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Per Capita Income, International Trade Puzzles, and CO_2 Emissions

Justin Caron and Thibault Fally

After estimating preferences and productivity across sectors and countries, we find that the cross-country differences in per capita income and their implication for consumption baskets can shed light on trade patterns and explain why there is not as much trade as we might expect from standard trade models. We also find an important role for per capita income and consumption patterns in explaining cross-country differences in CO_2 emissions.

Also in this issue

With the large growth in international trade flows over the recent decades, and with terms such as "globalization" and the "death of distance" occupying newspaper headlines, one may believe that we have gone a long way from autarky to free trade. We are still very far, however, from a world with frictionless trade. While international trade amounts to 20% of World GDP, this number would be up to 90% in a world without trade frictions (computed for final goods trade).

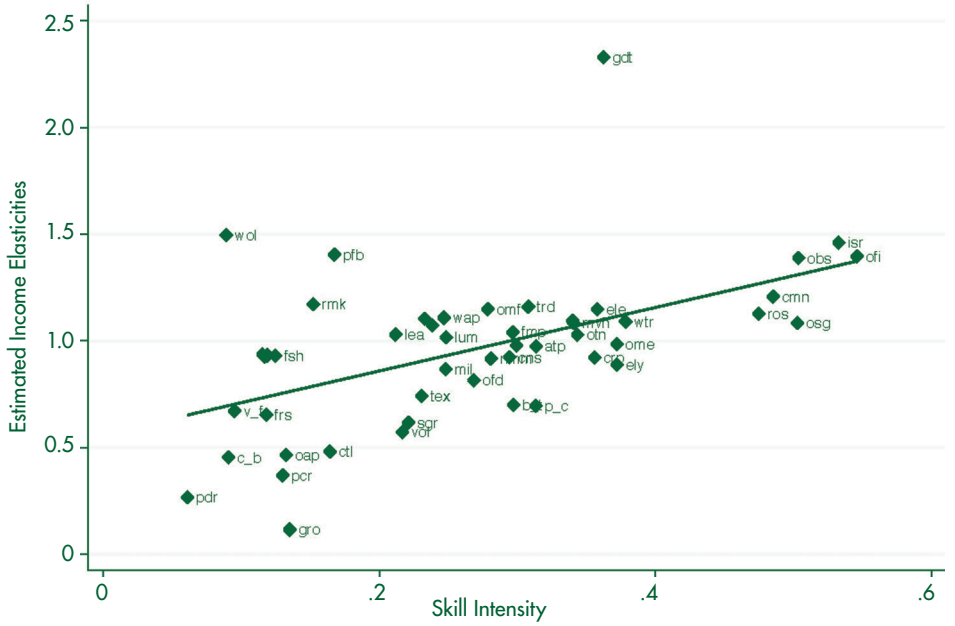
Countries with large differences in income per capita trade much less than countries with comparable incomes. Moreover, international trade is still highly localized: distance has a large negative effect on trade flows, and this effect has only become stronger over the past decades.

In this age of "globalization," this lack of trade observed in the data is a central puzzle for trade economists. Some call it the "Home Bias Puzzle": crossing a border has the same effect as a large increase in prices, even within a custom union such as the European Union. Some others call it the "missing trade puzzle," looking at the factors of production embodied in trade flows: countries do not trade much, even if they have very different endowments in production factors (skilled labor, unskilled labor, capital stock, land). Most of the literature, however, has focused on supply side effects: trade costs, marketing costs, productivity differences, institutional barriers, financial constraints, uncertainty, and price volatility, etc.

In recent research, we ask the following: can per capita income and differences in consumption baskets shed light on these trade puzzles? For most economists and non-economists, it seems rather obvious that the differences in per capita income across countries lead to large differences in consumption baskets and differences in the type of goods being imported by each country. Trade economists, however, have long neglected this aspect because most data focus on the supply side, and it is difficult to identify how much is driven by the demand side (consumer preferences) from how much is driven by the supply side (endowments, productivity differences, and trade costs).

In Caron et al., we propose an estimation strategy that allows us to identify demand parameters by looking at the patterns of trade flows. By comparing trade across country pairs for each industry, we are able to disentangle demand side effects (e.g., higher demand by some countries in a specific industry) from supply side effects. This allows us to estimate "non-homothetic preferences" (i.e., preferences where consumption shares

Figure 1. Correlation Between Income Elasticity and Skill Intensity



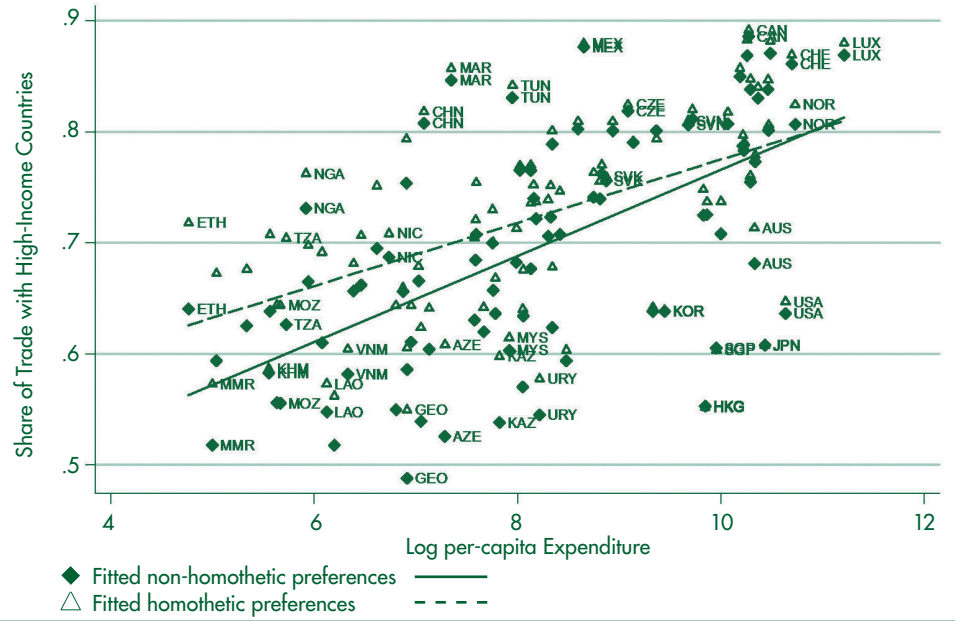
Note: Income elasticities evaluated at median country expenditure shares

