**The Journey to Green Economies: Essays at the Intersection of Public Policy, the Market, and Environmental Sustainability**

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## Chapter 1 - Productivity and the Environment, a Firm-Level Approach

In this first chapter, I explore whether abnormally high temperature and particulate matter pollution affect the traditional economic inputs to production: labor, capital, and total factor productivity (TFP).

### Background and literature

There is a growing body of literature investigating the effect of air quality and temperature on certain measurable outcomes of interest to policy makers and economists. From a productivity perspective, such research includes measuring the effects of air pollution on call center staff output (Cai, Lu, and Wang 2016), productivity in physically strenuous jobs (Graff Zivin and Neidell 2012), research on particulate matter pollution and fruit packers in California (Chang et al. 2016), and extreme temperature on productivity in China (Zhang et al. 2017). This chapter adds to this growing literature by comparing the effect of temperature and particulate matter across multiple firms in multiple countries.

### The Theoretical Structure

Understanding the potential effect of temperature and pollution on firm-level productivity requires first looking at the relationship between manufacturing inputs and outputs. I use a Cobb-Douglas production function, which argues that firm output is a function of labor, capital and total factor productivity (a measure representing improvements to input performance, such as knowledge of workers or advanced technology). By measuring changes in capital, labor, and total factor productivity, one can then see if degrading environmental conditions decrease input productivity.

### *Goals and Objectives*

Do degrading environmental conditions, such as high temperatures and air pollution:

1. Effect production output through changes to input productivity?
2. Differentially affect production output, by industrial sector or country?

### Data and Method

Firm level data used in this study comes from the World Bank Enterprise Survey, and consists of 127,000 firms, across 23 sectors and 123 countries, and covering 2006 to 2017. Temperature data comes from the Berkley Earth dataset, while particulate matter data comes from the World Health Organization’s PM2.5 and PM10 city level dataset.

My empirical strategy is to estimate the effect of environmental indicators on productivity outcomes using a fixed effects approach, with controls for country, year, and sector levels. My equation for sector *j*, firm *i*, in year *t* is:

In this equation, *P* is the productivity inputs (labor, capital, and TFP). The exogenous variables are *ENV*, environment, *city,* the firm city location, *BUS,* a vector of business level controls originating from the larger World Bank Economic Survey dataset, *ECON*, a vector of economic level controls such as GDP growth rates and unemployment, and , a vector of other relevant controls such as sector and country.

### Implications and Contributions

The literature demonstrates that degrading environmental conditions can decrease the productivity of firm inputs, often with such subtlety that firm owners are not immediately aware. This paper broadly assesses the influence of environmental conditions on input efficiency, thus providing generalizable advice to firm owners, scholars, and public policy makers alike on how to tackle environmental protection with the economy in mind. It also assesses how public policy aimed at reducing climate change or improving air quality could benefit certain sectors of the economy more than others. Key limitations include whether firms and countries in the data are representative of the broader population, whether World Bank calculations of productivity are accurate, and whether the environmental measures are fine enough to discern a causative effect.

## Chapter 2 - Green Capital and Prosocial Investing –evidence on returns from investor returns in the stock market

This chapter assesses the role environmental indicators of corporate social responsibility play in firm-specific stock market performance.

### 2.1 Background and Literature

While Corporate Social Responsibility (CSR) is a measure of a firm’s performance on social issues (including, specifically, environmental friendliness), Socially Responsibility Investment (SRI) refers to the investment strategy of favoring socially-responsible firms. Often SRI uses CSR as its primary indicator of responsible firms (Blasi, Caporin, and Fontini 2018).

The impact of CSR and SRI on firm capital accumulation is a long-standing topics of interest for researchers (Hill et al. 2007; Martin 1986). Benlemih and Bitah (2016) found that very high and very low CSR do not improve investment efficiency, while Auer and Schuhmacher (2016) who found no differences between SRI focused investments and market-based passive investment returns in the USA or Asia-Pacific. Relatedly, there is evidence that firms with high levels of CSR face lower costs of capital (El Ghoul et al. 2011). Overall however, the evidence of market outperformance for high CSR firms is mixed (Blasi, Caporin, and Fontini 2018).

#### Research Questions

1. Do pro-environmental behaviors influence both firms’ cost of capital and investor returns, and are they interrelated?
2. Does having higher environmental CSR have a positive effect on earnings surprises, regardless of whether the earnings surprises are positive or negative?

