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Sociology

2016

Organizing Economic Development: Industry and the State in the New Global Economy

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Princeton, NJ : Princeton University

<http://arks.princeton.edu/ark:/88435/dsp01gm80hx73g>

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ORGANIZING ECONOMIC DEVELOPMENT:
INDUSTRY AND THE STATE IN THE 'NEW GLOBAL ECONOMY'

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A DISSERTATION
PRESENTED TO THE FACULTY
OF PRINCETON UNIVERSITY
IN CANDIDACY FOR THE DEGREE
OF DOCTOR OF PHILOSOPHY

RECOMMENDED FOR ACCEPTANCE
BY THE DEPARTMENT OF
SOCIOLOGY

Adviser: Alejandro Portes

January 2016

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Abstract

This dissertation examines the role of the state in industrial transformations, and considers how state agencies can design strategies that promote industrial growth in the ‘new global economy’. Recent perspectives in economics have pushed at the edges of the Washington Consensus; in theory, governments can promote economic development by nudging industries with loans, subsidies, and other sectoral interventions. In practice, these views appear sensible yet vague, while many traditional interventions are no longer feasible under the rules of the World Trade Organization. International financial institutions, for their part, have argued that industrial policy demands ‘better governance’ than is characteristic of less developed countries. I discuss the challenge of redeploying industrial policy in developing countries in light of international rules and consider options for institutional design.

At the macro level, Chapter 2 examines the link between the quality of public administration and economic development, focusing on two questions: First, does bureaucratic probity promote economic development? Second, should ‘good governance’ be seen as a prerequisite for industrial policy? Chapter 3 examines the link between trade protection and industrial change. Tariffs are not a miracle drug, but they have been a critical element of state-led development strategies. I contribute to the debate with new cross-national, cross-industry quantitative evidence. Cross-country regressions have been a staple of the literature on trade and growth for the last two decades, but the results have been mixed, and studies rarely examine the underlying mechanisms—such as industrial ‘catching up’—that link tariffs to economic outcomes.

The great question is not whether states should deploy industrial policy, but how. Chapter 4 examines the experience of Chile as it pushed, year after year, decade after decade, to develop a global salmon industry. To draw out the implications for other developing countries, Chapter 5 looks beyond Chile's 'developmental state' and focuses on how to create 'space' for industrial policy. Developmental state theories typically assume that industrial policies are visible and open to public scrutiny. Today, there is all the more reason to maintain a neoliberal fiction while moving industrial policy underground.

Acknowledgements

I am grateful to Alejandro Portes, Patricia Fernandez-Kelly, and Miguel Centeno for their wonderful mentoring throughout this project. Early on at Princeton they introduced me to the sociology of development and helped me see how much it resonated with my own interests. I hope that some of their many contributions to my thinking about sociology, organizations, and development studies are visible here despite my errors.

Alejandro Portes provided generous support and guidance throughout graduate school. Working with him and a multinational team of scholars on our co-authored project has been a great privilege and an incredibly rewarding experience. Patricia Fernandez-Kelly has been a tremendous source of support ever since I arrived at Princeton. She has always encouraged me but also challenged me to make my work relevant, helping to ground my thinking less in the theoretical literature and more in the real world. Ultimately, her mentoring planted the seeds for a project that turned away from abstract models and toward concrete policy debates. I am grateful to Miguel Centeno for always receiving my ideas with his famous enthusiasm and for helping me along the transition from a ‘consumer to a producer of knowledge’. Miguel has also gone above and beyond the call of duty to support my career. Martin Ruef also provided wonderful mentoring and prompt feedback during the early stages of my dissertation. His insistence on methodological rigor has greatly improved my work and shaped my thinking about research on organizations and development.

I was fortunate to have a great group of colleagues and friends at Princeton and afar, including Maria Abascal, Onobu Akogwu, Xiaoling (Ling Ling) Ang, Sofya Aptekar, Kevin Bell, Brookes Brown, Elaine Enriquez, Rene Flores, Jim Gibbon, Gabriel Kuris, Cristina Mora, Petra Nahmias, Berkay Ozcan, Jean Nava, Victoria Reyes, Stephanie Schacht, Craig Upright, participants in the Center for the Study of Social Organization workshop, as well as and Donna DeFrancisco, Cindy Gibson, Amanda Rowe, Lil Morgan and Eleidis Sierra. I am especially grateful to Denia Garcia, Tina Lee, and Liza Steele for being both amazing friends and inspiring colleagues. My lifelong best friends, Tabitha Lucas and Tabitha Laigle, have been more important than they know. They have shaped my intellectual curiosity and my concern with the general injustice of the world. So much of what I know I learned from them.

I also want to thank the Indiana University sociology department. My deepest thanks go to Melissa Wilde (now at the University of Pennsylvania). It is no exaggeration to say that this dissertation would not have happened without her, not least because I would never have thought to apply to Princeton in the first place. I am forever grateful to Melissa for showing me the ropes of graduate school admissions and funding, for introducing me to Marx and Bourdieu, and for supporting my intellectual development in an incredible way. I only hope that the end result might justify her faith in my abilities.

For supporting my goal of returning to academia, and for listening to my rants about economic governance and US social policy, I want to thank my former employers and colleagues, especially Miguel Molina and Oscar Ortega. My former colleagues in the United Nations Department of Economic and Social Affairs have also informed the substance of this project and motivated me to return to academia with a public purpose.

For financial support I thank the Princeton University Graduate School, the Center for the Study of Social Organization, the Center for Migration and Development, and the Program in Latin American Studies. Jose Luis Velasco and Hazael Cerón were also kind enough to give me an institutional home at the Universidad Nacional Autónoma de México and the Colegio de México during various summers.

Finally, I owe an enormous debt to my family. The unconditional love and support of my parents Craig and Diane, my brother Michael, and his wife Clara have mattered more than I can say. I am especially grateful to my parents and brother for encouraging all of my interests and activities, including sociology, even when I could not quite explain ‘what I was going to do with that’, and then for being happy for me when it all paid off. My father also fostered an interest in the history of my home state, and my thinking about its social and economic transformations have undoubtedly influenced this project.

For encouragement and support I thank my wonderful parents-in-law, Dora and Javier, my sister-in-law, Paula, and granny—who prayed and burned through many candles to make sure this would happen—as well as my extended family, especially Susan and Bruce, Dave and Becky, Paul and Kathy, Chuck and Denise, my late uncle Carrie, Carla, Connie, my cousins—especially Hope and Vladimir—and my late grandmother, Elsie. I am particularly grateful to Dave for his support and for wanting to see me become the first person in our family to earn a Master’s and a Ph.D. (to be closely followed by my amazing ‘little’ cousin, Ben). I have also been blessed with two precious nephews, Elijah and Micaiah, who helped keep everything in perspective.

My wonderful husband, Javier, is the one who made this all worthwhile. I cannot imagine a more caring and supportive partner. And because I promised, I especially thank him for sustaining me with Pienaroma espresso during the final weeks of writing. Finally, none of this would have happened without my late great-aunt and hero, Shirley Stump, who encouraged me in all of my educational pursuits along every step of the way. Because she did not live to see me finish, I dedicate this dissertation to her.

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Chapter 1

Introduction

Why do certain industries thrive in some countries and stagnate or fail in others, and when does industrial change contribute to national economic success—particularly under conditions of rapid global economic and financial integration? One prominent feature of recent waves of globalization has been the explosive growth of manufacturing industries in a number of emerging economies. This shift was key to the ‘East Asian miracle’, or to the handful of Asian economies that experienced booming manufactured exports and rising incomes in the last half of the twentieth century. Yet despite such evidence of manufacturing success, other developing countries—for example, Ecuador, Peru and Nigeria—failed to establish vibrant industrial economies during the same period. In the first case—regardless of whether the growth is due to productivity gains or capital accumulation (Krugman, 1994)—East Asia’s economic success is largely attributed to the region’s export-oriented industrialization strategy, and ability to enter global markets for mid- and high-technology exports (Gereffi, 1999). In the second case, stagnation is attributed to countries’ failure to develop a diversified industrial structure, or to restructure industry away from agricultural and extractive sectors to manufacturing for global export markets.

At a deeper level, sociologists and political economists have made the case that state institutions determine paths of industrialization. In the ‘developmental state’ paradigm, industrialization requires an effective public bureaucracy, capable of designing and implementing industrial policies in the pursuit of broad-based, long-term national growth—and with enough autonomy to avoid capture by narrow elite interests (Evans, 1995). Indeed, a vast literature shows that every major historical shift toward industrial diversification was initiated by the state (e.g. Gerschenkron, 1962; Johnson, 1982; Wade, 1990; Evans, 1995; Woo-Cummings, 1999; Amsden, 2001; Chibber, 2003; Chang, 2005; Breznitz 2012). This literature has drawn most heavily on the experiences of ‘late industrializers’ after the Second World War, particularly South Korea and Taiwan.

In the early postwar period, many developing countries sought to nurture the growth of national industries by mobilizing domestic investment, protecting infant industry, and promoting the expansion of the domestic market.¹ Typical policies included protection through a combination of tariffs and quantitative controls, exchange controls, import licensing, performance requirements, and domestic content requirements.² Not only were macroeconomic policies important, but also interventions at the sector, product, and firm level.

Much has changed in the 30 years since the Washington Consensus, however. Following the spread of trade and investment liberalization, as well as the rise of multilateral and bilateral trade agreements, developing countries today face formidable restrictions on industrial policy—rules that are more far-reaching and intrusive than those faced by South Korea and Taiwan.

¹ Many countries pursued a state-led industrialization strategy after WWII, but others were colonies or subject to ‘unequal treaties’ that prohibited tariffs. Most of these countries gained independence by the mid-1960s, however, and adopted similar import-substitution development strategies.

² At the time, membership in the world trading system had few or no entry requirements for developing countries, and included liberal exceptions for balance-of-payments and infant industry. See Lall (2004) for a detailed discussion.

Beyond rules of the World Trade Organization (WTO), a number of international codes and standards have clauses that restrict the use of industrial policies. International Monetary Fund (IMF) programs, for example, often contain detailed requirements on trade and industrial policies. Notwithstanding the previous success of state interventions, emulating the policies and practices of twentieth century East Asian countries appears unfeasible for countries striving to catch up today.

Today's developing countries need new forms of state intervention. This dissertation examines the role of the state in industrial transformations, and considers how state agencies can design strategies that promote industrial growth in the contemporary context. Recent perspectives in economics have pushed at the edges of Washington Consensus free-market policies; in theory, governments can promote economic development by 'nudging' industries with loans, subsidies, and other 'sectoral interventions' (c.f. Rodrik, 2010; Lin, 2012; Hausmann et al., 2013; ILO, 2014).³ In practice, these views appear sensible yet vague, while the 'rejuvenation of industrial policy' (Stiglitz, 2013) has primarily taken the form of attracting foreign direct investment and developing import-intensive export enclaves—activities that fail to generate significant positive spillovers. International financial institutions, for their part, no longer deny industrial policy's potential contribution to growth and development. Instead, they hold that industrial policy demands 'better governance' than is characteristic of less developed countries. Thus, they continue to uphold 'market-enhancing' reforms—or perhaps, 'neutral' sectoral policies—as the best alternative for developing countries today, effectively serving old wine in new bottles. I discuss the challenge of redeploying industrial policy in developing countries in light of international rules and consider options for institutional design.

³ Still, these perspectives often start with the premise that most industrial policies have failed (Lin & Monga, 2010; Rodrik, 2010)

The empirical chapters of the dissertation examine the role of the state at different levels of analysis. At the macro level, Chapter 2 examines the link between the quality of public administration and economic development. There is no shortage of studies positing a positive relationship between ‘good governance’ and economic growth, but this relationship is more often assumed than subjected to rigorous empirical scrutiny. Moreover, scholars have yet to examine the link between the quality of public administration and subsequent long term growth. This is somewhat surprising, given that over 15 years of evidence have accumulated since the introduction of the most widely used governance measures—the World Bank’s *World Governance Indicators*.⁴ The relationship between public administration and industrial growth also appears ambiguous. In many countries that implemented industrial policies and failed, failures in governance were seen as the real source of the problem. At the same time, many countries with poor governance have islands of bureaucratic probity—often state enterprises—that have performed well despite waves of government failure, making significant contributions to national development.⁵ This chapter focuses on two questions: First, does bureaucratic probity promote economic development? Second, should ‘good governance’ be seen as a prerequisite for industrial policy?

Chapter 3 examines the link between trade protection and industrial expansion. Tariffs are not a miracle drug, but they have been a critical element of state-led development strategies—from the practice of protecting ‘infant industries’ described in Alexander Hamilton’s seminal ‘Report on Manufactures’ (1791) to the experience of late-industrializing countries, most notably

⁴ At the time of writing, Kaufmann et al.’s (2009) report on the *World Governance Indicators* had over 5,800 Google Scholar citations.

⁵For careful empirical studies of inter-institutional and inter-country variation in bureaucratic performance, see Portes & Smith (2012) and Portes & Marques (2014). These studies find that bureaucratic probity is an important determinant of institutional quality; however, some institutions may make an important contribution to development notwithstanding instances of corruption.

in East Asia.⁶ There is simply no way for economies to diversify on a significant scale without giving producers some protection. With tariffs in place, governments can give national industry the time they need to absorb and apply new technologies before competing in global markets. Without tariffs, countries may only develop ‘export enclaves’—specializing in the low-skilled, low wage assembly of imported inputs, with minimal links to domestic suppliers. In recent years, countries have less flexibility in setting tariffs, but the WTO still allows some room for developmental trade policy (Amsden, 2005).⁷ I contribute to the debate with new cross-national, cross-industry quantitative evidence on the link between trade protection and industrial development. Cross-country regressions have been a staple of the literature on trade and growth for the last two decades, but the results have been mixed, and studies rarely examine the underlying mechanisms—such as industrial ‘catching up’—that link tariffs to economic outcomes. My goal is not to assess the global economic impact of trade protection, but to examine the impact of tariffs on industrial change in developing countries with different structural characteristics. How do targeted tariffs influence industrial development?

The great question is not whether states should deploy industrial policy, but how.

Chapter 4 examines the experience of Chile as it pushed, year after year, decade after decade, to develop a global salmon industry.⁸ Chile’s experience offers an important showcase for post-liberalization development strategies for several reasons. First, at the same time that Chile was celebrated as a pioneer in trade liberalization in Latin America, the government set up an export

⁶ Of course, East Asian industrial policy involved a lot more than trade protection.

⁷ The WTO imposes tariff ceilings on middle-income countries, but does not require the abolition of tariffs—and least-developed countries (LDCs) are exempt from tariff-binding. Additional provisions allow for ‘import surcharges’, or emergency tariff increases when there is a sudden surge in sectoral imports, or to confront an overall balance of payments problem. Still, developed countries actively seek to reduce that space through bilateral and multilateral trade agreements.

⁸ Casual observers might assume that salmon aquaculture is merely another natural resource-based industry, but Chile is also active in developing applications of biotechnology to improve the productivity of salmon aquaculture—for example, genetic engineering and vaccine development.

promotion agency to help potential exporters enter new markets, and a development agency with a strong entrepreneurial thrust to enter new industries by creating new companies (to be sold later to the private sector). Once these industries began to reach significant production levels in the 1980s, the Chilean government promoted exports through a range of measures, including simplified duty drawback, subsidies, and fiscal credits. Just as important, Chile's early liberalization was unilateral—Chile did not sign any free trade agreements until after its political opening in the 1990s. By that time, the Chilean government had also honed its 'developmental legal capacity', or litigation skills used to shield its developmental economic policies and combat trade protectionism in developed countries. To draw out the implications for other developing countries, I look beyond Chile's 'developmental state' and focus on how to create 'space' for industrial policy. Developmental state theories typically assume that industrial policies are visible and open to public scrutiny. Today, there is all the more reason to maintain a neoliberal fiction while keeping industrial policy 'under the table'.

Chapter 2

Governance without Growth: The Promises and Pitfalls of Governance as a Development Strategy

Do countries with greater bureaucratic probity experience faster economic progress? This question has been a core concern of sociology since Weber's classic essays on bureaucracy, and few questions are more central to development theory and practice today.

The answer in international policy circles is a resounding yes. At the 70th session of the United Nations General Assembly, world leaders named 'good governance'—the quality of public administration—among the most important development priorities in the 2030 agenda. The idea that good governance promotes growth has gained widespread currency in recent years, and the incorporation of a version of good governance in the new Global Goals is not surprising. The idea spread rapidly among lending and aid agencies in the 1990s, both as a way to explain the disappointing results of structural adjustment programs (new macroeconomic policy objectives required new institutions and better governance) and to qualify the relevance of the state (government interventions may have resulted in higher growth in East Asia, but sometimes the state is simply too incompetent, too corrupt, or too vulnerable to political pressure to coordinate developmental policies). Current efforts to promote good governance cover a broad range of targets, from reducing corruption to improving the rule of law, the protection of property rights, and the accountability and effectiveness of public institutions.

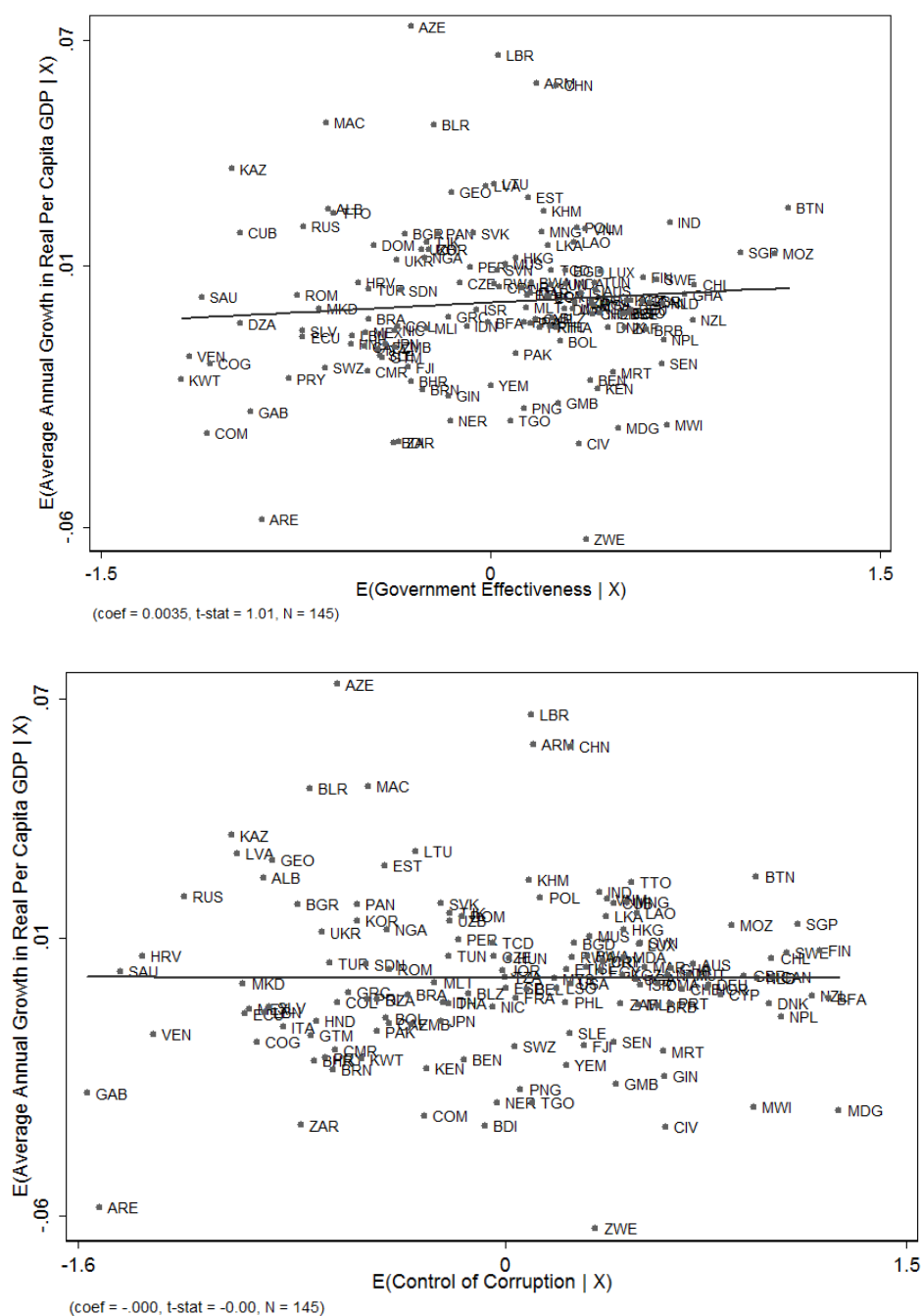
The view that good governance promotes growth prevails in sociology and economics as well. Following an explosion of cross-national empirical research over the last two decades, most analysts agree that there is a strong positive relationship between the quality of public administration and economic development.