directly depend on per capita income (as opposed to commonly used "homothetic preferences" where consumption only depends on prices). In a second step, we can then illustrate the role of the demand side and per capita income in explaining trade puzzles.

Why Do Preferences and Consumption Baskets Matter?

After estimating consumer preferences, we find large differences in consumption patterns across income groups, even after controlling for differences in prices. More importantly, we find these differences in consumption patterns to be systematically related to the demand for skilled labor workers in a sector, e.g., workers with a college education relative to "unskilled" labor with less than a high-school degree. This finding is illustrated in Figure 1 above.

Figure 2. Share of Trade with Rich Partners (Imports and Exports for Each Country)



Industries that require relatively less skilled labor (lower values on the X-axis) tend to be income "inelastic" (lower values on the Y-axis): a 1% increase in income leads to an increase in consumption of only half a percent (e.g., rice and many other agricultural goods). Industries that require relatively more skilled labor (higher values on the X-axis) tend to be income "elastic" (higher values on the Y-axis): a 1% increase in income leads to an increase in consumption of more than 1% (e.g., electronic equipment, financial services, etc.). This implies that richer countries tend to consume relatively more skilled-labor-intensive goods than other countries.

Why Does This Correlation Specifically Matter for International Trade?

Because richer countries tend to be more abundant in skilled labor, they tend to have a comparative advantage in skilled-labor-intensive industries. By combining this fact with the one above, we obtain a simple prediction: high-income countries tend to consume goods produced by other high-income countries rather than low-income countries!

We show that this demand-driven channel is quantitatively important. This is illustrated in Figure 2. Most low-income countries tend to sell less than 60% of their exports to high-income countries (per capita income above $10,000) while the richest countries like Switzerland and Luxemburg sell 90% of their exports to other high-income countries. Part of this pattern can be explained by distance and trade costs (dashed line and triangles), but we obtain larger differences once we account for the demand-driven channel mentioned above (solid line and squares in Figure 2).

This is also particularly striking if we look at the "net factor content" of trade, i.e., the amount of factors:

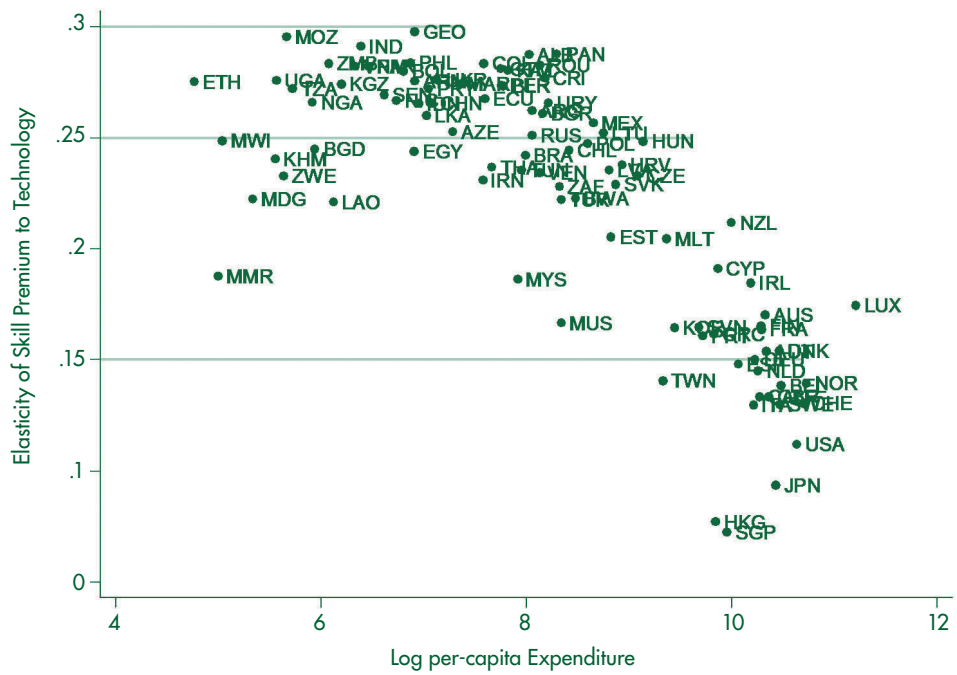
skilled labor, unskilled labor, capital, land, etc. required to produce exported goods minus imported goods. According to the standard models of trade, countries abundant in a factor should export (in net) goods that are relatively more intensive in this factor and import goods intensive in the relatively scarce factor. This is not what we see in the data: the net factor content of trade is much smaller than predicted by standard models (e.g., in skilled vs. unskilled workers), especially with poor countries. This is the "missing trade puzzle" identified by Trefler in a seminal paper published in the *American Economic Review* in 1995. Again, we show in Caron et al. that our demand-driven channel can partially explain this puzzle and reduce by almost half the gap between theory and data: with the mechanism above, countries tend to consume goods that are more intensive in the factors that are abundant at home, leading to smaller net factor content of trade.

