Woodward John 1958. *Management and Technology*, Cambridge: Cambridge University Press.