If there is a strong positive relationship between the quality of public administration and *long-term growth*, however, it is not immediately apparent from the data—at least in the years since scholars have developed comparable cross-country measures of governance. Figures 1a and 1b show the partial regression plots of growth over the 1996-2011 period and two initial-period measures commonly associated with ‘good governance’, after controlling for levels of initial income.⁹ The first measure is ‘government effectiveness’, defined as ‘the competence of the bureaucracy and the quality of public service delivery’. The second is ‘control of corruption’. In the first case, the relationship is only slightly positive and far from statistical significance. In the second case, the relationship is very slightly negative and insignificant.

This chapter examines the relationship between governance and long-term growth, taking a step back in order to look ahead. I find a significant gap between the conventional wisdom that governance promotes growth and the empirical ‘facts’ revealed by cross-country growth regressions and by the historical-comparative literature. This gap arises for a number of reasons.

⁹ The bivariate relationships between growth and each governance indicator are negative and significant, but likely spurious, given that developed countries theoretically cannot reach growth rates as high as developing countries. Thus, the figures show partial associations after controlling for initial per capita GDP.

Figures 1a and 1b: Partial Regression Plots between Growth and Governance, after controlling for Initial Per Capita GDP, 1996-2011¹⁰



¹⁰ The explanatory variables come from the World Bank's *World Governance Indicators*, measured in 1996.

First, historical measures of the quality of public institutions were not available in the seminal cross-national studies of governance and growth (cf. Knack and Keefer 1995; Mauro 1995; Evans and Rauch 1999). As a result, these studies have in fact examined the cross-sectional relationship between governance and growth (or levels of per capita income) at one point in time, rather than the link between bureaucratic quality and long-term growth and development.

Second, while sociologists have emphasized the governance of processes that alter the organization of the economy and lead to growth, mainstream economists have been more concerned with ‘market-enhancing governance’, or with the rule of law, the protection of property rights, and reducing the regulatory burden on firms to produce a ‘good investment climate’.¹¹ In many cases, the indicators of ‘good governance’ used by researchers are problematic because they conflate the content of policies with the bureaucratic capacity of public institutions.

Finally, many of the comparative-historical studies that provided the intuition behind the growth-governance link suffer from success bias. In particular, because scholars focused on Korea and Taiwan after these countries achieved some initial success, they risk overstating their bureaucratic quality prior to their industrialization.¹² These studies made the case that Korea and Taiwan owed their success to an unusually high-quality public bureaucracy, overlooking pervasive corruption and rent-seeking during their early postwar industrialization (see Kang, 2002).

¹¹ Also see Khan 2012, 2015.

¹² See Amsden (1989) and Evans (1995) for representative studies. This is not to question the significance or contribution of these studies, however, which were more focused on state actions that promoted industrial growth than on the general structure and practices of state bureaucracies.

To the extent that the existing empirical literature suggests a positive causal link from governance to growth, the main policy implication is that governments should continue to emphasize a broad governance reform agenda—whether through rule of law, broad civil service reforms, etc. Therefore, it is important to ask how well the evidence supports the presumption that doing so is a prerequisite for growth. I argue that the nature of the growth-governance link remains very much an open question, and that the time has come for a rethinking of the specific types of reforms and types of public institutions that are most likely to promote long-term growth.

Of course, good governance can improve well-being in the absence of growth. All citizens stand to benefit from more effective, more transparent, and more accountable public institutions. If the goal is to improve economic outcomes, however—which is important for reaping the fruits of governance reforms in the long run—policymakers may need to consider more targeted interventions.¹³

The chapter proceeds as follows. I begin with a review of the literature and conceptual issues in the study of growth and governance. I then turn to an empirical test of the relationship between governance and long run growth. I conclude by offering suggestions for future research and discussing policy implications.

¹³ In line with Sen's (1999) human capabilities definition development, I view education, health, and democratic participation as part of the means and ends of development. However, I also view employment as key to improving well-being. Efforts to promote development by improving only the supply side of the labor market—through improved education, health, and nutrition—fall victim to the same error as Say's Law—the outdated belief that 'supply creates its own demand' (see Amsden, 2010).

Literature

The Rise of Good Governance

Studies of governance and growth entered the twenty-first century with a flourish. When neoliberal adjustment programs began to show signs of wear in the 1990s, the study of state institutions became an unusually active field of scholarship. Development agencies shifted their focus from the content of policies to the institutions that implement policy, and incorporated the concept of ‘good governance’ in their rationales for lending and aid conditions (Aubut, 2004). At last, ‘explaining why some state bureaucracies are more effective than others... took precedence over simply condemning excesses of state intervention’ (Evans & Rauch, 1999: 748).

Perhaps no event was more influential than the failure of mass privatizations in transition economies after 1989. As Milton Friedman (2002) summed up the Russian experience, ‘it turns out that the rule of law is probably more basic than privatization. Privatization is meaningless if you don’t have the rule of law’. Prominent critics such as Joseph Stiglitz (1999) argued that privatizations—in the absence of appropriate governance institutions—created tremendous opportunities for corruption and asset-stripping. In short, it was a bad idea to privatize companies into an unregulated environment. The IMF responded to these failures by adding an explicit mandate to ‘promote good governance in all its aspects, including by ensuring the rule of law, improving the efficiency and accountability of the public sector, and tackling corruption, as essential elements of a framework within which economies can prosper’ (IMF, 1996).

Sociologists also found that poor governance contributed to the post-transition recession, but also showed that privatization and liberalization had directly undermined the capacity of the state and

the national economy (Burawoy 1996, Hamm et al. 2012). As Burawoy (1996) put it, ‘disabling the state to accelerate the creation of markets came at the cost of production’.

By the 1990s a second stream of literature emerged to explain the rise of the ‘East Asian Tigers’—the greatest economic successes of the 1970s and 1980s. A series of detailed case studies showed that highly competent government agencies drove the process of industrial development in these countries, starting with Johnson’s (1982) seminal study of the Japanese Ministry of International Trade, and followed by studies of Korea (Amsden 1989; Evans 1995), Taiwan (Wade 1990), and Singapore (Koh, 1997). World Bank economists concluded that state interventions succeeded in East Asia only ‘because of highly unusual historical and institutional circumstances... with government officials as competent and usually honest referees’ (World Bank 1993: 366). In a similar vein, a series of case studies identified weak public bureaucracies and corruption as key barriers to growth in sub-Saharan Africa (cf. Bates 1981, 1989; Evans, 1989). For development professionals and economists, the take-away was that ‘governance is a prerequisite for progress’.¹⁴

In this way, the emphasis on governance is not necessarily what it seems. First, poor governance and corruption have been used to explain away the shortcomings of liberalization programs. Second, the conclusion is drawn that until governments can develop highly competent and professionalized bureaucracies—or at least root out corruption—there is little to be done in the way of trade and industrial policy. Practitioners could explore institutional reforms that

¹⁴ World Bank 1994a, p. 9. In 2001, the World Bank identified corruption as the ‘single greatest obstacle to economic and social development’.

would best promote growth and accelerate industrial change in low income countries, but such efforts probably would not work, anyway.¹⁵ That, surely, is a counsel of despair.

More generally, when mainstream economists and development professionals talk of enhancing governance capabilities, they typically refer to reforms that complement trade and investment liberalization—including justice reforms, the protection of intellectual property rights, or perhaps reforms of strategic macroeconomic institutions, such as the central bank and tax administration. At this stage, however, it is not so clear whether good governance is a requisite for economic growth, let alone whether these particular reforms deserve priority in national growth strategies.

Does good governance cause growth? The cross-national evidence

A substantial body of quantitative literature holds that growth depends on governance. Both economists and sociologists began to develop cross-national indicators of ‘quality of government’ in the 1990s, and found these measures to be powerfully linked to economic performance. Mauro (1995) and Knack and Keefer (1995) were among the first to test the relationship using commercial ‘country risk’ indices developed for banks and international investors. These studies found a highly significant effect of various measures of ‘bureaucratic quality’ and average growth rates, although the analyses did not consider the impact of these

¹⁵ In theory, the World Bank now supports ‘New Industrial Policy’ (as opposed to ‘old’ horizontal industrial policies, which aimed to ‘level the playing field’ across firms, industries, and sectors while reducing opportunities for corruption and incentives for rent-seeking). ‘New Industrial Policy’ goes beyond a traditional emphasis on governance conditions and investment climate, to one that ‘facilitates learning and self-discovery of private actors’. Still, the presumption is that governments in developing countries do not have the capacity to manage industrial policies, and thus new approaches do not allow for the types of strategic state intervention that are most likely to accelerate industrial change, as described in Chapter 5.

measures on *subsequent* growth.¹⁶ The indicators used in these studies have been criticized on a number of grounds, but ultimately served to increase efforts to develop policy-relevant measures of ‘good governance’.

Evans and Rauch (1999) offered an important corrective to studies of governance and growth by drawing attention to questions of the comparative effectiveness of different forms of public sector organization. Most studies of ‘good governance’ had conceptualized ‘bureaucracy’ in negative terms—in line with Gary Becker’s idea that limited government is the ‘only surefire way to reduce corruption’—rather than in the Weberian sense of a ‘technology of human control’ (Becker 1995; DiMaggio 2001). Evans and Rauch developed original cross-national measures of bureaucratic quality, and found that countries with a public sector that adopted key elements Weber’s bureaucratic model—for example, meritocratic recruitment and long-term careers—experience higher rates of economic growth.¹⁷ Evans and Rauch regress prior growth rates on subsequent bureaucracy scores, however, under the assumption that bureaucratic quality does not change much over time.

Subsequent work has used fixed effects in panel growth regressions to test the relationship between governance and subsequent short-run growth (cf. Kurtz and Schrank 2007; Kaufmann et al. 2005; 2009). Still, there remain concerns in relation to cross-national tests of the relationship. While it is well established is that high levels of economic development are typically associated with exceptionally competent public sectors—‘Sweden or Denmark on a good day, perhaps’ (Andrews 2008) —it is not clear that higher levels of bureaucratic quality

¹⁶ Mauro (1995) measured ‘bureaucratic quality’ in 1980-1983, while average GDP per capita was calculated over 1960-1985; Knack and Keefer (1995) measured ‘bureaucratic quality’ in 1982-85 and focused on growth over the period 1974-1989. Thus, they regress prior growth rates on subsequent bureaucratic quality.

¹⁷ Despite this notable effort, the lion’s share of research on good governance continues to view bureaucratic procedures as ‘intrusive’ or as burdensome ‘red tape’

lead to higher long-term growth. Historically many countries have achieved high growth rates despite poor bureaucratic quality (on the average), while in other cases the relationship appears to be mutually reinforcing.

Moreover, the patterns revealed by data in the short-term—over periods of less than five years—are not especially revealing about the relationship between governance and long run economic performance. The empirically identifiable effect of governance on rates of growth—especially over short intervals—could be different from their effect on levels of income (Durlauf 2009). Now that 15 years of evidence have accumulated since the *World Governance Indicators* were introduced in 1996, we can see if the results hold up with growth averages constructed over longer time horizons, over a decade or more.

Different conceptions of good governance and ‘bureaucratic quality’

To the extent that the ‘institutional turn’ in the social sciences has informed the good governance agenda, it should come as no surprise that there has been extensive debate as to how concepts like good governance should be defined and measured.¹⁸ Some researchers have even questioned the value of cross-national governance indicators, given that they average out the most important variation in the data. Moreover, the definition of effective public institutions is not independent from countries’ economic agendas. (Portes 2006; Grindle 2008; Portes and Smith 2012). Others have found a positive growth bias in commonly used governance indicators (Kurtz and Schrank, 2007). Still others emphasize a need to distinguish between ‘growth-enhancing’ and ‘market-enhancing’ governance (Kurtz and Schrank, 2007; Khan 2012, 2015).

¹⁸ See Portes (2006) for a seminal review of conceptual issues in the study of institutions and development.

According to the World Bank (1994b), ‘good governance is epitomized by predictable, open and enlightened policy making; a bureaucracy imbued with a professional ethos; and executive arm of government accountable for its actions; and a strong civil society participating in public affairs; and all behaving under the rule of law’. This broad definition has provided the basis for the World Bank’s *World Governance Indicators* (WGIs), which encompass six different measures: ‘voice and accountability’, ‘instability and violence’, government effectiveness’, ‘regulatory quality’, ‘rule of law’, and ‘control of corruption’.

This broad approach to measuring governance has increasingly been criticized for conflating normative concerns about what policies should be in place with the quality of policy implementation.¹⁹ ‘Regulatory quality’, for example, is explicitly normative, defining ‘sound policy’ in terms of minimal regulations, taxes, barriers to trade, subsidies and protections, and high ‘investment and financial freedom’. From a growth-enhancing perspective, this conceptualization of ‘good governance’ is at odds with the experiences of countries during the process of industrialization.

Similarly, while the enforceability of contracts is an important aspect of rule of law and governance, the ‘rule of law’ measure also emphasizes ‘respect for intellectual property rights relating to trade secrets, industrial patents, and industrial counterfeiting’, which may not have the anticipated effect on growth. Product piracy (illegal imitation) is an oft-cited catching-up strategy in emerging economies, and was also used by today’s developed countries during their periods of rapid industrialization. Economic historians have documented episodes of product piracy in Germany’s machine tool industry (from 1900-1914 and 1919-1925), for example, and show how these episodes of industrial development influenced German legal attitudes: the government did

¹⁹ cf. Grindle (2008), Andrews (2010), Sundaram et al. 2012

not advocate for respect for foreign intellectual property rights until the industry became internationally competitive (Streb and Richter, 2009).

The measure of ‘governance effectiveness’ and ‘control of corruption’ are closest to sociological conceptualizations of bureaucratic quality, which emphasize the capacity of the state to meet its goals. ‘Government effectiveness’ is defined as the ‘competence of the bureaucracy and the quality of public service delivery’. ‘Control of corruption’ captures perceptions of both petty and grand forms of corruption in government.

This chapter takes a step back from these conceptual debates to ask whether the relationship between growth and bureaucratic quality—however it is measured—is really as important as the conventional wisdom implies. I apply standard models in the empirical growth literature, but with growth measures from subsequent time points to assess the impact of governance in the long run.

Data and Methods

Do countries with greater bureaucratic probity experience faster economic growth in the long run, once relevant country characteristics are accounted for? To test for a relationship between a country’s quality of public administration and subsequent GDP growth, I estimate a standard growth equation. I follow the standard specification for cross-country growth empirics in estimating the growth rate of per capita GDP as a function of the initial level of per capita income, as well as the initial level of investment and initial level of human capital.

The dependent variable is calculated as the average annual log change in real per capita GDP over 15 years, from 1996 to 2011.²⁰ The period ends in 2011 because not enough data were available after 2011, and the period begins in 1996 because it is the first year for which the World Government Indicators are available.

I measure ‘good governance’ using the World Governance Indicators developed by Kaufmann, Kraay, and Mastruzzi, which has become something of the ‘coin of the realm’ in quantitative research on governance (Kaufmann et al. 1999, 2009). The explanatory variables of interest are ‘government effectiveness’ and ‘control of corruption’, because these measures best capture the ability of the state to meet its goals. Both variables are measured only once, in 1996.

The initial level of investment is the log of the ratio of investment (public and private) over GDP from the PennWorld Tables. The human capital variable is the log of the ratio of workers with 12 or more years of education from Barro and Lee (2010).²¹ The initial level of per capita income is the log of per capita GDP, measured in 2005 US Dollars, from the World Bank’s *World Development Indicators* (2013). The control are measured only once, in 1996.

Studies often include additional control variables that may affect long-term growth, but this approach is problematic for several reasons. First, there is the problem of model uncertainty. Studies using different techniques to address this problem—extreme bounds analysis and Bayesian averaging—have shown that the most robust growth variables are initial income and the share of investment in GDP. These studies also show that estimated coefficients of explanatory variables are very sensitive to the other control variables included in the model (cf.

²⁰ The average annual log change in per capita GDP is calculated as $(1/(2011-1996))\ln y_{c1}/y_{c0}$. For simplicity, the estimating equation uses the notation $\ln y_{c1}/y_{c0}$.

²¹ I also ran the models using a measure of the percent of the population with tertiary education, and the qualitative results were the same (with regard to significance levels and coefficient signs).

Levine and Renelt, 1992; Salai-Martin 1997; see also Durlauf 2009 and Young 2009). Second, a concern with any regression is whether the explanatory variables are truly exogenous, and how sensitive the results are to other variables included in the model. Most commonly used variables are endogenous. Accordingly, the only control variables I include in addition to initial income, initial investment, and initial level of human capital are regional dummies.

The estimating equation is:

$$\ln y_{ct}/y_{ct-1} = \alpha + \beta_{WGI}WGI_{ct-1} + \mathbf{X}_{ct-1}\beta_X + \varepsilon_c \quad (1)$$

where $\ln y_{ct}/y_{ct-1}$ is average annual log growth in per capita GDP in country c between the two time periods, 1996 and 2011, WGI_{ct-1} is an indicator of the quality of public administration (government effectiveness or control of corruption) measured in the initial time period, 1996, and X is a vector of controls for initial country characteristics.

I begin by estimating equation 1 using the two measures from the World Governance Indicators for a sample of 145 countries. The choice of these 145 countries is primarily determined by the availability of the human capital measure.²² I then re-estimate the equation using a sample of low and middle income countries, 102 countries in total. Most studies that estimate the relationship between governance and growth include both developed and developing countries in the models²³, but our theoretical interest is in the link between governance and growth in developing countries. The underlying relationship between governance and growth may work differently in developing countries than in developed countries.

²² See Table A1 in Appendix 1 for the list of countries

²³ With the notable exception of Evans and Rauch (1999), who test the relationship with a sample of 35 developing countries.

In an effort to address the measurement issues described above, I also estimated the model using the Bureaucracy Scores developed by Evans and Rauch (1999) in a sample of 30 ‘developing’ countries. Although the Evans and Rauch ‘Weberian data set’ includes 35 countries, 5 of these countries were missing data either the control or the dependent variables. It would be too much to ask of the data to test the relationship here, although I include a plot of the partial association between bureaucracy scores and long-term growth (after controlling for initial income levels) in Appendix 1; the slope is slightly positive and far from statistical significance.

Findings

I begin by estimating equation 1 without any measures of ‘good governance’. The results, reported in column 1 of Table 1, are consistent with studies of the determinants of growth across countries.²⁴ Initial levels of investment and human capital lead to higher growth, while the negative coefficient for the initial level of per capita GDP is consistent with economic theories of conditional convergence.

Column 2a introduces the measure of government effectiveness. When this key explanatory variable is included, the coefficient for investment loses significance. Most likely, this is because the measure of government effectiveness is strongly correlated with investment—consistent with the notion that the concept is a measure of ‘investment friendliness’ as well as the quality of public administration. In column 2b, I add region fixed effects.²⁵ This means that the sample variation that the model is explaining is all within these regions. These variables also

²⁴ For representative studies, see Levine and Renelt, 1992 and Sala-i-Martin, 1997.