Implications for the Relative Wage of Skilled Workers

The correlation depicted above also has interesting implications for the skill premium (relative wage of skilled labor vs. unskilled labor). It predicts that richer consumers tend to consume goods that require relatively more skilled labor. Hence, in this framework, a homogenous productivity increase in all sectors and countries is no longer neutral and leads to an increase in the demand for skilled labor relative to unskilled labor. Mechanically, this leads to an increase in the relative wage of skilled labor.

In Caron et al. (2012 NBER working paper), we simulate a 1% homogenous productivity growth across all sectors and countries. The results are described in Figure 3. The Y-axis corresponds to the growth in the skill premium (in %): it is positive for all countries in our simulation (94 countries in our sample).

Figure 3. Effect of a One Percent Productivity Increase on the Skill Premium



Moreover, this effect is much larger for lower-income countries (lower values on the X-axis) than high-income countries (higher values on the X-axis). For instance, for China, a 1% productivity growth leads to a 0.25% increase in the relative wage of skilled workers. Given that China grows by almost 10% a year, this demand-driven effect on the skill premium can be very large. For the richest countries, this mechanism is quantitatively less important: a 1% increase in productivity only leads to a 0.1% increase in the skill premium.

Demand and CO_2 Consumption

In our most recent project, we look at the environmental implications of shifting consumption patterns. We use the same tools as above to answer a very different question: how can we explain the differences in CO_2 emissions across countries?

With "non-homothetic" demand, differences in per capita income can affect aggregate energy demand and CO_2 emissions if rising income skews consumption towards more or less CO_2-intensive goods. We can think, for example, of households moving from low- to middle-income levels that start to purchase refrigerators in increasing amounts, increasing the CO_2 intensity of their consumption basket (the average physical amount of CO_2 emitted to produce each dollar of the goods they consume). Consumers in high-income countries, on the other hand, may have enough with their one fridge and spend increasing amounts of their budgets on going out to a restaurant, which, per dollar of value, does not require much energy.

We provide a systematic assessment of the role of shifting consumption patterns on emissions over a set of countries, which spans most of the per capita income spectrum and accounts for most of the world's GDP. Relative to previous research, which has focused on the relationship between household expenditure patterns and emissions in specific countries, or focused on specific goods (for example the adoption of air conditioners in China), we can provide aggregate estimates of the role of consumption.

Our data and model allow us to uncover patters of comparative advantage in the production of CO_2-intensive

Most low-income countries tend to sell less than 60% of their exports to high-income countries (per capita income above $10,000) while the richest countries like Switzerland and Luxemburg sell 90% of their exports to other high-income countries.

goods. We can thus identify the role of income in determining energy demand, making sure that we are not confounding it for the fact that some countries may simply have a higher availability of energy or energy-intensive goods and services. We find that the share of consumer expenditure spent on energy (fossil fuels and electricity) decreases with income in all but the least developed economies. Interestingly, we also find a negative correlation between the income elasticity and the total CO_2 intensity of non-energy goods: in broad terms, richer consumers tend to spend proportionally more money on "clean" services.

Across countries, we find that this contributes to explaining the observed "inverted-U" relationship between a country's average level of per capita income and the CO_2 intensity of its average consumption basket. The fact that consumers buy different sets of goods contributes to explaining why the CO_2 intensity of middle-income countries is on average significantly higher than that of low- and high-income countries.

Since we know that per capita income is a good predictor of how consumption patterns evolve, we can then use it to predict how shifts in consumption will affect the evolution of CO_2 intensities, even absent technological change. Using general equilibrium simulations, we find that rising incomes will lead to large reductions in the direct CO_2 intensity of consumption in most countries. However, once the total demand for energy is taken into account, the effect becomes much weaker in low- and middle-income countries. We conclude that shifting consumption patterns has the potential to mitigate the effect of economic growth of global emissions, but only modestly in the short run.

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For additional information, the authors recommend:

Caron, J., T. Fally, and J.R. Markusen, 2012. "Skill Premium and Trade Puzzles: A Solution Linking Production and Preferences." NBER Working Paper No. 18131. http://www.nber.org/papers/w18131.

Caron, J., T. Fally, and J.R. Markusen, 2014. "International Trade Puzzles: A Solution Linking Production and Preferences." *Quarterly Journal of Economics* 129(3): 1501-1552. http://qje.oxfordjournals.org/content/129/3/1501.abstract.

Caron, J., and T. Fally, "Per Capital Income, Consumption Patterns, and CO2 Emissions." Working paper.

Adoption of Water-Related Technology and Management Practices by the California Avocado Industry

Julie Escalera, Ariel Dinar and David Crowley

We conducted a survey to examine factors that influence adoption of water-saving technologies and management practices by avocado producers in California who face scarce water quantity and deteriorated quality conditions. The research showed that location of orchard, high field landscape variability (irrigation complexity), and cost of water were among the main factors influencing adoption of irrigation technology and water management practices.

Multiyear drought in California has forced growers to re-evaluate water use in agricultural production. Avocado is one of the most water-intensive orchard crops, requiring approximately 50 gallons of water per pound of fruit. The recent 2009–2014 drought in California, along with anticipated decreases in high-quality irrigation water drive the adoption of water conservation practices, but the available technologies and management practices are not yet fully adopted by all growers. In this article, we report the results of a survey that was carried out to examine the socioeconomic and management factors associated with adoption of water conservation practices.