### Data and Methods

I propose to partially model the relationship between high environmental CSR and above-average returns using an optimization framework based upon work on pro-social behavior (Benabou & Tirole 2006), where investors trade market returns for non-monetary utility. My data consists of stock and CSR data from Thomson Reuters Eikon (TR), which has detailed, professional grade information on thousands of stocks from all regions of the world. Using this panel dataset, my aim is to estimate:

where is the firm’s return on investment adjusted for market rates of return; *ENV* is one of the measures of environmental CSR as calculated by Thomson Reuters; and represents a vector of control variables. To help control for omitted variable bias, control variables will include firm indicators of size, book value of assets, cash flow sensitivity, plus firm age, volatility, profitability and net leverage. I will also include year and industry dummies.

### Implications

This paper adds to the current literature by arguing that performance is likely time specific, due to short-term changes in non-monetary green utility. The paper also adds to the literature by considering constituent parts of environmental CSR other papers have not, but are included in the TR data. These include green innovation and resource use. The empirical method used in this chapter concentrates on within-firm variation of green CSR, providing a more robust analysis than the between-firm analysis undertaken by other, recent literature in the field. Limitations include the risk that TR scores are not representative of investor behaviors, or that firms who have high scores for CSR have other characteristics not captured in the model but are correlated with market outperformance.

## Chapter 3 – Sustainable Public Administration

This chapter studies the role sustainability may play in the future evolution of Public Administration, and whether current Public Administration coursework prepares its scholars for this future role.

### Background and Framing

This chapter investigates whether sustainability has the potential to move beyond environmental policy as a policy silo, to affecting all levels of public administration action, study, and assessment. This could occur through top-down policy and governance changes similar to how public administration as a field has been affected in the past (Light 2006; Lynn 1998; Rosenbloom 2008), or through societal change driven by changing preferences for sustainability reform (O’Neill and Nicholson-Cole 2009; Poumadere et al. 2005; Shaw and Goda 2004). I will critically analyze the status of sustainability within Public Administration as a field of study and assess the field’s preparedness for dealing with emerging environmental issues. Ultimately, historical evidence suggests that public administration could be dramatically altered by any societal movement demanding high levels of sustainability. Furthermore, I will investigate whether public administration is prepared for any such change, including whether public administration and policy as fields of study are adequately preparing students to tackle complex policy issues within a sustainability framework. I will argue this last point by reviewing the current coursework covered by students of public administration.

#### Research Questions

1. Is PA likely to be affected by a sustainability led transition, and is it ready for this transition?
2. Is policy formulation, implementation and evaluation different under sustainability assumptions?
3. Doe training in PA have sufficient environmental perspective?

### Theoretical Structure and Methods

For my first hypothesis, I will critically analysis some of the core concepts in sustainability to look at how it is evolving as an important issue for government and policy makers. Such analysis will include looking at planetary boundaries (Rockström et al. 2009), UN Sustainable Development Goals (UN 2017) and action on climate change from a Public Administration perspective (UNFCCC 2016), among others. I will then consider whether PA is likely to be affected by these changes, and how this might occur. For my second hypothesis, I will review how sustainable policy would look compared to current policy. I will do this within the context of the policy cycle framework (Jann and Wegrich 2006). Finally, I will review MPA/MPP programs at the top universities in the United States. I will look at various measures of sustainability training, including looking at the nature of environmental courses and the availability of sustainability or environmental policy majors to gain insight into whether public administration schools are preparing future leaders to tackle emerging issues in climate change, biodiversity and sustainability.

### 3.3 Implications

This paper would be the first to systematically tie sustainability literature to public administration. By investigating how sustainable policy and governance is different to current methods, I will offer insights to public administration scholars and schools on how better to integrate and consider sustainability as an important component of public administration.

## Timetable for Completion

2018 August – Advanced draft of chapter #2

September – Present chapter #2 as part of the SPA colloquium

December – Advanced draft of chapter #3

2019 April – Advanced draft of chapter #1

June – Advanced draft of complete dissertation

July-August – defend dissertation

## References

Auer, Benjamin R., and Frank Schuhmacher. 2016. “Do Socially (Ir)responsible Investments Pay? New Evidence from International ESG Data.” *Quarterly Review of Economics and Finance* 59: 51–62. http://dx.doi.org/10.1016/j.qref.2015.07.002.