²⁵ See Table A1 in Appendix 1 for the list of countries by region

Table 1—Results for Government Effectiveness and Control of Corruption, 1996-2011

	(1) Baseline Model	(2a) Government Effectiveness	(2b) Government Effectiveness	(3a) Control of Corruption	(3b) Control of Corruption
<i>Governance: WGI_{c0}</i>					
Government Effectiveness		0.004 (0.003)	0.005 (0.003)		
Control of Corruption				0.002 (0.003)	0.004 (0.002)
<i>Country Characteristics</i>					
Initial income: $\ln y_{c0}$	-0.009*** (0.001)	-0.011*** (0.002)	-0.009*** (0.002)	-0.009*** (0.001)	-0.009*** (0.001)
Initial investment: $\ln inv_{c0}$	0.006* (0.003)	0.005 (0.003)	0.001 (0.003)	0.006 (0.003)	0.002 (0.003)
Initial human capital: $\ln hc_{c0}$	0.009*** (0.001)	0.010*** (0.002)	0.003 (0.002)	0.010*** (0.002)	0.003 (0.002)
<i>Region fixed effects</i>					
East Asia & Pacific			0.005 (0.006)		0.006 (0.006)
E. Europe & Central Asia			0.016* (0.007)		0.016* (0.007)
Latin America & Caribbean			-0.001 (0.006)		-0.001 (0.006)
Middle East & North Africa			-0.008 (0.007)		-0.008 (0.007)
South Asia			-0.001 (0.009)		-0.000 (0.010)
Sub-Saharan Africa			-0.016* (0.007)		-0.016* (0.008)
R^2	0.26	0.26	0.40	0.26	0.41
Observations	145	145	145	145	145

Notes: The dependent variable is the average annual log change in per capita GDP in country c from 1996 to 2011. The explanatory variables—Government Effectiveness and Control of Corruption—are measured in 1996. The reference ‘region’ is composed of 24 industrialized countries, as defined by the World Bank. The countries include Western European countries, Australia, Canada, Japan, New Zealand and the United States.

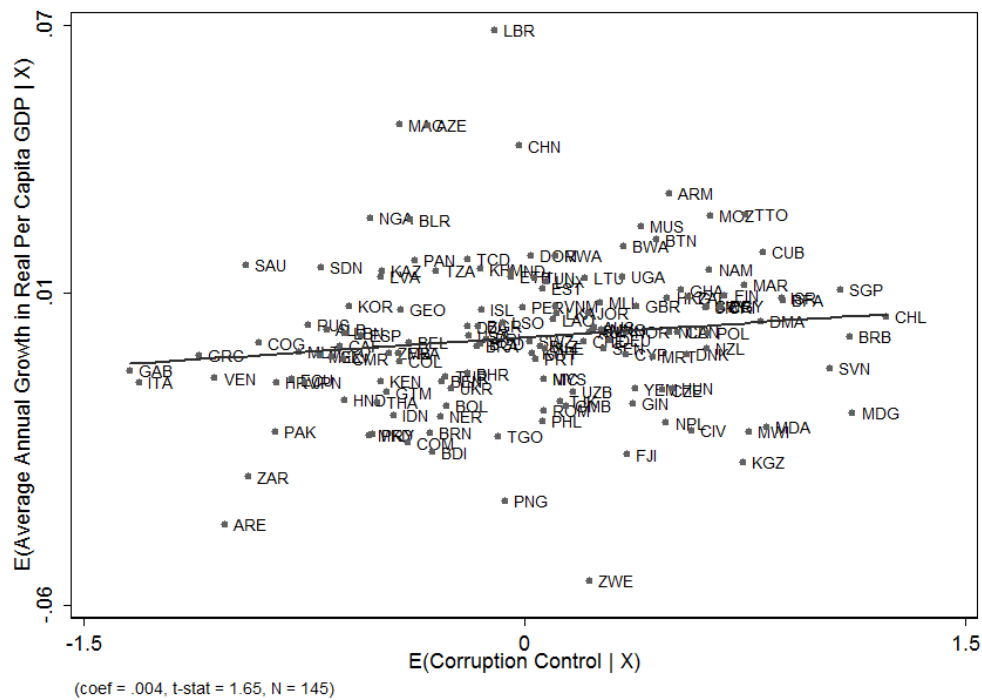
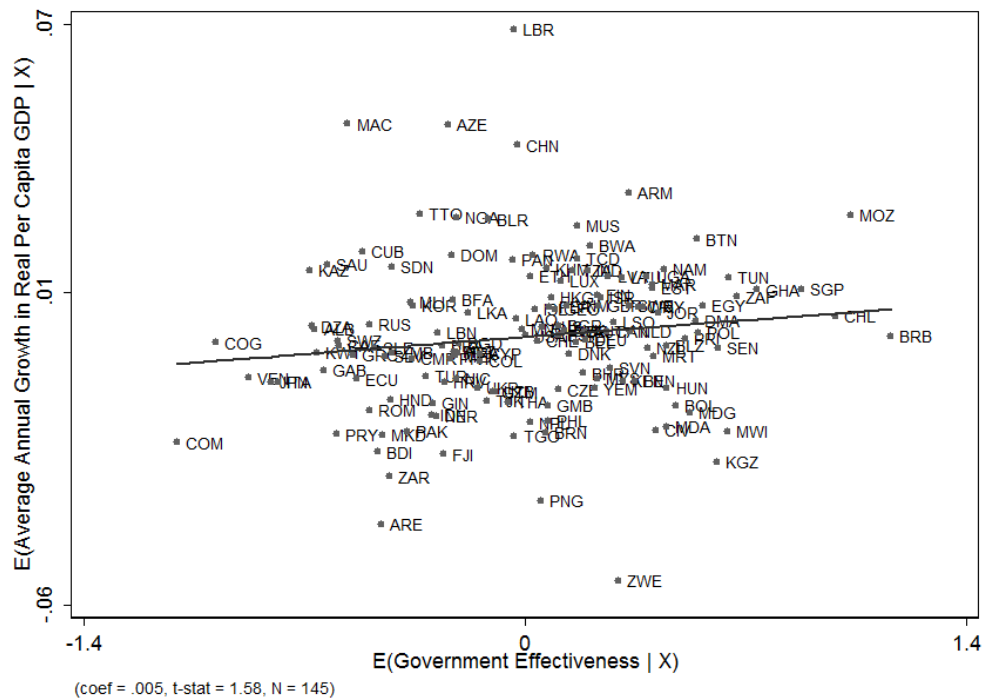
*** p<0.001, ** p<0.01, * p<0.05

implicitly control for the effect of historical and geographic factors that vary across regions. With region fixed effects, human capital becomes statistically insignificant as well, while the coefficient signs and significance remains the same for the other country characteristics. The coefficient for government effectiveness increases by 25 percent, but remains far from statistical significance.

Columns 3a and 3b of Table 1 introduce the measure ‘control of corruption’. The results are qualitatively similar to estimates of government effectiveness in 2a and 2b in terms of significance and coefficient signs. Control of corruption is slightly positive but insignificant in both models, and the effect is economically smaller than in estimates with government effectiveness. That the results using ‘government effectiveness’ and ‘corruption control’ are similar is not surprising given the high and statistically significant correlation between the two measures (0.92, $p < .001$).

In sum, the results based on the full sample of countries provide no evidence for the importance of government effectiveness or corruption control to growth. Figures 2a and 2b display the partial association between growth and each governance measure (columns 2b and 3b of Table 1, respectively). Again, these partial associations are quite weak.

Figures 2a and 2b: Partial Regression Plots



Findings for Developing Countries

To test the growth-governance link in developing countries, I omit high income countries and re-estimate equation 1 with a sample of 102 low and middle income countries.²⁶ This approach also ensures that the null results are not being driven by sample variation between high income countries and developing countries.

The results are reported in Table 2 below. Figures 3a and 3b display partial regression plots for government effectiveness (column 2b of Table 2), and control of corruption (column 3b of Table 2), respectively.

When the sample is restricted to low- and middle-income countries, the coefficient for government effectiveness increases in both models (columns 2a and 2b of Table 2) but remains statistically insignificant ($t = 1.05$ and 1.53). The coefficient for corruption control shrinks in model 3a (without region fixed effects), from $.002$ to $.000$, and remains far from significance in both models.

Again, the key finding here is that ‘good governance’ does not matter much for growth. I find no significant evidence that government effectiveness or control of corruption have any effect on growth, whether or not regional heterogeneity is taken into account, and whether or not the sample is restricted to developing countries.

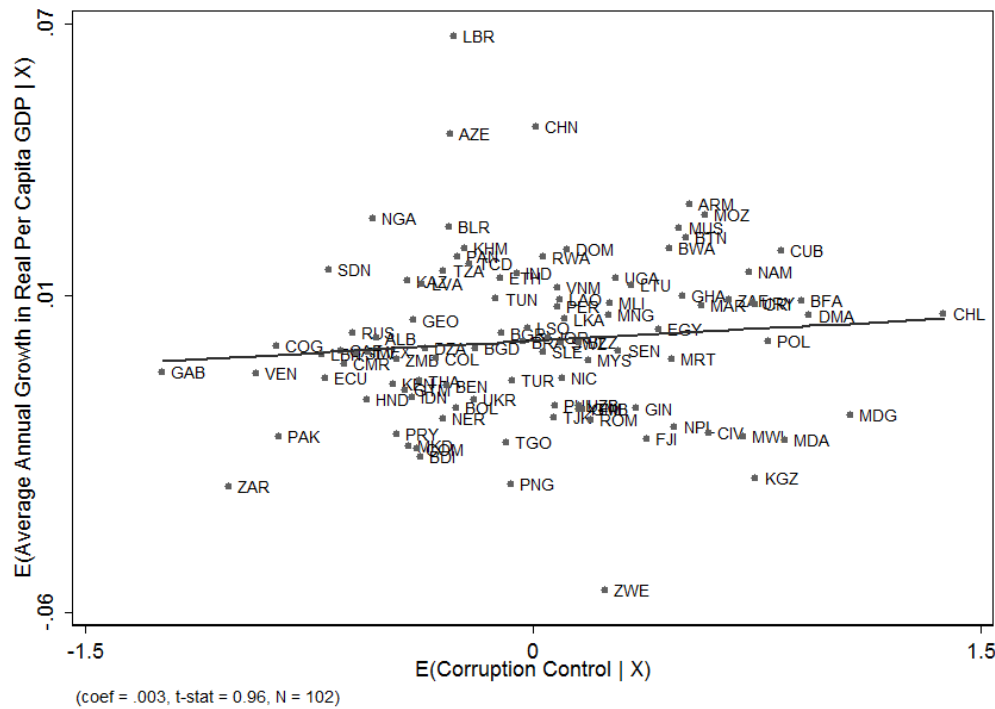
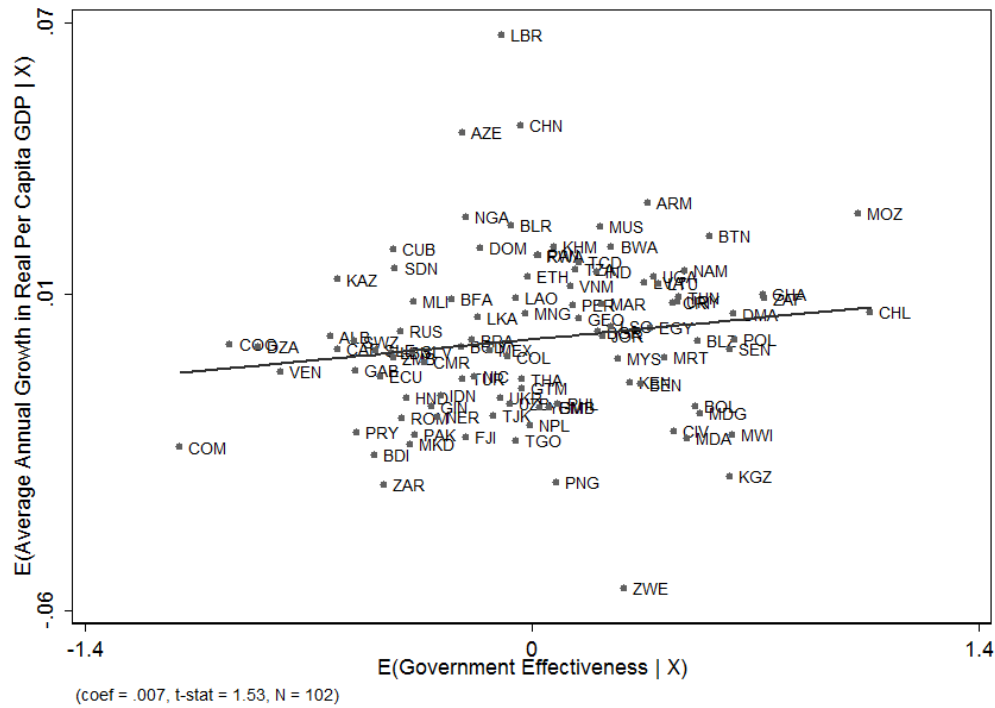
²⁶ I omit both high-income OECD and non-OECD countries, 43 in total.

**Table 2—Results for Government Effectiveness and Control of Corruption, 1996-2011,
Low and Middle Income Countries**

	(1) Baseline Model	(2a) Government Effectiveness	(2b) Government Effectiveness	(3a) Control of Corruption	(3b) Control of Corruption
<i>Governance: WGI_{c0}</i>					
Government Effectiveness		0.005 (0.005)	0.007 (0.004)		
Control of Corruption				0.000 (0.004)	0.004 (0.004)
<i>Country Characteristics</i>					
Initial income: $\ln y_{c0}$	-0.009*** (0.002)	-0.010*** (0.003)	-0.011*** (0.002)	-0.009** (0.003)	-0.009** (0.003)
Initial investment: $\ln inv_{c0}$	0.005 (0.004)	0.004 (0.004)	0.001 (0.003)	0.005 (0.004)	0.002 (0.004)
Initial human capital: $\ln hc_{c0}$	0.011*** (0.002)	0.011*** (0.002)	0.004 (0.003)	0.011*** (0.002)	0.004 (0.003)
<i>Region fixed effects</i>					
East Asia & Pacific			0.017* (0.006)		0.017* (0.007)
E. Europe & Central Asia			0.033*** (0.007)		0.033*** (0.007)
Latin America & Caribbean			0.015* (0.006)		0.014* (0.006)
Middle East & North Africa			0.011 (0.008)		0.011 (0.008)
South Asia			0.014 (0.009)		0.016 (0.009)
R^2	0.22	0.23	0.38	0.22	0.37
Observations	102	102	102	102	102

Notes: The dependent variable is the average annual log change in per capita GDP from 1996 to 2011. The explanatory variables—Government Effectiveness and Control of Corruption—are measured in 1996. Income levels are defined according to World Bank (2013) classifications. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Figure 3a and 3b: Partial Regression Plots, Low and Middle Income Countries



Sensitivity Analysis

To ensure that the null results are not being driven by outliers, I use the Welsch distance to systematically identify and omit influential observations from the sample (Welsch 1982). Results are reported in Table 3.

Table 3—Robustness and Sensitivity Analysis

	Full Sample		Low & Middle Income Countries	
	Government Effectiveness	Control of Corruption	Government Effectiveness	Control of Corruption
Baseline	0.005 (0.003) 145	0.004 (0.002) 145	0.007 (0.004) 102	0.004 (0.004) 102
Omitting Influential Observations $\geq 3\sqrt{K}$ or $\leq -3\sqrt{K}$	0.007* (0.003) 140	0.004 (0.002) 140	0.007 (0.004) 100	0.004 (0.003) 100

Notes: Each cell of this table reports the coefficient, standard error, and number of observations from one regression for the explanatory variable. The dependent variable is the average annual log growth of per capita GDP in country *c* from 1996 to 2011. The explanatory variables—Government Effectiveness and Control of Corruption—are measured in 1996. Each regression includes all three standard control variables and region fixed effects. The baseline estimates reproduce columns 2b and 3b of Table 1 and Table 2. Influential observations are omitted if the Welsch distance is greater than or equal to $3\sqrt{K}$, or less than or equal $-3\sqrt{K}$, where *K* is the number of parameters estimated in the model.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

The baseline models are largely robust to the omission of influential observations. After omitting influential observations from the sample of developing countries, I obtain quantitatively similar results for government effectiveness and control of corruption in the sample of developing countries, as well control of corruption in the full sample—these estimates remain far from significance. The coefficient for government effectiveness is found to be only marginally significant (at the 10% level) when influential observations are omitted from the full sample of

countries.²⁷ Overall, and especially among developing countries, the relationship is not strengthened by omitting influential observations.²⁸

Discussion

This chapter has evaluated the robustness of the link between long-term growth and governance. In sharp contrast to the existing cross-national literature, I find little to no evidence that ‘good governance’ is quantitatively important for long run growth. There is some weak evidence that government effectiveness may have a positive impact on growth, but the result is not robust and appears to be driven by parameter heterogeneity between developed and developing countries. Of course, it is also possible that ‘government effectiveness’ and ‘control of corruption’ are not meaningful indicators of the quality of public administration, or the measurement of these variables is limited and questionable.²⁹ Even if we were to develop valid and reliable aggregate measures of bureaucratic capacity, however, I question whether a strong and unambiguous link to long-term growth will emerge from the data.

The finding that ‘good governance’ is not a prerequisite for growth dovetails with some important findings from the qualitative literature. First, many poorly governed countries have performed relatively well, while many countries that adopted a range of ‘good governance’ reforms have performed poorly.³⁰ Second, countries may comply with ‘good governance’ standards yet still be dysfunctional when ‘perfectly reasonable’ components of governance and rule of law are stitched together to form a ‘monstrous new whole’ (Scheppele 2013, 2014). Even broad governance reforms aimed at instilling elements of Weberian bureaucracy have not met

²⁷ These are China (CHN), Liberia (LBR), Macau (MAC), United Arab Emirates (ARE), and Zimbabwe (ZWE).

²⁸ Belsley et al. (2005) suggest that observations with a Welsch distance greater than $3\sqrt{K}$ or less than $-3\sqrt{K}$ should be flagged for attention; however, I also used a lower cutoff ($1\sqrt{K}$ and $-1\sqrt{K}$) and obtained qualitatively similar results (not reported here).

²⁹ See Portes (2006); Smith and Portes (2012)

³⁰ See especially Grindle 2004, 2007a and 2007b.

with success. The World Bank's 'merit model' for civil service reform, for example, has been regarded as a relative failure.³¹ And it is not the case that civil service reforms simply failed because they were implemented in contexts where any reform was likely to fail. In a comparative study of public institutions in Mexico, Velasco (2012) shows that universal civil service reforms were counterproductive or ineffective in most public institutions, while the most 'developmental' state agency included in the study—the tax authority—had failed to implement the new civil service rules. Instead, different forms of bureaucracy—high on some measures and low on others—may be better suited for particular types of state institutions.

Conclusion

What now for governance reforms? I do not question the consensus that governance matters. Rather, I question whether theory and research have really emphasized the public institutions that have strategic importance for broad-based, national development.

The stakes in the governance-growth debate are also high. In 2014, the World Bank loaned \$5.3 billion for public sector governance projects.³² We thus need to give more attention to the channels through which particular institutional reforms promote growth. In the area of fiscal policy, lending agencies have done a great deal of thinking about appropriate institutional reforms—hence the global trend toward VAT systems supported by semi-autonomous tax authorities.³³ But in the areas of employment and industry, such institutional thinking is absent.

³¹ See Shepherd (2003). Also see Velasco (2012) for an illuminating discussion of the failure of civil service reforms in Mexico.

³² World Bank Annual Report 2015. Public sector governance does not include projects related to the rule of law.

³³ For an in-depth study of reforms in tax administration, see Brautigam et al. 2008. Setting aside the issue of whether the underlying tax reforms (e.g. reductions in tariffs and a transition to VAT systems) are developmental (they probably are not), institution-specific reforms to tax *administration* have succeeded in reducing corruption and improving collection in many countries (see Portes and Smith, 2012).