Prior research has shown that growers based their adoption decisions on farm operation complexity, financial risks, water quality, and cost of production. Other factors that influence adoption decisions are grower education, experience, use of University of California Cooperative Extension (UCCE), and farm size. To examine the importance of these factors for adoption and conservation decision-making by avocado growers, we collected information on these factors across representative farms and growing conditions in California. We estimated regression models to evaluate marginal contributions of the various factors.

California avocados, which account for 90% of production in the U.S., are commercially grown in six California counties: Orange, Riverside, Santa Barbara, San Luis Obispo, San Diego, and Ventura (Figure 1). Avocado production covers an area of nearly 52,000 acres and is managed by about 5,000 grower operations. Avocado growers have to manage highly saline and/or high-chloride water, interruptions to water delivery, mandatory reductions in water use, and rising cost of water.

Expenses on water represent the highest share of total production cost, suggesting that proper management of

Figure 1. Distribution of Avocado Orchards in California Included in the Survey

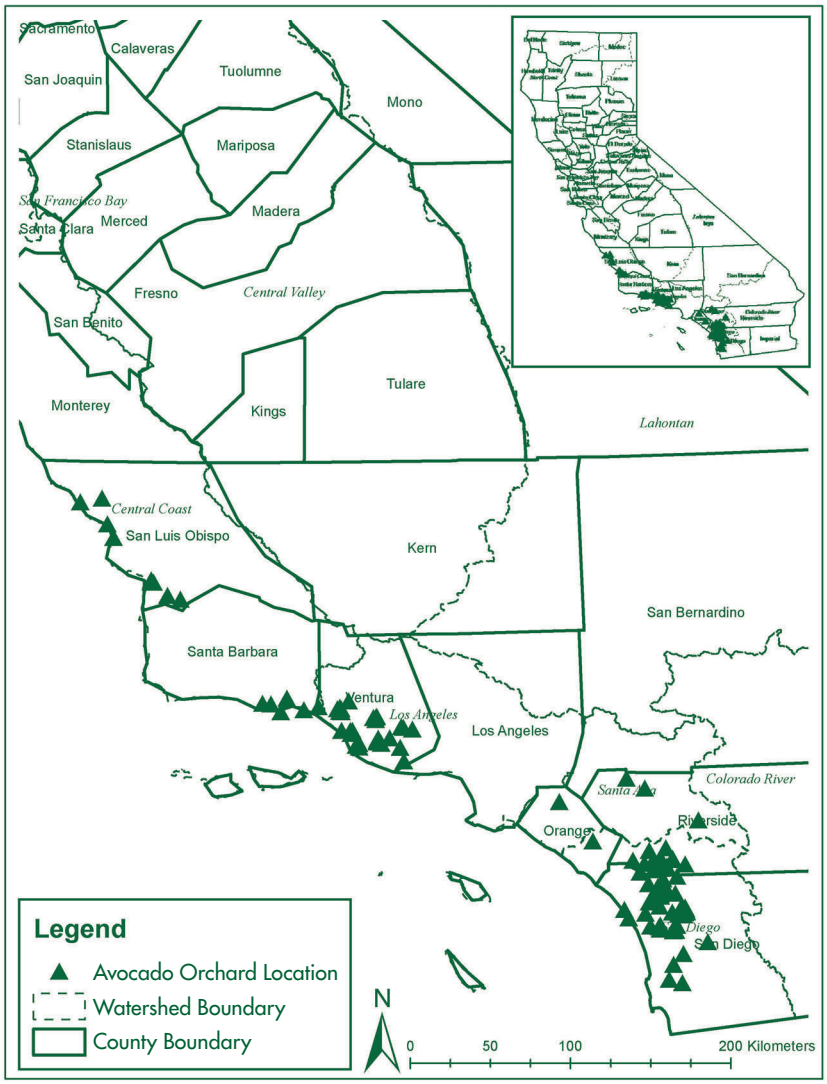
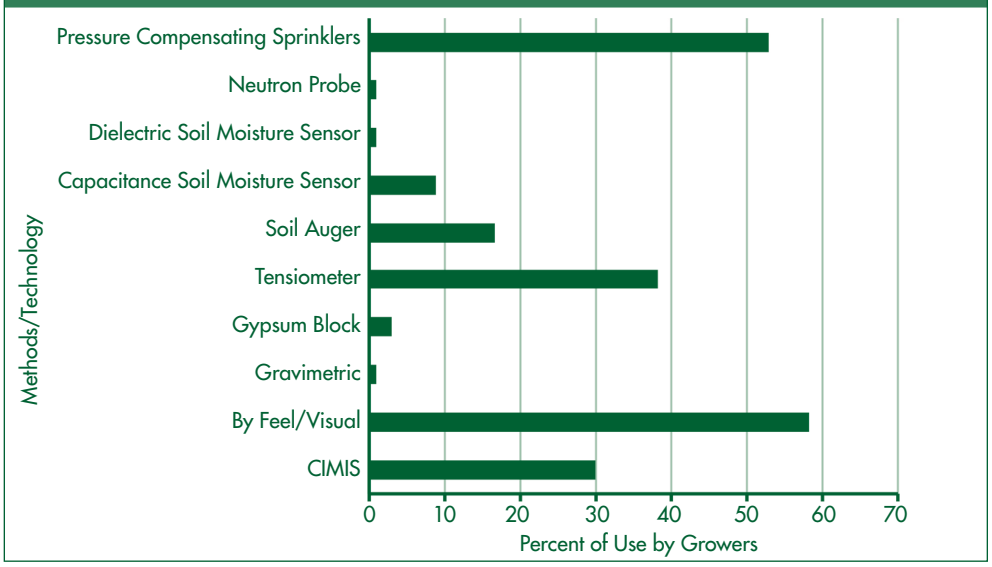


Figure 2. Methods Used by CA Avocado Growers to Determine When to Irrigate



this input is critical for profitability. To date, there is no research on avocado production under water scarcity or on the determinants of adoption with respect to water-saving practices or response to decreasing water supplies and qualities. Due to severe drought and limited quality of agricultural irrigation water in areas such as San Diego County, the results of this research are timely and essential for guiding policy to enable growers to withstand continued years of drought.