Benlemlih, Mohammed, and Mohammad Bitar. 2016. “Corporate Social Responsibility and Investment Efficiency.” *Journal of Business Ethics* (September 2015): 1–25.

Blasi, Silvia, Massimiliano Caporin, and Fulvio Fontini. 2018. “A Multidimensional Analysis of the Relationship Between Corporate Social Responsibility and Firms’ Economic Performance.” *Ecological Economics* 147(October 2017): 218–29. http://linkinghub.elsevier.com/retrieve/pii/S0921800917303968.

Cai, Xiqian, Yi Lu, and Jin Wang. 2016. “The Impact of Temperature on Manufacturing Worker Productivity : Evidence from Personnel Data.”

Chang, Tom, Joshua Graff Zivin, Tal Gross, and Matthew Neidell. 2016. “Particulate Pollution and the Productivity of Pear Packers.” *American Economic Journal: Economic Policy* 8(3): 141–69.

El Ghoul, Sadok, Omrane Guedhami, Chuck C.Y. Kwok, and Dev R. Mishra. 2011. “Does Corporate Social Responsibility Affect the Cost of Capital?” *Journal of Banking and Finance* 35(9): 2388–2406. http://dx.doi.org/10.1016/j.jbankfin.2011.02.007.

Graff Zivin, Joshua, and Matthew Neidell. 2012. “The Impact of Pollution on Worker Productivity.” 102(7): 3652–73.

Hill, R.P., T. Ainscough, T. Shank, and D. Manullang. 2007. “Corporate Social Responsibility and Socially Responsible Investing: A Global Perspective.” *Journal of Business Ethics* 70(2): 617–33.

Jann, Werner, and Kai Wegrich. 2006. “4 Theories of the Policy Cycle.” : 43–62.

Light, Paul C. 2006. “The Tides of Reform Revisited: Patterns in Making Government Work, 1945-2002.” *Public Administration Review* 66(1): 6–19.

Lynn, Laurence E. Jr. 1998. “The New Public Management: How to Transform a Theme into a Legacy.” *Public administration review* 58(3): 231. http://search.ebscohost.com.ezproxy.liv.ac.uk/login.aspx?direct=true&db=edsjsr&AN=edsjsr.10.2307.976563&site=eds-live&scope=site.

Martin, J. 1986. “Happy Returns for Do-Gooders.” *Financial World* (March 18): 32–33.

O’Neill, Saffron, and Sophie Nicholson-Cole. 2009. “‘Fear Won’t Do It’: Promoting Positive Engagement With Climate Change Through Visual and Iconic Representations.” *Science Communication* 30(3): 355–79. https://doi.org/10.1177/1075547008329201.

Poumadere, M, C Mays, S Le Mer, and R Blong. 2005. “The 2003 HeatWave in France: Dangerous Climate Change Here and Now.” *Risk Analysis* 25(6): 1483–94. https://doi.org/10.1111/j.1539-6924.2005.00694.x.

Rockström, Johan et al. 2009. “A Safe Operating Space for Humanity.” *Nature* 461(September): 472–75.

Rosenbloom, David. 2008. “The Politics-Administration Dichotomy in U. S. Historical Context.” *Public Adinistration Review* 68(1): 57–60. http://www.jstor.org/stable/25145576.

Shaw, Rajib, and Katsuihciro Goda. 2004. “From Disaster to Sustainable Civil Society: The Kobe Experience.” *Disasters* 28(1): 16–40. https://doi.org/10.1111/j.0361-3666.2004.00241.x.

UN. 2017. United Nations *The Sustainable Development Goals Report 2017*. New York. https://unstats.un.org/sdgs/files/report/2017/TheSustainableDevelopmentGoalsReport2017.pdf.

UNFCCC. 2016. “Report of the {Conference} of the {Parties} on Its Twenty-First Session, Held in {Paris} from 30 {November} to 13 {December} 2015 {Addendum} {Part} Two: {Action} Taken by the {Conference} of the {Parties} at Its Twenty-First Session.” 1194(January): 1–36.

Zhang, Peng, Olivier Deschenes, Kyle Meng, and Junjie Zhang. 2017. “Temperature Effects on Productivity and Factor Reallocation :” *JEEM/NBER*.