Tautological governance arguments have also been deployed by lending and aid agencies to deny low and middle income countries the possibility of industrial policy. For industrial policy to be effective, the thinking goes, countries need to build an effective government. To build an effective government, countries need broad civil service reforms, justice reforms, and ‘sound’ macroeconomic institutions. They also need to root out corruption. Yet broad civil service reforms have not been particularly effective, while ‘sound’ macroeconomic institutions and corruption are defined in such a way that precludes most options for trade and industrial policy. In the area of fiscal policy, for example, developing countries have been made to massively cut or even eliminate import tariffs. Central banks are made to target low, single-digit inflation rates, contributing to exchange rate volatility and making it difficult for countries to support the export sector with a stable and competitive exchange rate. And despite complaints from many development professionals, industrial policy is generally *not* unilateral; where there has been industrial policy, there has been lobbying (or ‘rent-seeking’)—this holds both for the East Asian successes as well as other cases typically regarded as failures.

To be sure, creating developmental institutions is no flick of the finger of fate. In many countries that implemented industrial policies and failed, failures in governance were seen as the real source of the problem. But at the same time, many countries with poor governance have islands of bureaucratic probity—often state enterprises—that make significant contributions to national development. Indeed, revisionist accounts of Korea’s postwar industrialization show that corruption and politicization were prevalent in public works contracts and loan allocations, yet pockets of the bureaucracy were staffed with highly educated professionals (Kang, 2002).

More generally, institutional turnarounds are actually quite common in developing countries, although successful transformations are more often associated with context-specific reforms—for example, the establishment of semi-autonomous tax authorities to support fiscal reforms—rather than government-wide reform efforts—as shown in recent comparative work by Portes and Smith (2012) in Latin America.³⁴ The tax administrations were successfully and rapidly transformed in several cases, and loans or ‘technical assistance’ from multilateral lending institutions certainly helped. But if these countries had greater policy freedom (especially tariff autonomy), perhaps they could accomplish more. If lending and aid agencies are really concerned with economic progress, they would do well to extend their thinking about governance to the areas of industry, trade, and employment.

In sum, good governance is an important goal in its own right. The governance agenda can also be good for growth, however, when it focuses on particular areas where governance is most closely linked to industrial change and economic growth. One step forward is to develop more contextual research, and the comparative institutional analysis described above provides a way forward. Rather than strain the meaning of governance by attempting to find a measure that ‘matters’ in all the countries in the world for which we have data, research might focus on organizational innovations that have fostered industrial development in countries outside East Asia, and in the context of trade and investment liberalization. Fortunately, sociologists’ understanding of the substantive, organizational, and institutional issues puts them in a privileged place for contributing to the ongoing debate. As Viterna and Robertson (2015: 41) observe, ‘as sociological insights about institutions, organizations, networks, power, agency and culture are

³⁴ Also see Portes and Marques (2014) for the case of Portugal.

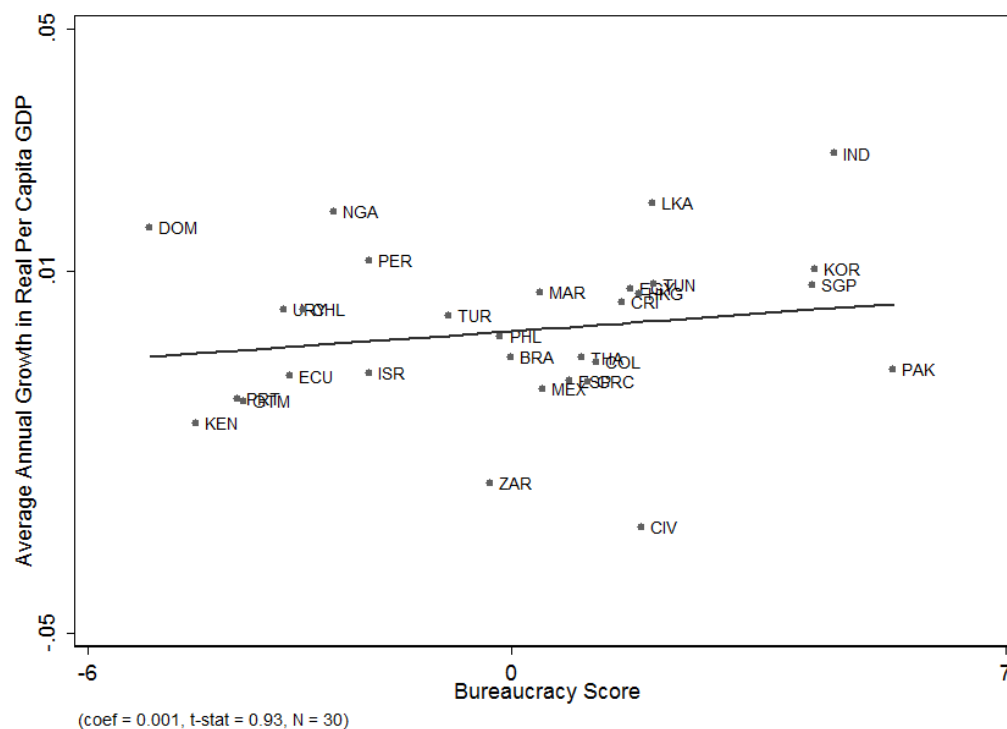
increasingly brought to the analyses of development process *and* development practice, the result will be a fuller understanding of the complexity of development transformations.’

Appendix 2

Table A2.1—List of countries in full sample by region

<u>Industrial</u>	<u>East Asia & Pacific</u>	<u>E. Europe & Central Asia</u>	<u>Latin America & Caribbean</u>	<u>Middle East & North Africa</u>	<u>Sub-Saharan Africa (cont'd)</u>
Australia	Brunei	Albania	Barbados	Algeria	Ethiopia
Austria	Cambodia	Armenia	Belize	Bahrain	Gabon
Belgium	China	Azerbaijan	Bolivia	Egypt	Gambia
Canada	Fiji	Belarus	Brazil	Israel	Ghana
Cyprus	Hong Kong	Bulgaria	Chile	Jordan	Guinea
Denmark	Indonesia	Croatia	Colombia	Kuwait	Kenya
Finland	Laos	Czech Rep.	Costa Rica	Lebanon	Lesotho
France	Macau	Estonia	Cuba	Morocco	Liberia
Germany	Malaysia	Georgia	Dominica	Saudi Arabia	Madagascar
Greece	Mongolia	Hungary	Dominican Rep.	Tunisia	Malawi
Iceland	Papua N. Guinea	Kazakhstan	Ecuador	UAE	Mali
Italy	Philippines	Kyrgyzstan	El Salvador	Yemen	Mauritania
Japan	Singapore	Latvia	Guatemala		Mauritius
Luxembourg	South Korea	Lithuania	Honduras	<u>Sub-Saharan Africa</u>	Mozambique
Malta	Thailand	Macedonia	Mexico		Namibia
Netherlands	Vietnam	Moldova	Nicaragua		Niger
New Zealand		Poland	Panama	Benin	Nigeria
Norway	<u>South Asia</u>	Romania	Paraguay	Botswana	Rwanda
Portugal		Russia	Peru	Burkina Faso	Senegal
Spain	Bangladesh	Slovak Rep.	Puerto Rico	Burundi	Sierra Leone
Sweden	Bhutan	Slovenia	Trinidad & Tob.	Cameroon	South Africa
Switzerland	India	Tajikistan	Uruguay	CAR	Sudan
UK	Nepal	Turkey	Venezuela	Chad	Swaziland
USA	Pakistan	Ukraine		Comoros	Tanzania
	Sri Lanka	Uzbekistan		DR Congo	Togo
				Congo Rep.	Uganda
				Cote d'Ivoire	Zambia
					Zimbabwe

Figure A2.1: Partial Regression Plot of Growth and Bureaucracy Scores, after controlling for initial GDP*



Note: Bureaucracy Scores were measured on the basis of surveys administered over the period 1993-1996.

Chapter 3

Tariffs and Industrial Change:

What You Protect Matters

In countries where there is great private wealth, much may be effected by the voluntary contributions of patriotic individuals; but in a community situated like that of the United States, the public purse must supply the deficiency of private resource. In what can it be so useful, as in prompting and improving the efforts of industry?

— Alexander Hamilton, *Report on Manufactures* communicated to the House of Representatives December 5, 1791.

Do import tariffs matter for national development strategies? Do they enable countries to diversify their economy and grow out of poverty, or are they merely a form of rent-seeking that creates economic inefficiencies and dampens long-term growth? Or, have they simply become irrelevant in the context of global economic integration? The answer to this question depends on how we interpret economic history and the role of trade and industrial policy in the course of development.

The prevailing view in mainstream economics is that trade openness is an essential ingredient for growth. The theory is straightforward: opening the domestic economy to international competition will increase the efficiency with which resources are allocated, unleashing long run growth potential. Although economic models of trade policy and growth have made exceptions for infant industry protection—a country can give up the short run benefits of free trade and protect emerging domestic industries in order to become more competitive in

the long run³⁵—economic professionals have questioned whether tariffs can achieve the goals of infant industry protection, and whether countries have the right ‘dynamic factors’, ‘externalities’, or comparative advantage to justify such interventions. Still others suggest that trade policies have little or no impact on economic performance.³⁶

Sociologists, political economists, and structural economists have taken a more pragmatic perspective on the role of trade policy. Tariffs are not a miracle drug, but they have been a critical element of state-led development strategies—from the practice of protecting ‘infant industries’ in the U.S. described in Alexander Hamilton’s seminal ‘Report on Manufactures’ (1791) to the experience of so-called ‘late-industrializing’ countries in the 20th century.³⁷ There is simply no way for economies to diversify on a significant scale without giving producers trade protection. What is critical for industrial policy is not the average tariff rate across industries, however, but the use of tariffs as a form of sectoral targeting, to promote structural change and build a broad industrial base. With tariffs in place, governments can give national industry the time they need to absorb and develop new technologies before competing in global markets. Without tariffs, countries may only develop ‘export enclaves’—specializing in the low-skilled, low wage assembly of imported inputs, with minimal links to domestic suppliers. In recent years, countries have less flexibility in setting tariffs, but scholars still see room for developmental trade policy.³⁸

³⁵ For example, Greenwald and Stiglitz (2006) advocate intervention in sectors with potential economy-wide knowledge externalities and high initial production costs which decrease slowly over time through learning-by-doing. See Harrison and Rodriguez-Clare (2010) for a careful review of work on infant industry protection.

³⁶ For early representative studies, see Krueger (1982) and Sachs and Warner (1995). For a representative but more nuanced perspective see Bhagwati (1985, 2004).

³⁷ Of course, industrial policy involved a lot more than trade protection in these cases.

³⁸ The WTO imposes tariff ceilings on middle-income countries, but does not require the abolition of tariffs—and least-developed countries (LDCs) are exempt from tariff-binding. Additional provisions allow for ‘import surcharges’, or emergency tariff increases when there is a sudden surge in sectoral imports, or to confront an overall balance of payments problem. Still, developed countries actively seek to reduce that space through bilateral and multilateral trade agreements. See Amsden (2005) for a detailed review.

Empirical efforts to resolve the debate over the appropriate role of trade policy have generated mixed results. Most cross-national studies have examined the impact of tariffs on national economic growth, finding either a positive or negative impact depending on the period in question, and offer little guidance as to the impact of tariffs on industrial development—the main underlying mechanism linking trade protection to long run growth outcomes.

This chapter contributes to the debate with a direct and systematic test of the relationship between protection and industrial change. I emphasize the importance of targeted protection for industrial upgrading, and examine the impact of tariffs targeting more technology-intensive manufacturing sectors on the differential growth of these sectors.³⁹ Specifically, I disaggregate tariffs at the industry level and match tariff data to industry output measured at the 3-digit ISIC level, and present evidence suggesting that targeted protection offers potential for accelerating structural change. I consider both a sample of 58 developed and developing countries and a sample of 35 developing countries over the period 1980-2000. The results provide broad empirical support for the importance of import tariffs and sectoral targeting in generating structural change—that is, a progressive change in the sectoral composition of the economy toward increasingly higher value-added activities.

Background

Today's developed countries—perhaps most successfully the United Kingdom and the United States—have historically used tariff protection to boost their domestic industrial base. Britain maintained high tariffs both before and after its industrial revolution, from the late 18th century to

³⁹ Not all modern activities take place in manufacturing, of course, but historically rapid growth is associated with the expansion of manufacturing activities (UNIDO, 2009).

the mid-19th century.⁴⁰ The U.S. was protectionist throughout the 19th century; tariffs reached their highest levels during its first wave of industrialization. It wasn't until U.S. industry became internationally competitive in the postwar period that U.S. producers shared a common interest in gaining access to foreign markets, rather than in protecting the domestic market. Yet while Britain and the United States have employed import tariffs most aggressively, their protectionist strategies were similar to those employed in continental Europe, and later by the East Asian 'miracle' economies of Japan, Korea, and Taiwan in their industrial development in the 20th century.⁴¹ These governments all had clear industrial priorities, and protected priority industries with tariffs and other measures.

Other countries that were less developed in the early postwar period—for example, Austria, Italy, Finland, and France—maintained relatively high tariffs until the 1960s to allow them to upgrade their industries. Tariffs were not quite as high in Japan in the postwar period, although imports were carefully controlled through other methods. Today's developing countries typically have lower tariff rates than those that prevailed in the U.S. and Europe at similar levels of development.

In the post-WWII era, many developing countries employed 'industrial policies' aimed at protecting emerging industries from competition by products from more industrialized countries. By substituting imports with domestic production and using tariffs (and non-tariff measures) to control trade in priority sectors, governments sought to accelerate the transition from commodity-based economies to manufacturing-based economies. Notwithstanding the

⁴⁰ Industrial tariffs averaged 45-55 percent in 1820. Britain had zero tariffs for a short period in the 1860s to 1870s, but they were raised again in the 1880s to protect heavy industry (e.g. steel, chemicals, machinery). See Baroich (1993) for a study of tariffs and economic history in the U.S., UK, continental Europe, and former colonies.

⁴¹ In Japan, tariff rates were bound below 5% by unequal treaties until 1911. When Japan regained tariff autonomy in 1911, tariff protection became an important element in its industrial strategy.

subsequent rise of basic industry in these countries, industrial policies fell into disrepute in the 1980s amid balance-of-payments problems. Critics found that industrial policies prevent competition and require governments to ‘pick winners’, thereby creating ‘allocative inefficiencies’ and increasing the scope for rent-seeking by vested interests. Rather than promote the development of priority sectors that would serve as engines of growth and employment, then, many countries reduced tariffs and adopted ‘neutral’ policies that applied subsidies and fiscal incentives across-the-board. With ‘neutral’ policies in place, many countries have faced industrial stagnation, or in some cases, deindustrialization.⁴²

In light of these disappointing results, there has been renewed interest in industrial policy in recent years—just as some international organizations and aid donors began to advocate ‘building competitive industries’ and ‘innovation policy’ (another name for industrial policy) for the first time since the mid-1980s.⁴³ As governments begin to look back to industrial policies of the past to find a way forward, it appears an opportune time to evaluate the link between tariff protection and industrial transformation.

This chapter proceeds as follows. First, I review the literature linking trade protection to development at the industry and country levels. Next, I present the data and research design. The third section presents the results and discusses limitations. I conclude by reflecting on policy implications and identifying potential directions for future research.

⁴² For a comparison of industrial development in Latin America under state-led industrialization and after structural adjustment, see Cárdenas et al. (2000).

⁴³ Cf. IDB (2015), Lin (2014)

Tariffs, Industrial Development, and Growth

Industrial Change

A long-held tenet in economics is that structural change—change in the sectoral composition of national economies—is both a cause and consequence of economic growth (cf. Chenery, Syrquin, Taylor, & Westphal, 1984). Meanwhile, ‘world-system’ theories have long considered a nation’s position in the ‘international division of labor’ as a cause, as well as a result, of national development (Fröbel, Heinrichs, & Kreye, 1980; Wallerstein, 1974). From a world-system perspective, the highest returns on investment are concentrated in the sectoral niches filled by core (developed) nations, while ‘peripheral’ (developing) nations are relegated to niches that incorporate low levels of technology, support only low returns on investment, and limit opportunities for progressive transformation.⁴⁴ Scholars have thus been concerned with the dynamic implications of niche, or with questions of how and under what conditions developing nations may strengthen the role of manufacturing in their economies, gain technological and productive advantage, and improve their prospects for development.

Raúl Prebisch—the founding secretary general of UNCTAD, who is often associated with industrial policy in Latin America in the 1950s—saw tariffs as an instrument for effecting structural changes in the economy, and emphasized the need to develop manufacturing industry as a whole.⁴⁵ Subsequent work examined (or compared) the experiences of East Asian countries and demonstrated that protection is a requisite for industrial upgrading, with particular emphasis on state-led efforts to accelerate growth in technology-intensive sectors (e.g. Amsden 1989,

⁴⁴ Here, ‘niche’ refers broadly to participation in particular sectors or the production of particular products as much as the role assumed in the productive process, which may encompass a variety of activities (e.g., assembly, R&D). Nonetheless, the distribution of available activities depends on the sector – some sectors offer few roles with high returns, and others include a variety of activities associated with various levels of returns.

⁴⁵ See Prebisch 1950, 1959

2004; Wade 1990; Evans 1995). In the East-Asian ‘miracle’ economies, the state has been critical to identifying, encouraging, and developing competitive advantages in strategic industrial sectors that offered large export markets, the transfer of new technologies, and skill development. While these studies have focused on a broader range of industrial policies than tariff protection, they do emphasize the need for greater protection in emerging high-technology sectors. However, studies have not systematically addressed how tariff protection influences industrial change both across industries and countries.

Tariffs and Growth

The debate on trade policy and development has overwhelmingly focused on the relationship between tariffs (or ‘trade openness’) and national economic growth. After the Washington Consensus, a series of studies found that trade liberalization plays an important role in growth. Specifically, cross-country analyses found a negative relationship between average tariffs and growth in the post-war period (Edwards 1992, 1998; Sachs and Warner 1995; Clemens and Williamson 2004). But in the late 19th century, studies found a positive correlation between average tariffs and economic growth (Clemens and Williamson 2001; O’Rourke 2000). This divide in the empirical literature has led many to question whether there is a straightforward relationship between trade policy—or average tariff rates—and economic growth (Rodriguez and Rodrik 2001; Clemens and Williamson 2002; Yanikkaya 2003).

More recent studies have examined the pattern of protection and growth. Lehmann and O’Rourke (2008) examined the relationship between tariffs and growth in the late 19th century and found that agricultural tariffs had a negative impact on growth, while industrial tariffs had a

positive impact on growth. In a similar vein, Nunn and Trefler (2010) find that greater protection in skill-intensive industries is associated with faster long-term growth in the late 20th century.⁴⁶

In the theoretical models underlying these econometric studies, trade policy affects long-run growth through its impact on technological change: openness allows access to imported inputs, which embody new technology, increases the size of the market, raising returns to innovation, and affects a country's specialization in research-intensive production (Grossman and Helpman 1992). However, Grossman and Helpman (1992) also acknowledge that trade protection can encourage investment in research-intensive sectors for countries with an international advantage in these products.

From a sociological and structural perspective, however, economic development first requires diversification, not specialization.⁴⁷ A country with broad-based manufacturing capabilities is better situated to take advantage of new 'research-intensive' opportunities than one which has specialized in a few minimally-processed primary products. Thus, in the case of Malaysia's industrial transformation, broad-based success was achieved in the manufacture of foodstuffs, textiles, and machinery assembly more than a decade before entering export-oriented electronics production—behind tariff protection—eventually becoming the world's 3rd largest producer of semiconductors. Malaysia also deployed high tariffs to protect national automobile

⁴⁶ Although the authors also test underlying industry-level mechanisms that support the tariff-growth link, their theoretical emphasis is on growth rather than structural change.

⁴⁷ See Prebisch (1950) for a classic critique of specialization and theories of comparative advantage. For more recent perspectives on diversification in manufactures see, Gereffi and Wyman 2000; Imbs and Wacziarg 2003; Hausmann et al. 2005

producers, enabling them to break into a globally consolidated, capital-intensive sector that is notoriously difficult to enter.⁴⁸

Despite these important reasons to study the relationship between trade protection and industrial development, industrial change has received very little attention in the existing empirical literature on trade policy.⁴⁹ The analysis that follows is an attempt to derive broad yet strategic lessons from countries' industrial trajectories in the late 20th century.