Many water management technologies are available to growers and are in use by some (Figure 2). Data from our survey show that only 50% of California avocado growers use soil moisture monitoring technologies to manage irrigation. Gypsum blocks and tensiometers are the most commonly used soil moisture technologies by all farmers. They are inexpensive and easy to use. In our study, we found that among avocado growers, only 3% use gypsum blocks and 38% use tensiometers for irrigation management.

Our hypothesis was that socioeconomic factors (age, education, gender), rather than cost or management structure, largely influence adoption of water-saving technologies. Our approach was to develop a theoretical model where adoption is a function of socioeconomic, agroecological, and informational factors as described below.

Literature Review

Interruption in supply of water quantity and deteriorated quality can cause reduced yields, death of trees, and damage to soil chemistry and structure. Although not evaluated on avocado crops, other survey studies (detailed information on the individual studies is available from the authors) suggest that drought conditions lead growers of annual crops to adopt modern water-saving technologies.

Additional findings in the literature suggest that orchard growers are willing to adopt water-saving technologies if they anticipate a combination of benefits from various improvements, such as savings in energy and water. Modification of irrigation technologies, management practices, and cropping patterns to create 'technology bundles' was also observed. Such bundling provides flexibility in handling extreme climatic and water supply changes.

Several studies report that the management structure of the farm, and its size and between-field landscape variability, play an important role in on-farm adoption of water technologies. Growing high-cash crops and crops that are sensitive to water quality (salinity) and soil properties affect the adoption of water efficient irrigation technologies.

A recent study by Genius et al. quantified the role of information transmission in promoting agricultural adoption and diffusion through extension services and social learning in the case of olive production. Findings suggest that socioeconomic variables such as age, experience, and education had a significant impact on a farmer's adoption behavior and that extension agents and other farmers are the primary source of technology information for farmers. As Tey and Brinda found, not only is the existence of that information important for adoption, but realizing the benefits from the information is important as well.

Theoretical Framework

Based on the works reviewed earlier, we suggest a model that captures the behavioral relationship of grower adoption of irrigation technology and management practices under water scarcity and deteriorated quality. We consider socioeconomic variables such as age, education, experience, cost of inputs, and management structure of the farm as one set of variables. Location of the orchard, farm size, within plot variation of landscape, and soil properties are considered agroecological variables and may have fixed effects on adoption. Location can determine water quality and cost, as well as climatic factors involved with irrigation management

We consider the use of UCCE services, the California Avocado Commission, and interaction with other growers as sources of information. We asked growers where they went for information on specific topics, how often they use those sources, and the level of importance they attribute to those sources. Table 1 provides a summary of the variables we considered and their expected impact.

Empirical Application

Data collection was carried out during 2012–2013, using a survey instrument comprised of 71 questions (available from authors). We received 123 responses, which corresponds to nearly 2% of the avocado growers in California. Table 2 shows the distribution of number of growers and the acreage studied in each county. Data were analyzed using Logit and Ordinary Least Squares (OLS) regressions within the statistical package STATA.

The dependent variable in the adoption model was defined as either the use of a water-conserving irrigation technology (e.g., tensiometer, California Irrigation Management Information Systems (CIMIS)), or a water-saving management practice (e.g., frequency of using soil moisture equipment, testing irrigation for salinity, getting a water audit to improve distribution uniformity, and use of management response to water shortages). The independent variables in the adoption model are described in Table 1, based on the literature reviewed.

Table 1. Variables Affecting Adoption of Irrigation Technologies and Hypotheses Regarding Their Impact

Determinant of Adoption	Variables Used	Hypotheses Regarding Impact on Adoption
Socioeconomic factors	Operator age, years of experience, formal education, ownership type, cost of water, tenure (ownership)	Older growers may be less likely to adopt; growers with more years of experience, higher formal education, larger operations, and with higher cost of water will be more likely to adopt irrigation technologies and irrigation management practices.
Agroecological factors	Farm size, location of farm, soil properties	Growers who are full-time operators, with larger farm size, and located in areas with decreased water supplies will be adopters of irrigation technologies and irrigation management practices.
Informational factors	Use of Cooperative Extension, California Avocado Commission, and growers. Importance placed on information collected from each source.	Growers who use informational factors such as UCCE, and place a high level of importance on these factors, will be more likely to use irrigation technologies and water-saving practices than growers who do not use information factors or place low importance on them.

Discussion

This survey showed that several factors influenced the adoption of water-saving technologies by avocado growers in California. The most important factors were owner's age, location of orchard, high field variability (irrigation complexity), cost of water, and information collected from UCCE and growers. Growers in Riverside or San Diego County were more likely to adopt water-saving technologies and apply water-related management practices than those in the other counties. Growers within these two counties were also more likely to use CIMIS as a tool for irrigation scheduling and to take advantage of free water audits to improve water use. Also, compared to other counties, they made more management decisions regarding the long-term water management of their orchard such as stumping trees, cutting off water, and removing trees.

The share of growers using water audit services in order to improve irrigation efficiency by increasing their distribution uniformity was 52%. Forty-eight percent of growers had to take some action such as stumping trees, cutting off water, or removing trees in order to mitigate reductions in water delivery and quality.