Based on the above considerations, I specify the following:

H₁: Higher protection targeting high-technology industries will produce higher rates of structural change toward high-technology activities

H₂: Countries with a more developed industrial base in low-tech industries at time 0 will experience greater structural change toward high-technology activities at time 1

H₃: Higher rates of protection produce higher output growth in the same industry

All three hypotheses are single-tailed; the null hypothesis is specified as protection having no effect on the outcome variable.

⁴⁸ Tariffs had reached high as 190 percent, but were reduced to 20 percent to comply with AFTA rules. At that time, excise duties were increased for cars, and national producers were allowed a 50 percent rebate on excise duties (See-Hock and Kesavapany (2006).

⁴⁹ One notable exception is Kwon (2013), who tests the contingent impact of average tariffs on growth across countries, after accounting for the level of industrialization with an interaction term (manufacturing share of GDP*average tariff rate). However, the industrialization variable was not significant in any of the model specifications.

Protection in Developed vs. Developing Countries

Surprisingly, the lion's share of cross-national research on the tariff-growth link has considered developed and developing countries as a whole,⁵⁰ while single-industry and cross-industry studies of infant industry protection have focused almost exclusively on developed countries (cf. Baldwin and Krugman 1986, 1989; Hansen, Jensen and Madsen 2003; Head 1994; Irwin 2000).

This approach is problematic because, as Prebisch (1950) has argued persuasively, protection has different meanings in developing countries and in advanced industrialized countries. While protection is understood as an instrument for 'catching up' among developing countries, the protection of primary production in industrialized countries tends to depress growth in low-income countries, and to decrease growth in world trade. Moreover, the historical literature has demonstrated that tariffs have different impacts, and are deployed for different reasons depending on the stage of development. For example, the Korean government nurtured new industries through tariff protection between the 1960s and 1980s, and then reduced protection once they had developed sufficiently to meet the international competition—or by the time Korea gained high-income status.⁵¹

I examine the protection-industrial change link in a sample of both developed and developing countries to be consistent with the existing cross-national literature and to show that my results are robust, but I focus on the findings from the sample of developing countries. I estimate models for developing countries both with and without South Korea and Singapore—two of the newly industrialized countries—to show that these cases of manufacturing-led growth are not driving the results. Because the fruits of infant industry protection are expected to emerge

⁵⁰ Again, the exception is Kwon (2013), who examines tariff interaction effects in 69 less developed countries.

⁵¹ Of course, Korea also used quantitative import controls, subsidies, directed credit and other forms of support.

in the long run, I examine the protection-industrial development link over a roughly 20-year period, from 1980-2000.

Empirical Strategy

I examine the protection-industrial development link using a multi-level approach, incorporating both country- and industry-level data. This allows the study to address fallacies that could arise from the analysis of industrial change at the country level. First I examine the impact of protection targeted in medium- and high-technology manufacturing sectors on structural change toward more technology-intensive activities. Then I examine the relationship at the country-industry level, to understand the impact of protection on output in the same sector, and to ensure that the relationship between targeting and structural change at the country level still holds after controlling for industry-level tariffs.

Data and Measurement

To address the impact of targeted tariff protection on national industrial development, I compiled data from different sources at the industry and country levels of analysis. Tariff data are from the UNCTAD TRAINS Database, UNCTAD (1994) *Directory of Import Regimes* and Nunn and Trefler (2010). Industry output data come from the UNIDO (2006) Industrial Statistics Database at the 3-digit level of ISIC (Rev. 2). Tariff rates are calculated by dividing total import duties by the volume of imports. Because simple tariff averages tend to underweight high tariff rates, average tariff rates were weighted by import levels. The data were deflated and purchasing-

power-parity adjusted. I match the disaggregated tariff data to industry output data measured at the 3-digit ISIC level, although some sectors were overlaid to produce a match.

The sample consists of 23 advanced industrialized countries and 35 developing countries. At the industry level, the data consist of 17 industries, 16 of which correspond to 3-digit ISIC manufacturing industries—the remaining industry is agriculture. The choice of countries was determined by the availability of tariff data; historical data were not available for most small developing nations in UNCTAD’s Directory of Import Regimes.

Because the disaggregated tariff and industry data are available for different years for different countries, the starting and ending year of measurement varies by country, but roughly covers the period 1980-2000. Tariff data are available starting in 1972 for 20 industrialized countries, starting in the period 1980-1983 for 27 countries, and starting in 1985-1987 for 11 countries. To account for the different entry periods in the models I include cohort fixed effects. The list of countries by region and time period is shown in Table A1 in the appendix. The list of industries and classifications is shown in Table A2 of the appendix.

Dependent variables

The dependent variable in country-level models of industrial change is a measure of structural change toward higher-technology-intensive sectors, or the growth of high technology-intensive sectors relative to low technology-intensive sectors. The measure is constructed as the average annual log change in the sums of sector output shares in high technology industries relative to low technology industries. Abusing notation, I refer to this outcome variable as $\Delta high-tech industry_c / low-tech industry_c$.

The dependent variable in the country-industry growth regressions is the average annual log change in industry output. By an abuse of notation, this outcome variable is represented as $\ln output_{ict}/output_{ict-1}$.⁵²

Explanatory variables

The key explanatory variable of interest, *targeting_{ct-1}*, is a measure of differential tariff protection in medium and high-technology sectors relative to low-technology sectors, constructed with the industry-level tariff data and using OECD (2011) industry technology classifications. The industries and technology classifications are shown in Table A2 of the appendix. The variable is a difference measure and constructed as follows. First, I used the four-category OECD technology classifications to generate a two-category technology classification. I treat all sectors classified by the OECD as low technology-intensive as low-technology, and all remaining sectors as high technology-intensive (the resulting high-technology category captures 3 medium and high technology-intensive OECD classifications).⁵³ The measure *low-tech tariff_{ct-1}* is the average tariff rate across low-technology sectors in the initial period; *high-tech tariff_{ct-1}* is the average tariff rate across high-technology sectors in the initial period. The measure of differential protection is calculated by taking the log difference of the two measures:

$$targeting_{ct-1} = \ln high-tech\ tariff_{ct-1} - \ln low-tech\ tariff_{ct-1}$$

⁵² The average annual log change in output is calculated as $(1/(t_1 - t_0)) \ln output_{ict1}/output_{ict0}$, where t_1 refers to the ending-year for each country, t_0 refers to the starting-year for country c , $output_{ict1}$ refers to the output of industry i in country c at time $t=1$, and $output_{ict0}$ refers to the output of industry i in country c at time $t=0$.

⁵³ The 4 OECD classifications are low, medium-low, medium-high, and high. Results were qualitatively similar when the low and medium-low OECD categories were treated as low-technology and only the medium-high and high categories were classified as high. Because I view diversification away from foodstuffs, textiles, and apparel and into more capital-intensive sectors (ranging from medium-low to high) as critical for industrial development, however, I use a low cut-off for ‘high technology’ sectors.

A second explanatory variable of interest in the country-industry regressions is the industry-level tariff rate, $initial\ tariff_{ict-1}$, the natural logarithm of the initial-period tariff rate in industry i in country c .

Control variables

Based on the tariff data, I construct a control variable, $average\ tariff_{ct-1}$, the natural logarithm of the initial-period average tariff rate for country c .

Based on the industry data, I construct three control variables. First a continuous variable initial industry output $output_{ict-1}$, the natural logarithm of the output in industry i in country c at time $t-1$. I expect that tariff protection should lead to higher output growth in that sector. I also include two controls for the initial industrial structure: i) the natural logarithm of the sum of output in low technology-intensive sectors in country c at time $t-1$, denoted as $low-tech\ output_{c0}$; and ii) the natural logarithm of the sum of output in high technology-intensive sectors in country c at time $t-1$, denoted as $high-tech\ output_{ct-1}$.

The models also include three standard control variables used in cross-country growth empirics, the initial level of per capita GDP, the initial level of investment, and the initial level of human capital. The initial level of investment is the log of the ratio of investment (public and private) over GDP from the PennWorld Tables. The human capital variable is the log of the ratio of workers with 12 or more years of education from Barro and Lee (2010). The initial level of per capita income is the log of per capita GDP from the World Bank's *World Development Indicators* (2013). The control variables are measured only once, at time $t-1$ for each country c .

Tariffs and Industrial Transformation

I provide empirical evidence on the effect of targeted protection on industrial upgrading and output, as described in the hypotheses above. To examine the relationship between targeted protection and industrial transformation, I begin at the country level and ask whether countries with differential protection in high-technology sectors experience faster industrial upgrading, or faster structural change toward high-technology activities.

The estimating equation is:

$$(1) \quad \Delta \text{high tech industry}_c / \text{low tech industry}_c = \alpha + \beta \text{targeting}_{ct-1} + \beta \text{avg tariff}_{ct-1} + \beta \text{lowtech output}_{ct-1} + \beta \text{hightech output}_{ct-1} + X_{ct-1}\beta_X + \varepsilon_c$$

where Δ denotes change between periods $t-1$ and t , $\Delta \text{high-tech industry}_c / \text{low-tech industry}_c$ is the average annual log change in the sums of sector output shares in high technology industries relative to low technology industries in country c , targeting_{ct-1} is a measure of differential protection in more technology-intensive industries in period $t-1$, avg tariff_{ct-1} is the average tariff rate across industries in country c at time $t-1$, $\text{low-tech output}_{ct-1}$ and $\text{high-tech output}_{ct-1}$ are measures of the initial-period industrial profile of country c (to account for path dependence, and X_{ct-1} is a vector of controls for standard initial country characteristics used in cross-country growth empirics, region fixed effects, and cohort fixed effects.

To examine growth at the industry level, I also estimate country-industry panel regressions. I ask whether industries with higher tariff protection exhibit faster expansion over the period in question, and whether the relationship between targeted protection in skill-intensive and industrial growth holds after controlling for initial industry-level tariffs. I estimate the

following specification that expresses changes in industry-level output as a function of initial tariffs, and initial industrial profiles:

$$(2) \quad \ln output_{ict}/output_{ict-1} = \beta_0 output_{ict-1} + \beta_1 initial\ tariff_{ict-1} + \beta_2 avg\ tariff_{ct-1} + \beta_3 targeting_{ct-1} + \beta_4 lowtech\ output_{ct-1} + \beta_5 hightech\ output_{ct-1} + X_{ct-1}\beta_X + \alpha_i + \varepsilon_{ic}$$

where $\ln output_{ict}/output_{ict-1}$ is average annual log output growth in industry i of country c , $output_{ict-1}$ is the initial-year industry output, $initial\ tariff_{ict-1}$ is the initial tariff level in industry i of country c , and X is a vector of controls for the initial country characteristics, region fixed effects, cohort fixed effects, and industry fixed effects, to control for unobserved industry characteristics.

Results

Industrial Upgrading

I begin by estimating equation 1 without the measure of ‘targeted protection’ in the sample of 58 developed and developing countries. The results, reported in Model (column) 1 of Table 1, are largely as expected: the negative and inconsistent effect for average tariffs is consistent with findings in the growth literature (Edwards 1992, 1998; Clemens and Williamson 2004; Nunn and Trefler (2006); Estevadeora and Taylor 2008). The coefficients for standard country characteristics (from the growth empirics literature) do not appear as effective in explaining structural change: they are negative for initial investment and human capital, but also insignificant. The coefficient for initial national income is positive and significant, however, suggesting that countries with higher GDP per capita experience faster industrial upgrading in the manufacturing sector. Countries’ initial industrial profile also matters; countries with larger low-tech manufacturing industries are more likely to move into high-technology sectors,

Table 1—Tariffs and Industrial Upgrading

	Developed & Developing Countries		Developing Countries	
	(1)	(2)	(3)	w/o South Korea & Singapore (4)
<i>Import Tariffs</i>				
Targeted protection		0.039* (0.018)	0.083* (0.032)	0.101* (0.038)
Average industrial tariff rate	-0.003 (0.009)	-0.005 (0.009)	0.038 (0.069)	0.030 (0.022)
<i>Industrial Profile</i>				
Initial low-tech sector output	0.015 (0.007)	0.018 (0.011)	0.004 (0.015)	-0.002 (0.016)
Initial high-tech sector output	-0.021* (0.008)	-0.022** (0.008)	-0.018 (0.009)	-0.015 (0.006)
<i>Country Characteristics</i>				
Initial income	0.050* (0.009)	0.040* (0.018)	0.044 (0.023)	0.045 (0.023)
Initial investment	-0.030 (0.017)	-0.025 (0.017)	-0.012 (0.021)	0.011 (0.016)
Initial human capital	-0.009 (0.012)	-0.009 (0.012)	-0.027 (0.021)	-0.033 (0.024)
<i>Region fixed effects</i>				
Middle East & North Africa	Yes 0.027 (0.024)	Yes 0.027 (0.024)	Yes -0.072** (0.026)	Yes -0.077** (0.023)
Latin America	0.056 (0.030)	0.057 (0.032)	-0.051 (0.032)	-0.052 (0.032)
Sub-Saharan Africa	-0.030 (0.031)	-0.030 (0.031)	-0.142*** (0.034)	-0.165*** (0.033)
South Asia	0.038 (0.022)	0.038 (0.022)	-0.087*** (0.023)	-0.089*** (0.019)
East Asia & Pacific	0.100*** (0.021)	0.096*** (0.021)		
<i>Cohort fixed effects</i>				
1980-83	Yes -0.053** (0.015)	Yes -0.053** (0.015)	Yes	Yes
1985-87	-0.087* (0.034)	-0.087* (0.034)	-0.036 (0.028)	-0.044 (0.031)
R^2	0.49	0.54	0.64	0.64
Observations	58	58	37	35

Notes: The dependent variable is a measure of the average annual log change in the sums of sector output shares in high technology industries relative to low technology industries in country c between the two time periods, roughly 1980-2000. The explanatory variable of interest is an indicator of protection targeting medium to high-technology sectors—the difference in tariffs in medium-to-high tech sectors and low tech sectors. The time period covers 1972-2000, but starting and ending years vary by country (most start in the 1980s); see table A.1 of the appendix. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

while countries with lower initial output in high-tech sectors experience faster structural change toward these industries, consistent with notions of structural convergence, or industrial catching up.

Model 2 introduces the measure of targeted protection. The measure is positive and significant, indicating that protection targeting high-tech sectors produces faster structural change toward high-tech industries. When this key explanatory variable is included, the other coefficients remain qualitatively the same, and the R-squared increases by 10 percent (from 0.49 to 0.54).

Models 3 and 4 apply the same specification in a sample of developing countries. Model 3 includes two newly industrialized countries as well, South Korea and Singapore. The results are qualitatively similar to results from Models 1 and 2, although the coefficient for ‘targeted protection’ is much larger in the sample of 35 developing countries, when Singapore, Korea and advanced industrialized countries are excluded. I find strong support for hypothesis 1, that greater protection targeting high-technology industries will produce faster industrial upgrading.

The coefficients for countries’ industrial profile are no longer significant, however, suggesting that this earlier result was driven by sample heterogeneity between developed and developing countries. Thus, I do not find support for the hypothesis greater manufacturing experience in low-technology sectors at time $t-1$ drives upgrading at time t (H_2).

Ultimately, results support the intuition that targeted protection is especially important for industrial catching up in developing countries. If protection is indeed driving industrial upgrading, however, we should also find a positive impact of initial industry-level tariffs and

output growth (H_3). To test whether this effect is observed in the data I turn next to country-industry growth regressions and estimate equation 2.

Country-industry growth regressions

I now turn to the results of country-industry growth regressions. Results are reported in Table 2.

To account for the presence of unobserved, country-level effects in the error terms, I estimate the regressions with robust, clustered standard errors. All models include industry fixed effects, region fixed effects, and cohort fixed effects. Because data were missing for some industries in different countries, there are 926 observations for 58 countries in Models 1 to 3, instead of the 986 potential observations ($58 \times 17 = 986$), 573 observations for 37 countries in Model 4 (with 629 potential observations), and 539 observations for 35 countries in Model 5 (with 595 potential observations).

I begin by estimating equation 2 without the average tariff rate and initial industry tariff rate in the sample of 58 developed and developing countries, shown in Model (column) 1. The results are largely as expected following the estimates of equation 1 reported above; the signs of the coefficients are similar. Initial country income is not significant when initial industry output—the most significant variable in the model—is controlled for. Initial industry output is negative and highly significant, suggesting structural convergence among industries, and the targeted protection measure is significant at the $p < 0.05$ level. Model 2 introduces the initial industry tariff, which is also significant at the $p < 0.05$ level. The targeted protection measure retains significance, and the coefficient increases by about 4 percent, from 0.025 to 0.026. The

remaining coefficients remain qualitatively similar, although low-tech sector output is slightly reduced and loses significance.

In all models, the coefficients for the measure of targeted protection in high-tech industry have the expected sign, are statistically significant, and are remarkably stable in magnitude. This result indicates that targeted protection in high-technology industry has a strong positive impact in all sectors. Additional models restricted to medium and high technology-intensive industries showed a strong, robust positive impact of ‘targeted protection’ and output in these sectors. Thus, the structural change described above captures the differential expansion of high-technology industries rather than a relative decline in low-tech industries.

Initial industry tariffs lose significance when the average tariff rate is included in the model, and even turn negative (but insignificant) in the model for developing countries. This suggests that average tariffs—a country-level predictor—and initial industry tariffs—an industry-level predictor—are highly correlated and create collinearity. However, the results do show that the relationship between sectoral targeting and structural change is not simply explained by the impacts of industry-level tariffs.

Table 2—Country-Industry Growth Regressions

	Developed & Developing Countries			Developing Countries w/o South Korea & Singapore	
	(1)	(2)	(3)	(4)	(5)
<i>Industrial Tariffs</i>					
Targeted protection	0.025* (0.012)	0.026* (0.011)	0.025* (0.012)	0.055* (0.020)	0.079** (0.021)
Average industrial tariff rate			0.003 (0.007)	0.022 (0.015)	0.024 (0.016)
Initial industry tariff		0.006* (0.002)	0.005 (0.003)	0.007 (0.004)	-0.006 (0.008)
<i>Industrial Profile</i>					
Initial industry output	-0.015*** (0.004)	-0.015*** (0.004)	-0.015*** (0.004)	-0.018*** (0.005)	-0.021*** (0.005)
Initial low-tech sector output	0.015* (0.007)	0.011 (0.006)	0.011 (0.006)	0.003 (0.008)	-0.003 (0.009)
Initial med- high-tech output	-0.003 (0.006)	-0.001 (0.005)	-0.001 (0.005)	0.003 (0.007)	0.010 (0.006)
<i>Country Characteristics</i>					
Initial income	0.005 (0.014)	0.007 (0.013)	0.007 (0.014)	0.003 (0.013)	0.003 (0.013)
Initial investment	-0.002 (0.015)	-0.002 (0.015)	-0.001 (0.015)	0.009 (0.016)	0.013 (0.016)
Initial human capital	0.006 (0.007)	0.003 (0.007)	0.003 (0.007)	0.004 (0.016)	-0.004 (0.014)
<i>Region fixed effects</i>	Yes	Yes	Yes	Yes	Yes
<i>Cohort fixed effects</i>	Yes	Yes	Yes	Yes	Yes
<i>Industry fixed effects</i>	Yes	Yes	Yes	Yes	Yes
R^2	0.32	0.32	0.33	0.36	0.39
Countries	58	58	58	37	35
Observations	926	926	926	573	539

Notes: The dependent variable is the average annual log change of output in industry i in country c . The explanatory variable of interest is an indicator of protection targeting medium to high-technology sectors—the difference in tariffs in medium-to-high tech sectors and low tech sectors. In models 1-3, there are 927 observations from 58 countries and 17 industries. Model 4 excludes the 21 advanced economies listed in table A.1 of the appendix; model 5 excludes the 21 advanced economies as well as South Korea and Singapore. The time period covers 1980-2000, but starting and ending years vary by country. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

Discussion

This chapter examined the link between targeted sectoral protection and industrial upgrading, and shows that the results are robust to differences in model specification and samples. The relationship is particularly strong in developing countries, suggesting that targeted protection can play an especially important role in industrial catching up in these countries.