Growers who rated information from UCCE as an important source were more likely to use CIMIS and tensiometers as tools for determining irrigation timing. The average rating for UCCE by growers was 3.4, with zero being not at all important to 5 being extremely important. Growers who placed a high level of importance on information collected through grower-to-grower interactions were more likely to use water audits and CIMIS as a way to conserve water.

Orchard landscape variability had a significant effect on adoption—those with high field variability (e.g., steep slopes, poor soil quality, and irregular shape of irrigated blocks) used tensiometers (32%) and CIMIS (30%), and they had higher responses to having had to make water-saving management decisions such as stumping, etc.

Water price was also important for predicting whether a grower chose to get a water audit or make water-saving decisions. Water prices

Table 2. Avocado Water Use Survey Observations

California County	No. of Growers	Avocado (Acres)
Orange	2	94
Riverside	16	734
San Diego	51	1036
Santa Barbara	12	304
San Luis Obispo	8	151
Ventura	34	1580
Total	123	3899

California avocados account for 90% of production in the United States and many growers face challenges with water supply and quality. This study examines several factors that influence the adoption of water-saving technologies by avocado growers in California.

ranged from $1.26/hcf (one hundred cubic feet) to $3.93/ hcf, with the highest prices reported in San Diego and Riverside Counties.

For managing salinity and leaching, growers who irrigated with groundwater tested their water for salinity. Groundwater and district water chloride values ranged from 84 to 134 parts per million (ppm). (Negative effects of chloride on avocado production can be seen at levels above 75 ppm.) Growers who irrigated their orchards with district water (81%) were less likely to test their water. It may be important to note that water districts provide free water reports to growers.

Conclusions and Policy Implications

This research indicates that orchard location, high landscape field variability (irrigation complexity), and cost of water were among the main factors influencing adoption of irrigation technology and water management practices. These variables are not readily controllable through policy instruments, but the results suggest that growers farming in more arid regions, on slopes, in irregular shaped orchards, or within districts that have a high water cost will be the earlier adopters within the California avocado industry.

In counties such as San Diego, where growers have experienced up to a 30% cut in water deliveries and an increase of up to 130% in water costs, the results seem to coincide with the trend of reductions in water application. Sixty-seven percent of the growers located in San Diego County had to stump, reduce canopy, or remove trees to mitigate the interruption in water supply.

Technologies that can help guide growers when and how much to irrigate are still used at low levels of adoption, although it appears that rising costs of water may influence future adoption of such technologies. We found the role UCCE, in sharing information and educating on these technologies, to be significant and valued by growers. This finding has an important policy implication, as this is one way in which policy can intervene and improve growers' preparedness for water interruptions and deteriorated quality.

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For additional information, the authors recommend:

Genius, M., P. Koundouri, C. Nauges, and V. Tzouvelekas, 2014. "Information Transmission in Irrigation Technology Adoption and Diffusion: Social Learning, Extension Services, and Spatial Effects." *American Journal of Agricultural Economics* 96(1): 328-344. 344. http://ajae.oxfordjournals.org/content/96/1/328.short.

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Does Management Matter? Evidence From India

Nick Bloom, Benn Eifert, Aprajit Mahajan, David McKenzie, and John Roberts

A long-standing question is whether differences in management practices across firms can explain differences in productivity, especially in developing countries where these spreads appear particularly large. A randomized controlled trial with large textile firms in India found that adopting improved management practices raised productivity by 17% in the first year through improved quality and efficiency and reduced inventory, and within three years led to the opening of more production plants.

A pervasive feature of manufacturing and other industries is that there are large productivity differences across firms and countries. Different firms, and different plants within the same firm, turn similar amounts of measured capital and labor into very different amounts of output. Because productivity is the ultimate driver of long-run economic growth, this puzzle has attracted the attention of many economists.

One explanation is that productivity differences partly reflect the quality of management. Management quality is notoriously hard to measure. Earlier research made a start by constructing measures of management practices across thousands of firms worldwide. This research highlighted, for example, the "management gap" between the U.S., Japan, and countries such as India. This gap in turn mirrors the cross-country differences in productivity that have been documented extensively by economists. In addition, there is considerable variation in management within countries (Figure 2) that also mirrors the productivity spread within countries.

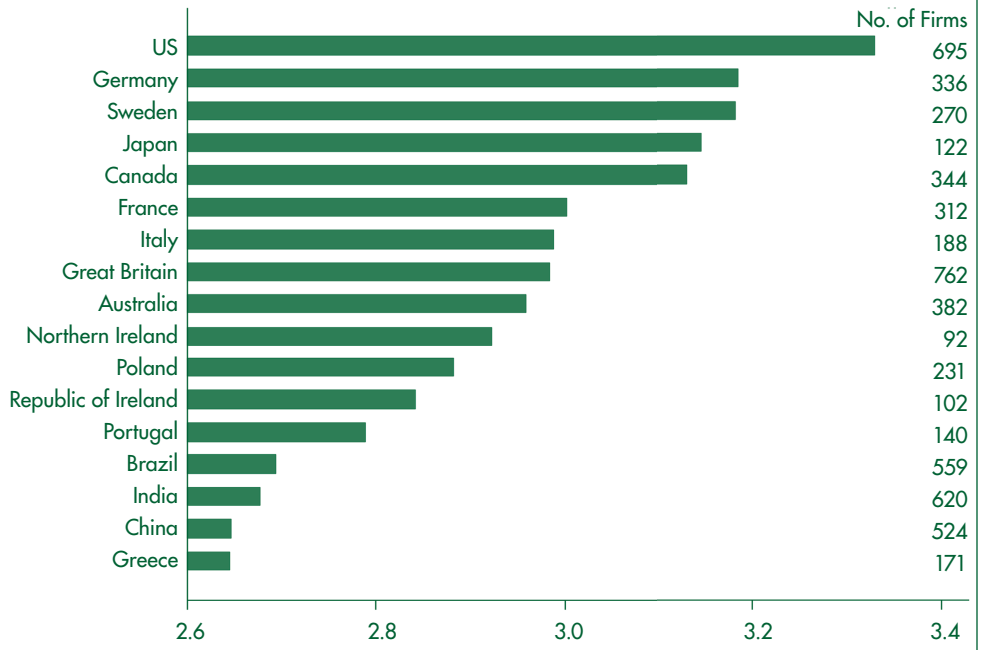
The gold standard for establishing causality, however, is the randomized experiment. Can management be studied by randomized trial? A group of economists (including Aprajit Mahajan, now at ARE) teamed up with a major consulting firm to give it a try.