This chapter is far from the final word on the topic, however. With better data, future studies may be able to better address how different stages of development and countries' structural characteristics—size and industrial profiles—condition the impact of tariffs.

Limitations and Sensitivity Analysis

One important limitation of this chapter concerns the temporal coverage. The relationship between protection and industrial change should be examined over different time periods to ensure that the results are not sensitive to global economic cycles, but this will require more years than those for which disaggregated tariff measures are readily available. Ideally, more observations would be available for developing countries before the waves of trade liberalization in the 1980s and 1990s, and after most developing countries gained independence in the 1960s. Future efforts may be able to compile disaggregated tariff data for earlier years—perhaps through the 1970s—using information published by developing country statistics and customs offices, to test for robustness to different time periods. This would also allow for an examination of the impact of different patterns of protection on countries' industrial trajectories at different stages of development. As more time passes we will also be able to re-examine the relationship in the 21st century.

In any case, as an additional check to ensure that the results were not driven by the ‘commodity boom’ or high commodity prices in the 1990s, I reclassified the mineral fuels sector as ‘low’ technology-intensive (rather than medium-low) reran the models (with measures of targeting, initial industrial structure, and the expansion of low- and medium-to-high- tech sectors recalculated accordingly), and obtained qualitatively similar results. More generally, the results were not sensitive to the cut-off between low and medium-high sectors, or to the classification of medium-low sectors in the ‘low technology’ category (as opposed to the ‘medium-to-high’ technology category as reported above).

Of course, less developed countries also rely on tariffs as an important source of revenue. This was especially true in the early postwar period (that is, before liberalizations associated with the global rise of value-added tax regimes, but after developing countries achieved independence). With tariff disaggregated data at the product level, it may be possible in the future to distinguish between the impacts of tariffs deployed as a tool of industrial policy vs. tariffs deployed for public finance reasons. Some studies in of tariffs in 20th century suggest a way forward by identifying and distinguishing tariffs designed to raise revenue in the late 19th century (Lehmann and O’Rourke, 2008).

Another concern is how to account for variation in tariff autonomy. Many countries began IMF-mandated tariff reduction programs in the 1980s, although many were able to maintain moderate tariff rates throughout the 1980s or even 1990s. Because data on IMF lending conditions are not publicly available before the mid-1990s, however, there is no straightforward way to account for the impact of IMF tariff programs. Future work may supplement the IMF Monitoring of Fund Arrangements database with tariff requirements from the 1980s by coding IMF archival materials.

Multiple rounds of multilateral trade negotiations have also restricted tariff autonomy for developing countries, although GATT rules allowed for ‘asymmetric protection’ throughout the 1980s and much of the 1990s. Specifically, early GATT rules allowed developing countries to determine which agreements to support and which to discard, and developing countries had not participated extensively in tariff liberalization until the Uruguay round. At that time, developing countries had ‘bound’ less than a third of their tariff lines, compared to nearly 85 percent for industrial countries.⁵⁴ Thus, while ideally we would have disaggregated tariff data from earlier time periods, the starting period in the early 1980s still captures a period of relative tariff autonomy among developing countries, and allows us to make inferences about the impact of tariffs on industry and growth outcomes. India’s growth acceleration began in the 1980s, for example, more than a decade before its trade and financial liberalization in the 1990s. But even after trade liberalization in 1991, India’s average industrial tariff remained above 30 percent.

Finally, the question of agricultural development also deserves special attention. I include agriculture in the models tested here because development and long-term growth have historically required diversification away from agriculture (except in very rare circumstances). This is not to suggest that agriculture does not merit protection in developing countries, however; on the contrary, the agriculture sector is crucial to poverty alleviation and well-being. Indeed, even during the period of import-substitution industrialization in Latin America, governments directed every aspect of agriculture—from product selection and prices to market organization—and took deliberate measures—e.g. subsidies and credits provided to farmers from state-owned development banks—to stabilize rural incomes and production. Agricultural development and the well-being of many rural populations have since been threatened by reductions in import

⁵⁴ When a country ‘binds’ its tariffs at a certain level it commits not to raise its tariffs above that level.

tariffs after the trade liberalizations in the 1990s (not to mention the disbanding of rural development banks to meet IMF lending conditions).⁵⁵ Haiti's tragic experience with rice production after being required to dramatically reduce tariffs on rice imports is just one case in point.⁵⁶ An examination of agricultural development and tariffs is beyond the scope of this chapter, however.

Conclusion

In line with existing historical-comparative research, this study provides support for the argument that industrial upgrading generally requires government initiative or industrial policy. Of course, this is not to say that there is a simple correlation between tariffs and structural change. Tariff structures that work wonders in some countries may have weak or unintended consequences in others. Still other countries have performed quite well in the absence of tariff protection—but often with the use of alternative policy measures—as we will see in Chapter 4 in the case of Chile. I argue that any practical approach to trade protection must be contingent on the business and industry environment.

Because the historical-comparative literature suggests that the mechanisms linking protection to industrial change are contingent on countries' industrial profiles and stage of development, future research is needed to understand the impact of tariffs on particular industries in countries with different structural characteristics. Research aimed at ascertaining the circumstances under which import tariffs and other forms of protection enable industrial development is likely to prove most productive.

⁵⁵ see Chang 2005, 2012 for a study of agricultural development before and after trade liberalization; see Hansen-Kuhn (1993) *Structural Adjustment in Central America* on the impacts of SAPs on agricultural development in Central America.

⁵⁶ For a basic introduction to the topic see: <http://www.globalresearch.ca/haiti-aid-or-trade-the-nefarious-effects-of-u-s-policies/5357204>.

This is also an opportune time for renewed sociological interest in other issues surrounding the link between tariffs and industrial development. First, historical sociologists have shown that the tariff politics are not merely a function of ‘rent-seeking’, but a reflection of competing interests in the domestic economy. In a study of the antebellum U.S., for example, Chase-Dunn (1980) showed that those exporting raw materials and importing luxury products opposed tariffs because they made consumer goods more expensive, while producers seeking to compete with British imports in the domestic market needed tariff protection.

The issue of tariff politics continues to be of great policy relevance for today’s low-income countries. Notwithstanding pressures and requirements to reduce tariffs in many developing countries—especially middle-income countries—WTO rules still allow for ‘asymmetric protection’ in less developed countries. Thus, there is often room for industrial policy; the issue is whether or not countries *voluntarily* agree to restrictive international codes or bilateral agreements with the U.S, as is often the case (Amsden 2005; Rodrik 2013). Despite protests from many economists, however, this is not necessarily a problem of ‘capacity’ in developing countries. Rather, state decisions on tariffs, which some segments of society fiercely oppose, are often supported or promoted by others.

Second, sociologists recognize that industrial development is multidimensional, and productivity or efficiency—the outcome of interest in most industry-level studies of protection—are just one relevant dimension. In sociology, models of industrial change assume that the environment selects for social and political criteria, not only productivity. Low production costs are not a source of comparative advantage if they cannot be translated into sales, for example. Productivity is not a concern in sociological theories of industrial change unless it is shown to affect the outcome, making a sociological approach well-suited for studies of protection.

In sum, this chapter is far from the final word on the topic of protection and industrial change. It does provide strong evidence to suggest that tariffs matter, however, and more importantly, what you protect matters. This opens up the possibility for greater sociological attention to this literature.

Appendix 3

Table A3.1—List of countries and temporal coverage by region

<u>Middle East & North Africa</u>	<u>Sub-Saharan Africa</u>	<u>Advanced Economies</u>
Algeria, 1985-1998	Burundi, 1980-1988	Australia, 1972-2000
Egypt, 1981-1998	Cote d'Ivoire, 1980-1996	Austria, 1972-2000
Iran, 1980-1987	Ethiopia, 1981-1995	Belgium, 1972-2000
Morocco, 1982-2000	Ghana, 1982-1993	Canada, 1972-2000
Syria, 1982-1985	Kenya, 1982-2000	Denmark, 1972-2000
Tunisia, 1982-1999	Malawi, 1985-1996	Finland, 1972-2000
Turkey, 1987-1997	Mauritius, 1981-1998	France, 1972-2000
	Nigeria, 1982-1994	Germany, 1972-2000
<u>East Asia & Pacific</u>	Sierra Leone, 1982-1986	Greece, 1972-2000
China, 1982-2000	Tanzania, 1982-2000	Ireland, 1972-2000
Indonesia, 1980-2000	Zimbabwe, 1983-1997	Italy, 1972-2000
Malaysia, 1981-2000		Japan, 1972-2000
Singapore, 1983-2000	<u>Latin America</u>	Netherlands, 1972-2000
South Korea, 1987-2000	Argentina, 1987-2000	New Zealand, 1972-2000
Thailand, 1981-2000	Bolivia, 1986-1999	Norway, 1972-2000
	Brazil, 1986-2000	Portugal, 1972-2000
<u>South Asia</u>	Chile, 1987-2000	Spain, 1972-2000
Bangladesh, 1983-2000	Colombia, 1986-2000	Sweden, 1972-2000
India, 1981-1999	Ecuador, 1986-1999	United Kingdom, 1972-2000
Nepal, 1983-2000	Mexico, 1983-2000	United States, 1972-2000
Pakistan, 1982-1992	Venezuela, 1987-2000	
Sri Lanka, 1983-2000		

Table A3.2—Industries and technology classifications

ISIC Rev. 2	Detail	OECD Technology Classification	2- category Technology Classification	SITC Rev. 2
111	Agriculture	Low	Low	0
321,322	Textiles & wearing apparel	Low	Low	65,84
323	Leather products	Low	Low	61,68
331	Wood products	Low	Low	63
332	Furniture	Low	Low	82
341	Paper products	Low	Low	64
324,356	Footwear	Low	Low	85
353,354	Petroleum refineries & products, coal products	Medium-low	High	3
355	Rubber products	Medium-low	High	62
361,362,369	Non-metallic mineral products	Medium-low	High	66
371	Iron and Steel	Medium-low	High	67
372	Non-ferrous metals	Medium-low	High	68
382	Non-electrical machinery	Medium-high	High	71-75
384	Transport equipment	Medium-high	High	78,79
383	Electrical machinery	High	High	76,77
385	Professional & scientific equipment	High	High	87,88
352	Chemical products (non- industrial, including drugs and medicines)	High	High	54,55

Table A3.3: Descriptive Statistics—Country level

Variable (natural log)	N	Mean	Std. Dev.	Min	Max
Industrial change - differential growth of high- and medium-tech sectors	58	0.03	0.06	-0.20	0.16
Sectoral bias of tariffs	58	-0.51	0.38	-1.45	0.56
Average tariff (weighted across all industries)	58	-1.74	1.12	-4.34	0.54
Initial period ln real per capita GDP	58	8.42	1.03	6.40	9.78
Initial period investment to GDP ratio	58	2.83	0.60	0.61	3.95
Initial period human capital	58	-2.27	1.18	-5.03	0.14
Initial output in low tech industries	58	23.69	1.50	20.48	27.24
Initial output in medium to high tech industries	58	22.48	2.48	15.63	27.67

Table A3.4: Descriptive Statistics—Industry level

Variable (natural log)	N	Mean	Std. Dev.	Min	Max
Average annual output growth	926	0.01	0.07	-0.79	0.41
Initial period tariff in industry	926	-2.02	1.53	-9.21	0.83
Initial period industry output	926	20.05	2.65	11.89	26.53

Chapter 4

Beyond ‘Picking Winners’:

How the Chilean State Creates Winners from Scratch

Over the last thirty years Chile has been acclaimed for the success of its policies designed to expand non-traditional exports and diversify the economy away from mineral extraction. Traditionally a mining economy, the share of copper products in Chile’s export basket fell from about 70% in the 1970s to 35% by 2002, as Chile became one of the fastest-growing economies in Latin America.⁵⁷ The transformative impact of these industrial policies is reflected in the unlikely rise of Chilean salmon farming. In the 1980s, Chile—a country with no native salmon population—managed to build a salmon industry from scratch and transform itself into a global salmon producer, generating more than 30,000 direct and indirect jobs and transforming the outlook of its rural communities.⁵⁸ So successful has been Chile that it displaced major industrialised countries—namely the United States, Canada, and Scotland—as leaders in the global salmon industry, becoming the world’s second-largest producer after Norway.⁵⁹ Today, Chile is the leading supplier of salmon to the US and Japanese markets—the world’s largest salmon consumers—and salmon is Chile’s main export after mineral products.⁶⁰

⁵⁷ Meller & Simpasa (2011)

⁵⁸ Salmón Chile, the salmon industry trade association, reports 24,800 direct and 9,800 indirect jobs. Indirect jobs include transportation, fish feed manufacture, net cleansing and repair, repair and maintenance of equipment and machinery, diving and site location services, processing plants, administration and engineering services, consultancy (veterinary, oceanographic, ecologic, etc.), and commerce in general.

⁵⁹ According to SalmonChile, Chile’s annual salmon exports reached over US\$1billion in 2003 and US\$3 billion in 2013. Chile’s share of worldwide salmon production value rose from 10% in 1990 to 38% in 2007, just behind Norway (39%).

⁶⁰ Aduanas Chile, Cuadros de Exportaciones. Salmon accounted for 3.7% of total Chilean exports after copper in 2013; over 75% of total exports from the Southern region of Chile, and more than 20% of Chile’s total food exports.

On the surface, the remarkable growth of salmon-farming in Chile appears to be driven by the private sector—whether by Chilean entrepreneurs or foreign investors—and fuelled by economic liberalization or natural comparative advantage—namely, Chile’s low labour costs and long and temperate Pacific coast. Quietly, however, the Chilean government has played the role of an industry entrepreneur, promoting new activities that private corporations were loath to undertake given their risk and capital requirements, and directing industrial development towards increasingly high value-added activities. By creating and envisioning new areas for business development, the government has played both a critical leading and supporting role in the development of salmon farming in Chile. Indeed, one of the most striking features of the industry’s trajectory was that despite numerous efforts to develop salmon aquaculture with familiar techniques in the 1960s and 1970s—such as credit subsidies, cooperation agreements and technical assistance programs⁶¹—salmon failed to take root and flourish until Fundación Chile—a unique government agency—intervened directly to set up a salmon farming and exporting business in 1982. Just as important, the Chilean government continues to foster entry, innovation, diversification, and upgrading both within and across priority industries.

The first sections of this chapter are designed to convey the extent of the efforts of the Chilean government to develop priority industries, with a spotlight on the salmon industry. The emphasis is less on evaluating the relative merits of different policy instruments, and more on unveiling the organization of industrial policy in Chile.⁶² I focus on how Chile organised its entry into salmon farming—the formation of objectives and strategies, the relationship between the public and private sector, and relationships among government agencies. The final section holds this account up to the light of the developmental state theories. I speculate on why Chile’s

⁶¹ with Canada, Japan’s International Cooperation Agency (JICA) , and the United States (with ICLARM—and offshoot of the Rockefeller Foundation—in 1975 & 1976).

⁶² Here industrial policy refers to any intervention targeting particular sectors or activities in the economy

‘developmental state’ has gone underground and whether a Chilean-type developmental state may help governments cope with the current constraints of global economic governance.

Background

Chilean salmon aquaculture experiments began in the late 1960s, just as the government was attempting to spur economic and rural development through the expansion of food processing industries.⁶³ Following repeated collapses of Chile’s wild pelagic fish stocks—low-value commodity fish used in the production of fishmeal and fish oil (Chile’s principal fisheries exports at the time)—the Chilean government saw aquaculture as the best hope for both diversifying fisheries exports and offsetting the decline of its fish stocks. But the Chilean government also sought a fish species at the high end of the aquaculture value scale—one that would improve incomes and employment opportunities in Southern Chile, thus easing the plight of rural fisherman, and also build Chilean scientific and technological capacity in aquaculture.⁶⁴

Meanwhile, Atlantic and Pacific salmon stocks were declining in the Northern Hemisphere, just as fishing limits and environmental restrictions—as well as consumer demand—were rising.⁶⁵ Fearful that salmon stocks were nearing exhaustion, countries with native salmon habitats sought to restore ‘wild’ salmon populations through a technique called ‘ranching’, in which salmon are ‘hatched’ and reared in captivity, released into the open sea as young adults, and then harvested when they return to spawn.⁶⁶ The United States and Japan were

⁶³ Fundación Chile, 2005. Efforts to transplant salmon to Chile for recreational fishing began in the early 20th century, however; see Galusda, 1907.

⁶⁴ Cf. Wedenoja, 2009. C.f. Acurra, 1995; Duran, 2007; Fundación Chile, 2005; Iizuka, 2004; Katz, 2006; Swanson, 2013; Terram Chile, 2000; Vage, 2005.

⁶⁵ At the same time, a number of regulatory changes—most notably the establishment of 200 mile limit fishing zones—both limited commercial fishing opportunities (the harvesting of wild fish) and motivated research and development in salmon aquaculture.

⁶⁶ See Nelson, 1981; Nash, 2010. Theoretically, a powerful instinct leads salmon to return to the streams where they were born when they are ready to reproduce, typically after 2-3 years at sea.

the first countries to develop and ranching programs, and the fastest growth was occurring in the Northwest United States. In the 1970s, salmon landings in the Pacific Northwest—with a coastline of 5,000 km—totaled 400,000 tons.⁶⁷

At the same time, Japan and the United States sought to diversify salmon production geographically, and began showing real interest in technical cooperation and joint ventures in Chile.⁶⁸ Chile's long coastline, lined with fjords and adjacent to a clean supply of fresh water in the country's lake region seemed ideal for raising fish like salmon, which breed and 'hatch' in fresh water, but mature in salt water. Moreover, because the water was never cold enough to freeze, Chile could potentially harvest salmon all year. If Chile could reach a production of 40 tons/km, government officials reasoned, Chile's 1,700 km of potential 'salmon coastline' could produce 68,000 tons of ranch salmon annually. Over the 1970s, the Chilean government—acting through the Regional Planning Service (SERPLAC), CORFO, and the National Fishing Service (SERNAP)—developed and financed a series of feasibility projects to cultivate salmon with foreign assistance.⁶⁹

A decade of assistance with no salmon

While Chile had a large fisheries sector, it had no native salmon runs, and hence no salmon-focused research or expertise. The Chilean government sought to gain knowledge and experience both through intensive formal training of Chilean marine biologists in Japan, and hands-on training through cooperative programs and technical assistance in Chile.

⁶⁷ Mendez, 1982.

⁶⁸ Japan in particular was trying to secure an external source of salmon; in 1979, Nichiro negotiated the takeover of Peter Pan (a US seafood company in Seattle) and also set up a subsidiary in Chile to expand salmon production. See Swanson, 2013.

⁶⁹ Mendez, 1982.