The team selected 20 large Indian textile plants. Fourteen were randomly assigned to receive intensive guidance on management practices while the remainder were designated as a control group. One of the first things they observed was the chaotic nature of many of the Indian factories. Many firms had dirt and garbage on the factory floors. Inventories and spare parts were scattered all around the site, and there was typically no systematic quality control

The consultants introduced operational practices that are standard in U.S. and Japanese factories. They persuaded firms to measure inventories, quality defects, and production efficiency, and to organize daily meetings to assess the data. With these basic steps in place, repeated defects were swiftly identified and eliminated. Inventories were trimmed from several months to a few weeks. Machine breakdowns were analyzed to understand and then fix their root cause. Productivity at the treated plants rapidly rose by 17% and the researchers estimate that annual profits rose by about $325,000.

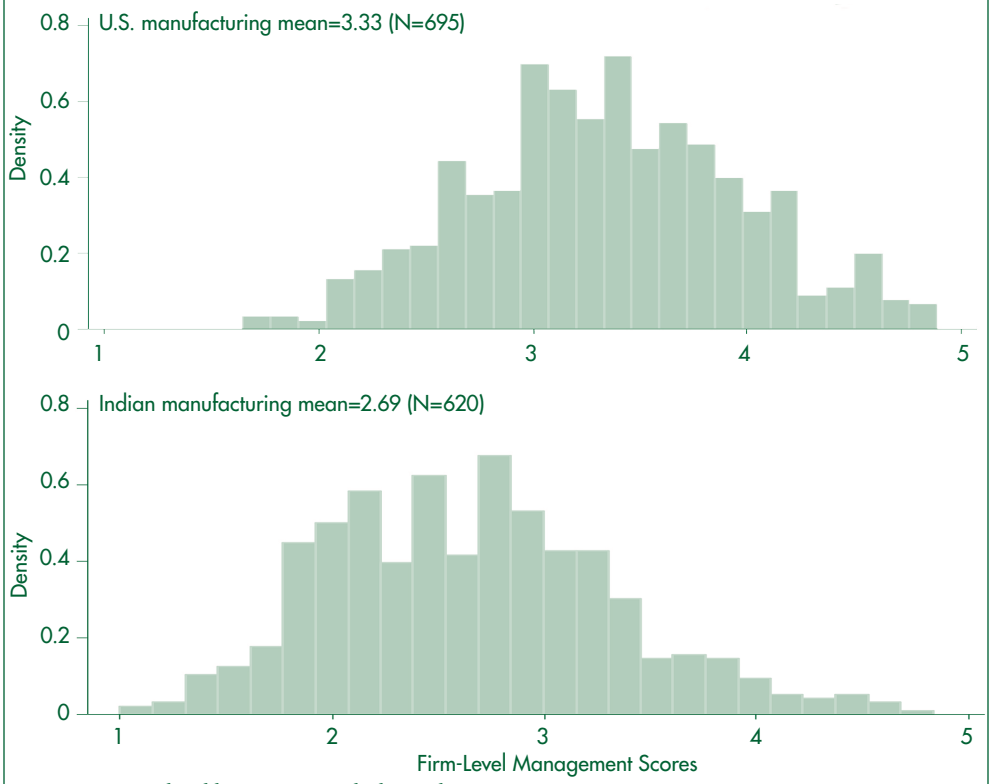
The study raises some obvious questions. First, why hadn't these practices been adopted before? The researchers advance several explanations. First, for somewhat common management practices, the major initial barrier to adoption was that firms had heard of the practices but thought they would not be profitable to adopt. For example, many of the firms were aware of preventive maintenance, but few of them thought it was worth doing. They preferred to keep their machines in operation until

Figure 1. Management Appears Worse in Developing Countries



Average country management score, manufacturing firms 100 to 5,000 employees (Monitoring, targets and incentives management scored on a 1 to 5 scale Methodology: Bloom & Van Reenen (2007, QJE), Data: Bloom, Sadun & Van Reenen (2010, AR)

Figure 2. India's Low Score Is Due to a Tail of Badly Managed Firms



Firm-level histograms underlying the county averages

they broke down, and then repair them. This accounted for slightly over 45% of the initial non-adoption of practices.

Second, for the uncommon practices, the major initial barrier to the adoption was a lack of information about their existence. Firms were simply not aware of these practices. These practices included daily quality, efficiency and inventory review meetings, posting standard operating procedures, and having visual aids around the factory. Many of these are derived from the Japanese-inspired lean manufacturing revolution and are now standard across North America, Japan, and northern Europe but not in developing countries.