The first agreement was between Chile's Ministry of Agriculture and Livestock and the University of Washington in 1967-1970 to select the right rivers to introduce Pacific salmon to rivers in southern Chile, on an experimental basis. Yet the project was discontinued given the lack of results: the salmon never returned for harvest. Starting in 1969, a contemporaneous initiative with the Japanese government brought a team of marine biologists from the Chilean Fisheries Service to Japan for six months of training in Japanese salmon hatcheries. The Japanese International Cooperation Agency (JICA) donated essential equipment, including a fishing exploration boat, and field experiments followed in southern Chile to introduce Japanese strains of Pacific salmon. Still, the salmon failed to return.⁷⁰ In 1975, a team of U.S. aquaculture and salmon experts—with funding from an offshoot of the Rockefeller Foundation—visited Chile to select potential sites for hatcheries, and assembled a program for major international funding by the Inter-American Development Bank. Again, funding and interest eventually petered out. Notwithstanding advances in salmon culture techniques, fish diets and disease control, as well as processing, the government found it difficult to justify the project given the lack of results.⁷¹

Despite these initial failures, Japanese and Chilean fisheries experts believed that a major salmon fishery could be established through massive releases from hatcheries. In 1972, the government of Chile and Japan signed an agreement to build a commercial salmon hatchery in a river near Coyhaique in southern Chile. Over 8 million young salmon were released between 1974 and 1978, but still, no returns were detected. The project even became a source of embarrassment for the Japanese government; as one JICA project manager recalled, 'the people who authorized the funding for the project said 'you spent that much money and don't have any

⁷⁰ C.f. Aguilera, 2011; Swanson, 2013; JICA, 2014;

⁷¹ Nash, 2010.

results? It's over.”⁷² Still, Chilean fisheries experts and biologists involved in the JICA project were able to build on the training acquired in both Japan and Chile by establishing their own farming ventures in the years that followed, becoming the pioneers of captive salmon farming in Chile.⁷³

Meanwhile, a new form of fully captive, commercial salmon aquaculture was just beginning to take off in Norway in the 1970s, and quickly gained emulators in Scotland and Ireland, as well as in both the Atlantic and Pacific coasts of the United States and Canada. Chilean officials and fisheries experts followed these developments, and observed that captive farming may be especially suitable to Chile, given that results would not depend returns—the salmon would never be released in the first place—and given Chile's status as a major producer of fish meal and fish oil—the major input in salmon feed.⁷⁴

Starting again near zero

The Chilean government finally acted decisively to establish a fully captive method of salmon farming in the early 1980s. Notwithstanding numerous projects related to salmon aquaculture worldwide, the research was still in its early stages, and commercial projects tended to be sold or terminated if fish failed to materialize within three or four years.⁷⁵ Direct government intervention was thus necessary to demonstrate the commercial feasibility of salmon aquaculture in Chile.

⁷² Interview cited in Swanson (2013); See Swanson, 2013, Mendez (1982), ‘A Program for the Introduction of Pacific Salmon in Southern Chile’, and Vage (2005)

⁷³ In 1979, Pablo Aguilera, a Chilean salmon expert trained through the JICA project, began experiments to raise young salmon in the first sea cage. See Aguilera, 2011; Vage, 2005.

⁷⁴ Feed is the single highest cost item involved in rearing salmon in captivity, accounting for up to 40% of total costs up to harvest time. See Lindbergh, 1987; Duran, 2007.

⁷⁵ Lindbergh, 1982.

Acting through Fundación Chile (FCH) and the regional Ministry of Planning (SERPLAC), the Chilean government acquired installations to raise young salmon from Domsea Farms for 1\$million in 1981, began a pilot salmon farming experiment in its place, and established Chile's first salmon farming enterprise, Salmenes Antártica, Ltda., in 1982. Domsea Farms—an affiliate of Union Carbide, a large U.S. conglomerate—had established a salmon ranching operation on the island of Chiloe in 1976, taking advantage of the location's 'natural enclosures' for rearing young salmon (thus avoiding major capital costs), and access to ship and air services in nearby Puerto Montt.⁷⁶ Domsea Farms did record Chile's the first salmon returns, yet the numbers were nowhere near those required for cost recovery. Thus, Fundación Chile intervened with a full salmon farming experiment because—in the words of Werner von Bischhoffshausen, a former director general of Salmenes Antártica—'No one in the private sector was willing to take the risk'.⁷⁷

Fundación Chile's strategy was not to conduct research and rediscover the wheel, but rather to take advantage of developments elsewhere—in this case, floating cages designed to farm salmon in captivity until harvest—and adapt and apply them in Chile. The most effective way to transfer technology, it seemed to FCH, was to get in and show firms by demonstration, or through business startups. If FCH could succeed in creating a new salmon fishery where there was none, and where efforts guided by major industrial countries—Japan, the United States,

⁷⁶ Although all previous ranching experiments had failed, Domsea Farms took the risk but avoided major capital costs

⁷⁷ Christian, 1988. Also see Mr. Lindbergh's (1982) consultation report to Fundación Chile. Mr. Lindbergh became vice president of Domsea Farms in 1970, and left in 1982 to become an independent consultant to corporate and government clients, including Fundación Chile and the U.S. South Carolina Wildlife and Marine Resources Department.

Canada—had failed, it would also provide a model for entry to other new industries, starting near zero.⁷⁸

With funding from SERPLAC, FCH developed solutions to a number of key problems through the pilot experiment, including cage design & technology, local production of fish feed, and the prevention and control of diseases. FCH also looked for ways to improve the layout of hatcheries and processing plants, to upgrade equipment, and ideas as to how to improve supply relationships with local firms. At the same time, private firms welcomed (and perhaps even sought) government support for research and development in aquaculture, and early investors—including many American and Japanese businesses—followed the progress of Salmenes Antártica and kept an ear to the ground for investment opportunities.⁷⁹

Following the experiment's initial success, FCH initiated contact with the business sector and provided free consulting to encourage entrepreneurs to use the same cage design and salmon production techniques. Then, FCH created three additional companies to cover the full production chain, from the production of eggs and feed to the development of upmarket products, such as smoked salmon. At the start, farming operations had relied on imported salmon eggs, yet FCH determined that local egg production was critical not only to prevent the introduction of disease through egg imports, but also to make operations self-sufficient.⁸⁰

⁷⁸ Funcacion Chile, 2005.

⁷⁹ C.f. Iizuka, 2004; Funcacion Chile, 2005; Munoz, 2009; Swanson, 2013.

⁸⁰ Maggi, 2004. Imported eggs were considered the source of a 2007 outbreak in Chile; see, for example, "Norwegians Concede a Role in Chilean Salmon Virus," <http://www.nytimes.com/2011/07/28/world/americas/28chile.html>.

As soon as Salmones Antártica met its first production targets, FCH began developing technical plans for several nascent firms in the salmon industry—for a competitive fee. By 1988, Salmones Antártica had succeeded in meeting an ambitious production goal of 1,000 tons, including a contract with the San Francisco-based Washington Fish Co. for regular shipments. Salmones Antártica was promptly sold to a private Japanese seafood company, Nippon Suisan, for 22\$million in the same year. Not only did Salmones Antartica prove that Chilean salmon farming could be immensely profitable, but it also paved the way in making Chile a major salmon exporter in less than a decade.

The broader business impact was dramatic. More than 24 new salmon farms were established between 1983-1985. Fundación Chile provided technical assistance—for a competitive fee—to more than half of the new projects, for business design and start-up; disease prevention and control; the design and start-up of packing plants; and development of quality standards; and through the organization and sponsorship of seminars to inform private sector and stimulate investment. At the time, FCH had an annual operating budget of about \$4million, 40 percent of which came from income from the endowment, and the remaining 60 percent from consulting fees. By 1990, salmon exports had grown from virtually nothing in 1981 to over 26,000 tons per year. The trajectory of Chilean salmon is shown in Table 1 below.

Table 1—Growth in Salmon Production, 1981-2002

Year	World Salmon Production (thousand tons)	Chilean Salmon Production (thousand tons)	% Chile in World Salmon Production (thousand tons)	Total Export Value (Millions of US Dollars FOB)
1981	17	...	...	...
1984	49	...	...	...
1987	136	2	1.5%	8.0
1990	366	26	7.9%	140.0
1993	448	77	17.1%	291.4
1996	751	184	24.4%	525.0
1999	1,010	223	22.1%	817.8
2002	1,439	506	35.2%	973.0

Source: SalmonChile, various sources

On the back of this entrepreneurial work, CORFO⁸¹—Chile’s national economic development agency—was involved in a lot of sectoral planning and coordination. Starting in 1983, a special loan program financed by the Interamerican Development Bank and CORFO provided credit on generous terms to projects in priority sectors, including fishing (Munita 1984). Unpublished CORFO data indicate that 8.5\$ million in loans were issued to the fishing sector in one region alone between 1983 and 1989, and such loans were considered critical to the industry’s expansion. As one entrepreneur explained, ‘there was credit, there was a market, there

⁸¹ Like most Latin American countries, Chile pursued a program of import-substitution industrialization (ISI) in the postwar period. CORFO—established in 1939—was the principal planning agency responsible for Chile’s ISI, and the creation and administration of Chile’s SOEs. CORFO is credited with the rise of basic industry, including oil, electricity generation, steel, sugar, among others, although ISI never reached the scale found in larger economies, precisely due to Chile’s small size. CORFO has changed with liberalization, and the privatization of many (but not all) SOEs, but it continues to play a critical, if opaque, role in Chilean industrial development.

was a workforce, there was the successful experience of other firms, and there was economic and political stability’.⁸²

With the salmon industry well established by 1989, the government concluded its entrepreneurial role in the sector, and pushed forward instead with policies designed to promote exports, and to nudge and support salmon producers to increase the level of processing (value-added) of salmon products. To this end, Fundación Chile continued to provide consulting services to the private sector, and kept a close watch both on the productive capacity of Chilean salmon producers and developments in salmon aquaculture abroad. With financial support from Corfo, for example, FCH continued to organize technical study tours for Chilean salmon farmers to visit installations in Norway and Scotland. In 1993, Corfo financed the establishment of a new research institute, the Institute for Salmon Technology (Intesal), to undertake research on the environmental impacts of salmon and salmon diseases. Another key public agency—the government’s export promotion agency, ProChile—emerged contemporaneously (established in 1974), and played a critical role in creating a market for salmon exports, as described below.

Creating a market for Chilean salmon

At first glance, Chile’s salmon export success may appear straightforward; all salmon producers had to do was reach an economy of scale, and traders around the world would be eager to meet growing consumer demand for the fish. And in light of previous technical cooperation programs with the U.S. and Japan—the world’s largest fish importers—those countries appeared a natural market for Chilean salmon. Yet the growth of Chile’s salmon trade challenges some of our basic assumptions about demand-driven industrial growth. For example, by the time Chilean salmon

⁸² Munita 1984.

farms produced commercial quantities of fish, there was no longer a salmon shortage in Japan. Improved hatchery techniques had boosted Japanese salmon harvests, while a growing economy meant that average Japanese consumers could afford ‘wild’ salmon imported from Alaska.⁸³

The principal task for government was thus to create a market for Chilean Salmon. In the mid-1980s both Fundación Chile and Corfo worked quietly with ProChile—the government’s trade promotion agency—and APSTH, the nascent trade association formed in 1986—to promote Chilean salmon to U.S. and Japanese markets.⁸⁴ In 1988, ProChile launched promotional and marketing campaigns in both the U.S. and Japan, co-financed (50-50) by company contributions (channeled through APSTH).

For ProChile, the first targets were Japanese and U.S. seafood importers. Efforts to break into the Japanese market began when a representative in ProChile’s Tokyo office contacted the Japanese Seafood Importers Association, and developed a list of member companies that traded in salmon. ProChile representatives visited each of the resulting 200 firms in person, but only 4 or 5 companies indicated any interest in Chilean salmon. For ProChile, it was a start. ProChile organized salmon trade tours to Chile for prospective Japanese buyers, identifying and inviting traders to Chile following previous meetings, and agreed to cover (or co-finance) the cost of travel. With the appeal of a free trip abroad, more and more Japanese traders became acquainted with Chilean salmon farms, and before long they were importing vast quantities of Chilean salmon.⁸⁵ In 2008, over 80 percent of the salmon consumed in Japan was imported from Chile.⁸⁶

⁸³ Swanson, 2013.

⁸⁴ ProChile established trade offices in numerous countries—some as freestanding commercial offices, and others within diplomatic missions.

⁸⁵ Swanson (2013), Chapter 3.

⁸⁶ Today, Japan remains Chile’s largest export market. In 2013, over 28 percent of Chile’s salmon exports went to Japan, and 24 percent went to the U.S. (SalmonChile)

Tastings also played an important role in convincing Japanese traders and consumers to take a risk with an unfamiliar fish. Some Japanese wholesalers, for example, were biased against farm-raised salmon based on previous negative experiences with farm-raised fish from Norway. But when ProChile provided samples and organized tastings, Japanese traders were impressed by its taste and quality (and attributed the difference to Chile's 'high-quality fishmeal').⁸⁷ Ultimately, the perceived high quality of Chilean salmon—coupled with a low price—convinced traders to take the risk.

To consolidate the entry of Chilean salmon in the Japanese market, ProChile, together with the Association of Salmon and Trout Producers (la Asociacion de Productores de Salmon y Trucha, today SalmonChile), began a program to promote Chilean salmon directly to customers at some of Japan's largest retailers—for example, through tastings and promotions at 150 *Ito Yokado* locales, one of Japan's most important supermarket chains. Substantial amounts were also dedicated to trade fairs in Europe, Japan, and the U.S., and campaigns to promote salmon consumption in these markets (e.g., through ProChile's Imagen-Pais campaign), and a generic campaign to the U.S. market developed jointly with Canada. Later, ProChile and SalmonChile launched a campaign to diversify salmon exports to Brazil, China, and Mexico, and other emerging markets.⁸⁸

In parallel with this export promotion work, Fundación Chile sought ways to support commercialization by improving packaging and building new processing capabilities (for example, by slicing salmon to fit into plastic trays for obento lunch boxes on the Japanese market). Equally important was Fundación Chile's support in developing a system of quality control, or a seal to certify the quality of salmon exports, which was critical to the industry's

⁸⁷ Ibid.

⁸⁸ JICA, 2014; Fundacion Chile; Swanson, 2013

export success. In this way, Fundación Chile not only helped increase and diversify Chile's salmon exports, but also helped increase the value-added of salmon exports.

Government initiatives were particularly important for the growth and internationalization of domestic salmon producers (given that subsidiaries of multinational salmon producers could always use the distribution channels of the parent company). Operating in parallel with the government's export promotion work was Salmocorp S.A., an export company formed in 1990 by a group of 13 large Chilean salmon producers (with indirect support from FCH), to launch an intense, joint marketing effort with product-specific promotions in various markets.

Salmon producers further benefited from government efforts to promote non-traditional exports. In the mid-1980s, the government created an export fund, the Fondo de Promoción de las Exportaciones (FPE), and initiated a campaign to promote non-traditional exports through simplified duty drawback. Salmon producers received a subsidy of up to 10 percent on the value of their export shipments. In addition to duty drawbacks for salmon producers importing capital equipment, fiscal credits were applied to companies that purchased capital equipment from domestic producers, allowing them to borrow up to 73 percent of customs duties that would have been paid had the equipment been imported, and on the same terms (at an interest rate set by the Central Bank of Chile). Special credit lines and guarantee funds for non-traditional exports, elimination of the stamp tax on export credits, and VAT exemptions further provided would-be entrepreneurs with additional incentive to enter the salmon industry.

More recently, the government's capacity to promote Chilean salmon in international markets has been limited by increasing trade protectionism in developed countries. ProChile's promotional campaigns in the U.S. were discontinued following dumping accusations; in 1998,

the US International Trade Commission found countervailable ProChile's assumption of costs in connection with the salmon producers' and exporters' participation in trade fairs held in the U.S., and the European Commission initiated an antidumping case in 2001.⁸⁹ Today, ProChile campaigns must emphasize broader country promotion that does not privilege salmon over other export products.

A New Institution for New Industry

FCH's role in setting up a new salmon farming venture is just one example of how the foundation pursues its mission of helping the Chilean private sector to enter new industries, increase exports, and push toward the technological frontier.⁹⁰ Today, FCH's work in aquaculture has shifted toward biotechnology and vaccine development, as well as novel techniques to farm new, high-value fish species, such as the Patagonian Toothfish (Chilean Sea Bass). At the time of its founding, however, the organisation had struggled to find its niche.

Origins of Fundación Chile

FCH was established in 1976 through an unlikely agreement between the U.S. conglomerate International Telephone & Telegraph (ITT) and the Government of Chile, with an initial endowment of US \$50 million. Its roots lie in one of the most politically sensitive compensation cases negotiated during the military government's divestiture program for companies that had been nationalized under the presidency of Salvador Allende (1970-1973). Around the time ITT

⁸⁹ A successful defence resulted in minimal sanctions, however. See Federal Register 1997, 1998.

⁹⁰ FCH's formal mission is to 'transfer to Chile those technologies which can improve the utilization of the Nation's natural resources and productive capacity and stimulate the creation of new business enterprises based on these technologies.'

property was expropriated, internal ITT memos—offering to finance efforts to prevent Allende from taking office in 1970—were leaked to the press, damaging the company’s public image.⁹¹

In negotiating settlement with ITT, Raul Sáez—the Minister of Development and Economic Coordination, and former Executive Vice President of CORFO—proposed establishing a large, multi-faceted, ITT research center in Chile as a practical means of promoting the technology transfer envisioned in a recent meeting on Inter-American relations, where U.S. Secretary of State Kissinger and Foreign Ministers of 25 Latin American countries had agreed ‘to promote policies facilitating transfers of both patented and unpatented technical knowledge among the respective countries’. While multinationals typically establish research and development (R&D centers) in the United States, Sáez suggested that a joint research facility in Chile would ensure that research and technical support flow in both directions. ITT responded with enthusiasm, perhaps seeing the joint venture as a way to improve the company’s image in Chile. In 1974, ITT accepted compensation at about \$100 million, and agreed to reinvest \$25million of the compensation in the joint venture, which was matched by the Government of Chile.⁹² The endowment was issued in tranches, according to ‘bottom-line’ performance benchmarks, yet the goal was for FCH to become self-financing, by selling services to the private sector, and later by creating profitable business enterprises based on the use of new technologies. FCH’s mission was to carry out scientific and technological research, and apply the research to industrial production and services in Chile.

⁹¹ ITT’s other investments—including a telecommunications factory and two Sheraton hotels—were not touched by appropriations. See *Washington Post* coverage by Laurence Stern (e.g. CIA \$400,000 Chile Fund Reported) and Lewis H. Diuguid (ITT Hearings Derail U.S.-Chile Talks).

⁹² U.S. Department of State Cables, June & July 1974. (Released to public on 30 June 2005); also see the 1974 ‘*Conference of Tlatelolco: Declaration on Inter-American Relations.*’

Managing Fundación Chile

From the beginning, the plan was for Chileans to eventually manage all of FCH's activities.

Under the terms of the agreement, an ITT subsidiary (International Standard Electric Corporation) assumed managerial control for a ten year period. Board members were named by both the government and ITT, and FCH's statutes required that the Vice President of CORFO and the President of Conicyt (the national scientific research and technology commission) serve on the board.⁹³

During this period, ITT set up in-house training programmes to build Chilean managerial and technical capacity and required Chilean staff to visit companies and technology centres abroad. The idea was both to enhance the staff's managerial and professional development, and to keep a close watch on U.S. firms so as to identify ways to improve the productive and technological capabilities of Chilean firms. In turn, during the first 10 years FCH would : 1) Reimburse ITT for all direct costs incurred in providing technical information (travel and subsistence allowance); 2) Keep data confidential until otherwise authorized by ITT; 3) inform ITT of any invention, discovery, or improvement that may result from research using substantial amounts of ITT technical information; and 4) allow ITT free use of new knowledge, reimbursing the Foundation for all direct expenditures related to the transfer of the information. When ITT's formal management period ended in 1986, three ITT executives still remained on the board, although by that time FCH had established its own contacts abroad. Anthony Wylie, a Chilean with a PhD in vegetable physiology was appointed first director general under the new management.⁹⁴

⁹³ *Diario Oficial de la República de Chile*, decreto ley N° 1528, de 1976

⁹⁴ Cf. Christian, 1988; Huss, 1991, and Fundacion Chile, 2005.

Today, FCH runs without ITT involvement and in partnership with BHP Billiton. In 2005, BHP Minera Escondida contributed an endowment of \$10 million, again matched by the government through CORFO. The board is named by both the government and BHP, and FCH's statutes require that the Vice President of CORFO and the President of Conicyt (the national scientific research and technology commission) serve on the board.

Finding the right niche

Notwithstanding a remarkable record of successful business ventures, Fundación Chile took time both to identify fields of action and to determine the best method of technology transfer. At the time of its founding, the Government of Chile and ITT agreed that research would concentrate on electronics and nutrition science, bridging ITT's commercial interest in developing fortified food products, and public health interest aiming to reduce dietary deficiencies in the population.⁹⁵

Robert Cotton, the founding General Director and a leading scientist in ITT Continental Baking Company—guided the first set of projects in 1977, including studies of krill, financial support for establishment of shellfish aquaculture, and the development of a high-protein cracker for the public education system's breakfast program.⁹⁶ FCH dropped its interest in nutrition in the same year, however, with the arrival of a new General Director, who had directed an important ITT R&D division in Spain, and introduced similar business practices to FCH. FCH continued to search for the right niche, eventually settling on the fields of aquaculture, agroindustry, and forestry, in which Chile was thought to have natural comparative advantage, and later expanded into information technologies, environmental research, chemical metrology, and biotechnology.