Third, as the intervention progressed, the lack of information constraint on the uncommon practices was rapidly overcome in both treatment and control firms. It was easy to explain the existence of the uncommon management practices, so the non-adoption rates of these practices fell relatively rapidly.

Fourth, the incorrect information constraints were harder to address because the owners often had strong prior beliefs about the efficacy of a practice, and it took time to change these. This was often done using pilot changes on a few machines in the plant or with evidence from other plants in the experiment. For example, the consultants typically started by persuading the managers to undertake preventive maintenance on a set of trial machines, and once it was proven successful, it was rolled out to the rest of the factory.

Fifth, once the informational constraints were addressed, other constraints arose. For example, even if the owners became convinced of the need to adopt a practice, they would often take several months to do so. A major reason is that the owners were severely time constrained, working an average of 68 hours per week already.

A related question is why product market competition didn't drive the badly managed firms out of business? A variety of factors may be at work. In the experimental study, the senior management positions in all the firms are held by the owning family. The owner of one of the best-managed firms offered a simple explanation for why he could not expand: "no sons, no brothers." If the expansion of well-managed firms is limited, and entry into the market restricted by credit constraints, import tariffs or other factors, low productivity firms may persist.

Finally, what are the implications of this for public policy? The research does support some of the common recommendations to improve productivity, like increasing competition (both from domestic firms and multinationals) and improving the rule of law. Our results also suggest that firms were not implementing best practices on their own in part because of lack of information and knowledge. This suggests that training programs for basic operations management, like inventory and quality control, could be helpful, as would demonstration projects.

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Nick Bloom is a professor in the economics department at Stanford University; Benn Eifert received his Ph.D. in economics from UC Berkeley and is a portfolio manager for Mariner Coria; Aprajit Mahajan is an associate professor in the ARE department at UC Berkeley; David McKenzie is a lead economist in at The World Bank; John Roberts holds the John H. and Irene S. Scully Professorship in Economics in the Graduate School of Business at Stanford University. They can be contacted by email at nbloom@stanford.edu, aprajit@berkeley.edu, and dmckenzie@worldbank.org, respectively.

For additional information, the authors recommend:

Bloom, N., B. Eifert, A. Mahajan, D. McKenzie and J. Roberts. 2013. "Does Management Matter? Evidence from India" *Quarterly Journal of Economics* 128(1):1-51. www. are.berkeley.edu/~aprajit/DMM.pdf

Faculty Profile: Thibault Fally

Thibault Fally
Assistant Professor
Department of Agricultural and Resource Economics
UC Berkeley

Thibault Fally joined the faculty of the Department of Agricultural and Resource Economics at UC Berkeley as an assistant professor in July 2013. Prior to coming to Berkeley, Thibault earned a Ph.D. from the Paris School of Economics in 2009 and taught at the Economics Department at the University of Colorado in Boulder.

His research interests mainly relate to firm decisions and trade, which includes various topics such as supply chains, foreign direct investment, institutions (financial development in particular), economic geography, income inequalities, industrial organization, and firm structure. His work has been published in the *Quarterly Journal of Economics*, the *Review of Economics and Statistics,* and the *Journal of International Economics* among other journals.

His work on financial development (access to finance) investigates whether and how it can foster various outcomes such as entrepreneurship, firm size, firm growth, and trade. This includes a first paper (with co-authors) on firm creation, showing that improved access to finance can lead to the entry of smaller firms and foster the post-entry growth of these new firms.

A second paper related to financial markets (with Juan Carluccio) examines how multinational firms choose their suppliers depending on their access to finance such as local banks. An interesting implication is that financial constraints can give rise to the vertical integration of their suppliers and foreign investment inflows to mitigate financial constraints facing their suppliers. The authors build a model with predictions on import flows depending on product complexity and access to finance in the source country, which they test using detailed data on French multinational firms. Thibault is now working on a new project where they examine how trade affects entrepreneurship using detailed data on French firms.

Another important part of his research agenda is to understand how firms interact along supply chains or across different supply chains, and their impact on wages. One of his papers relates to Ann Harrison's research (his predecessor in international economics at UC Berkeley ARE) on the impact of foreign multinational firms on domestic firms in host countries, examining why some firms and industries tend to be negatively affected while others see an increase in efficiency. In this vein, a second paper examines how access to suppliers and consumers affects differences in wages across regions in Brazil, using both firm-level and worker-level data in the light of new economic geography models.

More recently, Thibault's work has examined how cross-industry input-output tables can provide useful information on supply chains. In a series of three papers, he has developed a model and various indexes to describe the length and integration of supply chains, and the specialization of countries along those chains.

Finally, another line of his research emphasizes the role of demand in shaping production and trade patterns. His paper with Justin Caron and James Markusen is described in this issue of the *ARE Update*. In an ongoing project, also briefly described in this issue, Thibault and Justin examine how much of the cross-country differences in CO2 emissions can be explained by consumption patterns.

Thibault is excited to start new research projects with his new colleagues and students at UC Berkeley ARE and other departments on the UC Berkeley and UC Davis campuses. Aside from research and teaching, Thibault and his wife, Alexandra, enjoy what the Bay Area has to offer: a sensational variety of restaurants (Californian, French, Japanese, Peruvian, Laotian, etc. with occasional detours to In-and-Out), nearby wineries, beautiful hikes, great tennis courts, nautical activities, etc. Thibault and Alex live up in the hills in Oakland, trying their best to avoid driving on deer, skunks, and bears on their way home! They also don't miss any opportunity to go out in the East Bay or San Francisco to meet up with friends and colleagues.

Thibault Fally can be contacted by email at fally@berkeley.edu and his research papers can be found at htpps://are.berkeley.edu/~fally/

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