⁹⁵ At the time, ITT had been seeking new applications for soy in the nutritional improvement of baking products in the U.S.; see Cotton (1974)

⁹⁶ The Continental Baking Company (the maker of Twinkie and Wonder bread, purchased by ITT in 1968) was one of the first food companies to introduce enriched flour products in the U.S.

It is difficult to ascertain the precise reasons and actors surrounding the first shift in niche, however.⁹⁷ In the case of salmon, there was clear private interest (evidenced by numerous cooperation agreements), a need for the government to assume the risk, and salmon production would provide an important source of foreign currency and jobs. But the development of salmon farming would also provide a domestic market for Chilean fishmeal—one of Chile’s largest exports at the time, and the largest input in salmon production—and the fishmeal industry had just been privatized in the late 1970s.⁹⁸

Building the model

FCH initially devoted itself to consulting services sought by Chilean businesses—for example, by looking for ways to improve the layout and equipment of food processing plants, to improve the quality of food products, to build new supply relationships with Chilean firms, and to convert existing local suppliers into exporters. Yet businesses appeared reluctant to adopt FCH’s recommendations, and few projects moved past the exploratory phase. If FCH was to influence the private sector and push practices closer toward the technological frontier, it needed a new approach. It was not enough to take charge of adapting and developing the technology; FCH would have to move a step further, creating commercial-scale pioneer firms to demonstrate the commercial viability of the new technology.

In 1982, FCH began its entrepreneurial drive with the creation of Salmones Antartica, Ltda., described above. The strategy was to begin by creating an example. In forming new companies to pursue new industries and technologies of interest, FCH looked for more than just increasing profits with modern equipment and management techniques, however. The enterprise

⁹⁷ FCH’s archival records were either purged or simply not maintained during the military regime.

⁹⁸ Corfo had nationalized the industry after a collapse in stocks in 1965-66, and the industry was returned to private investors in the late 1970s (Cushman 2013)

must be both technically innovative and have social importance, such as job creation and setting an example that private Chilean firms can reproduce. The key objective is to stay ahead of the private sector, even as it grows and becomes more aggressive in its own search for new ideas and technology.

In the decades that followed, FCH provided seed capital for research contracts with Chile's principal universities and created more than 70 private companies destined to create new products, later sold to the private sector, with proceeds returned to the foundation's endowment. In this way, FCH has also served as a motor for the successful development of an array of export industries such as salmon, wine, fresh fruit, wood products, and various technologies.

Unlike similar institutions in other contexts, FCH is involved in the full process of technology transfer, from the idea or identification of an opportunity, to the process of innovation and adaptation, through to commercial implementation. In many cases, the technologies come from abroad, and their adoption produces large yet short term results. One firm, for example, developed a partnership in Brazil to gain access to technology for sterilizing foods using gamma rays. In other cases, however, the technology is sourced domestically, with higher potential impact over the long run—for example, the development of the southern hake, which took over 10 years to develop but has been just as important as Chile's salmon industry. In such cases, FCH may retain ownership—and much of the value—of the innovation (in this case the genetically-engineered eggs) with strong intellectual property protection.⁹⁹

⁹⁹ See *Los 30 años de Fundación Chile*

Lessons

By reviewing the relative success and failures of salmon aquaculture in Chile, three key lessons stand out:

1) Refreshing policies: don't drop the innovation ball

An important aspect of Chile's industrial policy framework is that policy measures are continuously refreshed to maintain a consistent focus on new products, technologies, and processes at the technological frontier. Just as important, FCH continuously pushes Chilean firms and industry toward emerging, higher value-added activities. Once FCH succeeded in its demonstrative and export promotion efforts with salmon aquaculture, its strategy shifted toward finding ways to add value to Chilean salmon before it is exported. This strategy has proven effective, and even necessary as the global industry consolidated over the course of the 1990s. Today, profit margins are tight for whole and fillet salmon, while upmarket products, such as frozen filets packed with seasoning and recipe suggestions, make up more than 50 cents on the dollar of Chile's salmon export revenues. Success with salmon farming soon led FCH to experiment with salmon genetics and vaccines as well, and to seek intellectual property in these strategic areas.

2) Support Indigenous Business Development

Another important yet often overlooked aspect of Chile's industrial policy is the (implicit, but never explicit) emphasis on national production and indigenous business development—whether public or private—especially when markets risk control by multinational conglomerates. For example, when the salmon feed industry became dominated by multinational companies, Corfo-

Fontec (an R&D fund) provided 20-80 public-private financing for 5 national producers to form Salmofood, a salmon feed production company.¹⁰⁰ Today, Salmofood is the only domestically-owned producer of salmon feed. Similarly, when Chilean stakeholders learned that a Norwegian vaccine company might be acquired by global competitors—thereby threatening the technological dynamism of vaccine production in Chile—Corfo supported Chile’s first direct investment in Norway.¹⁰¹ Early in the industry’s development, the Chilean government carefully supported selective breeding programs and the development of capacity for domestic egg production, controlling salmon egg imports with phytosanitary measures.

3) Build developmental legal capacity

Development scholars generally agree that WTO rules, bilateral and multilateral trade agreements (FTAs), and reactionary trade protectionism in developed countries have restricted states’ regulatory autonomy and developmental capacity (Amsden 2000; Chang 2007). However, WTO members may still promote science and technology at the company level, and influence rule interpretation through lawyering and litigation. The Chilean government has arguably honed its legal capacity as part of a deliberate development strategy.

The developmental state hasn’t disappeared, but it may be underground

Developmental state theories typically assume that industrial policies are visible and open to public scrutiny. In an important paper, Fred Block (2007) shows how neoliberal ideology contributed to the ‘clandestine’ form of the U.S. developmental state. Because the political climate would not allow an explicitly developmental state, the government promotes science and

¹⁰⁰ Maggi, 2002; Duran, 2007.

¹⁰¹ Panorama Acuicola Magazine, 2004.

technology through the Department of Defense and National Institute of Health. In small developing countries, however, there is all the more reason to maintain a neoliberal fiction while pushing industrial policy ‘underground’.

By design rather than accident, Chile’s developmental state has taken the form of a seemingly loose set of industrial policies, thus diverging from the coherent ‘developmental bureaucratic state’ associated with South Korea and Taiwan. When asked about policy coordination across agencies and research institutes, Corfo officials immediately respond that there is no centralized policy coordination,¹⁰² although substantial cooperation and collaboration is apparent to the casual observer.¹⁰³ Indeed, an important defence in trade disputes has been to show that ‘FCH should not be viewed as the government, nor was FCH entrusted or directed by the Government of Chile to take actions that would normally be vested in the government’¹⁰⁴

Chile’s industrial policy agenda and priority sectors are thus supported by a cadre of lawyers, who successfully defend Chile’s industrial policies in trade disputes and negotiate favorable terms in multilateral and bilateral trade agreements. Indeed, even South Korea is said to have negotiated its first cross-regional trade agreement with Chile in 2003 in order to learn from the Chilean negotiators before seeking trade agreements with the U.S. and Japan (Park and Koo, 2007).

With a growing consensus that the role of the state must adapt to new conditions in the twenty-first century¹⁰⁵—in particular, a liberal trade environment that no longer allows for export

¹⁰² Personal communications with four Corfo officials.

¹⁰³ Considering, for example, that the Executive Vice President of Corfo serves on the board of directors of Fundacion Chile.

¹⁰⁴ U.S. Federal Register, Preliminary Negative Countervailing Duty Determination and Alignment of Final Countervailing Duty Determination With Final Antidumping Duty Determination: Fresh Atlantic Salmon from Chile. November 19, 1997

¹⁰⁵ See, for example, Amsden (2004) and Evans (2008)

subsidies or performance requirements—it is important both to review and compare these methods and to carefully examine divergences. These changing organizational methods are of great analytic importance, because they come with a different set of responsibilities and capabilities. State efforts to drive industrial development while also maintaining a neoliberal fiction require a different kind of organization than efforts made in plain public view.

Conclusion

Chile has achieved remarkable growth in a range of food and natural resource-processing industries, and much of this success is attributed to Chile's economic opening. It is commonly assumed, for example, that Chile's military regime, in pursuing economic and trade liberalization in the 1970s and 1980s, had either opposed or eliminated sectoral interventions. Yet the military government had placed great emphasis on export and sectoral promotion, and many programs did favor certain kinds of industries over others—(e.g., 'non-traditional' exports over traditional exports). Moreover, it was not until Chile's political opening in the 1990s that the government negotiated Chile's first free trade agreements.¹⁰⁶ Sound macroeconomic fundamentals—including a stable and competitive real exchange rate—did provide an important basis for the success of salmon farming. Yet priority was given to the promotion of non-traditional exports and new industrial activities, and new institutions—including Fundación Chile and ProChile—were created and dedicated exclusively to the achievement of these objectives, to complement economic liberalization. In other words, macroeconomic policy, and the existing incentives of private sector actors were considered insufficient to achieve a satisfactory level of export diversification.

¹⁰⁶ Up to 1989, Chile had not signed any free trade agreements, but by 2009, the successive democratic governments had signed 24 (see Ffrench-Davis; Stallings, 2008).

Chapter 5

Conclusion

What now for the developmental state? Recent years have seen growing debate about the changing role of the state in the ‘new global economy’, as WTO rules and other international codes have delimited the industrial strategies available to developing nations.

A central argument of this dissertation is that the developmental state’ and industrial policy continue to play a critical role in growth and social transformation. Yet while the ‘developmental state’ has not disappeared, it may appear underground: we can no longer assume that states pursue industrial strategies out in the open and subject them public scrutiny. Instead, successful developmental states—particularly small, open economies—may do well to shield heterodox institutions and policies with neoliberal ideology, as described in Chapter 4 in the case of Chile and discussed below.

A second argument of this dissertation is that broad governance reforms will not suffice. Effective public administration is critical for a developmental state, but institution-building should also focus on strategic institutions—beyond the basic ‘institutional infrastructure’ for markets, property rights, and contract enforcement—that are mostly to promote a ‘multidimensional conspiracy for development’ (Hirschman 1958, Evans 1995). Evidence from case studies suggests that developing countries are capable of dramatic institution-level turnarounds, notwithstanding the persistence of corruption in the broader state apparatus. Chapter 2 supported this argument with quantitative evidence challenging the assumption that control of corruption across the state bureaucracy is a prerequisite for development. Chapter 4

suggests that strategic institutions—for example, development agencies and ministries of economy and trade—deserve greater attention in the ‘good governance’ agenda.

I begin this synthetic chapter by reviewing the trajectory of development theory and practice from the late 20th century to the present. I briefly review the models of the developmental state that were built around the cases of Korea and Taiwan by Amsden (1989), Wade (1990) and Evans (1995), as well as more recent models (or revisions) developed in relation to Ireland and Israel (Chibber 2003, Breznitz 2005, O’Riain 2006). Then, I address some of the shifts in the historical context of development that are particularly relevant to theories of the state, with an emphasis on changes in global economic governance.

While some development scholars still see room for industrial policy—whether it’s because free trade agreements are voluntary (Rodrik 2004) or due to WTO concessions or asymmetric protection extended to developing countries (Amsden 2005), I see WTO rules and multilateral and bilateral trade agreements as a significant obstacle for industrial development. Results presented in Chapter 3 suggest that tariffs and sectoral targeting continued to play an important role in industrial change and upgrading in developing countries in the last decades of the 20th century. Where tariffs and related heterodox policies are no longer feasible, however, I argue that coordinated industrial and legal strategies are an increasingly important piece of the developmental policy toolkit. I develop and illustrate the argument through a discussion of Chile and Mexico. Finally, I suggest ways that these findings may inform the governance agenda and development strategies moving forward.

The Developmental State

Understandings of the role of the state and industrial policy have changed, first and foremost, because the historical context of development has changed. Developmental state theories largely evolved during, or shortly after, the postwar period of state-led industrialization. This was the period that saw the rise of basic industry across a range of developing countries—together with their expectations for development—collapse amid balance-of-payments problems and the subsequent imposition of trade and investment liberalization in the 1980s and 1990s. Then, as now, researchers have worked to comprehend and document the significance of these transformations.

Mainstream economists believed that growth was best achieved by opening the domestic economy to market forces through trade and investment liberalization. State intervention, in contrast, would corrupt the natural tendency for industrial development to follow national comparative advantage and create bloated, ineffective or predatory state bureaucracies. Others agreed that interventions matter, but disagreed about the form interventions should take, and exactly how the state should interact with industry. Still others perceived trade and industrial policies as futile.¹⁰⁷

In the three decades following the ‘Washington Consensus’, studies have shown that economic liberalization benefited new corporate strategies and financial interests, but not economic development: liberalization has generally resulted in national growth rates and employment levels well below those associated with state-led industrialization.¹⁰⁸ Developmental

¹⁰⁷ See, for example, Bhagwati (2004). And yet, as Stiglitz (1999, 2006) often observes, if state interventions—for example, export subsidies—do not matter, why is there so much effort to curb them?

¹⁰⁸ See Portes (1997), Cardenas and Ocampo (2000)

state theorists and political economists further challenged the Washington Consensus by showing that countries that continued to deploy heterodox policies outperformed countries that embraced the neoliberal orthodoxy.¹⁰⁹

Theories of the developmental state have taken a variety of conceptual and analytic models—from embedded autonomous bureaucracy or the developmental bureaucratic state, to the flexible developmental state, developmental network state, and the developmental military state (Amsden 1989, Wade 1990, Evans 1995, Breznitz 2005, O’Riain 2006, Block, 2014). Nonetheless, scholars have agreed on a few key elements of any developmental state. First, for the state to initiate industrial development, it must interact closely and strategically with local business interests or indigenous entrepreneurs. Close relationships to business owners allow the state to anticipate and respond to opportunities in both emerging and existing industries, while a rational Weberian bureaucracy helps the state avoid capture by narrow elite interests. Perspectives on development in the later postwar period—based largely on the experiences of Taiwan, Ireland and Israel—suggest that the state’s main role is to facilitate and coordinate industrial development, however, rather than to envision and implement an overarching development strategy (O’Riain 2004, 2006). In other words, the emphasis has turned to changing the conditions under which firms operate, rather than directly shaping business decisions. This dissertation, in contrast, suggests a need for coordination and vision, and advocates further attention to strategic institutions within the bureaucratic apparatus.¹¹⁰ Moreover, there is increasing need to distinguish between the strategies enumerated in ministry documents or

¹⁰⁹ See Amsden (1989), Portes (1997), Rodrik (2008), Serra and Stiglitz (2008)

¹¹⁰ Breznitz (2005) criticizes developmental state theories for treating the state as a unitary actor, although the emphasis is on treating variations in the success of industry interventions rather than the organization and coordination of developmental institutions within the state bureaucracy. Also see Portes and Smith (2012) a discussion and study of sub-national variation in the performance of state institutions.

described by development agencies and the way the government intervenes in practice.

Developmental state theorists typically assume that industrial policies are explicit and open to public scrutiny, but in the current context there is all the more reason to maintain a neoliberal (or ‘neutral’) fiction while moving industrial policy underground. Seemingly similar development strategies based on ‘free trade’, for example, often conceal vastly different sector and firm-level interventions.

The new global economic governance

Scholars have suggested that the developmental state paradigm has lost power in the current global economic context in recent years, owing both to the changing organization of production, or the rise of global production networks (Gereffi 1999), as well as more restrictive international codes and WTO rules. It is not that heterodox policies would not support national development strategies, but that governments no longer have the policy space to deploy them.¹¹¹

The establishment of the WTO in 1995 marked a sea change in global economic governance, as well as the industrial strategies available to developing countries.¹¹² The WTO aims not only to encourage countries to reduce trade barriers, but also to enforce countries’ commitments. Specifically, the WTO has sought to curtail the familiar industrial policies that served as trade barriers equivalent to tariffs—for example, subsidies, quantitative controls, and performance requirements—as well as trade-related investment measures (TRIMS) that limit government influence over direct foreign investment. Accordingly, the WTO is generally

¹¹¹ Cf. Amsden (2000), Chang (2002), Wade (2004), especially with regard to export subsidies, performance and procurement requirements, and tariff protection.

¹¹² Wade (2003).

regarded as more restrictive than its predecessor, the General Agreement on Tariffs and Trade (GATT).¹¹³ At the same time, trade protectionism in developed countries, as well as bilateral and multilateral trade agreements, have limited industrial policy autonomy in developing countries.

Nonetheless, more pragmatic assessments still see opportunities for challenging these constraints. As Amsden and Hikino (2000) put it, ‘the bark is worse than the bite’.¹¹⁴ More recently, scholars have shown that states with greater ‘developmental legal capacity’ may influence the interpretation of existing rules in the service of a broader development strategy.¹¹⁵ Both Chile and Mexico have embraced ‘free trade’ as a national development strategy, for example, but in remarkably different ways, owing to Chile’s greater ‘developmental legal capacity’, or coordinated efforts to develop legal arguments that support an activist industrial policy, described below.

Chile: Notwithstanding some of the broader limitations of the Chilean development model,¹¹⁶ Chile’s approach to trade and industrial policy may serve as a model for other developing countries seeking to push industries in new directions. Chile’s institutional infrastructure for trade encompasses three ministries and several coordination entities. Most important has been the Department for International Economic Relations, a specialized agency established in 1979 within the Ministry of Foreign Affairs, which oversees bilateral, sub-regional, and multilateral trade negotiations. Through technical cooperation programs, Chile has enhanced its capacity for coordination between different public institutions involved with trade

¹¹³ See Amsden (2000), Wade (2003), Chang (2002, 2007).

¹¹⁴ Also see Evans (2005).

¹¹⁵ See Santos (2012) for an introduction to ‘developmental legal capacity’ and a comparison of legal capacity in Brazil and Mexico.

¹¹⁶ Skeptics may point out that Chile’s high-tech sectors are largely dedicated to ‘second-generation innovations’. Moreover, notwithstanding important social gains following Chile’s democratic transition, further reforms are needed to improve labor conditions (for the case of salmon, see Winn 2004).

and industrial policy, and developed a strategy for promoting targeted industries through a cluster program (IDB 2015). So far, Chile has used the WTO dispute settlement system to successfully defend industrial policies against challenges from the U.S. and other developed countries, including government efforts to support salmon.¹¹⁷ Specifically, Chile was charged a negligible, *de minimus* (0.04%) countervailable subsidy rate for ProChile's export promotion assistance, and succeeded in defending Fundacion Chile (and FONTEC assistance) by showing that Fundacion Chile's decision to invest in the founding of Salmenes Antartica was consistent with the behavior of private investors in Chile. Chile has also succeeded in using phytosanitary measures to ban imports of salmon eggs (genetic material) from U.S. egg farms since 2000, even while U.S. producers have questioned whether the measure was designed to protect Chile's emerging domestic salmon egg industry.¹¹⁸

Mexico: Mexico has also embraced free trade, but in practice as well as theory, and thus shows a very different institutional infrastructure, and very different experience with the WTO system and FTA negotiations. Mexico's trade unit consist of a small team in the Ministry of Economy, which was first created to advise and participate in NAFTA negotiations. Today, the office is responsible for trade negotiations and dispute settlement, although the Ministry of Economy largely relies on external international legal counsel to prepare its cases, with seemingly little interest in training a team of Mexican lawyers to develop and coordinate litigation strategies.¹¹⁹ Again, the institutional infrastructure has influenced the government's legal strategies. In the case of Mexico, the focus is on maintaining the current trade regime—

¹¹⁷ WTO Dispute Settlement DS97. United States countervailing duty investigation of imports of salmon from Chile.

¹¹⁸ Draft Environmental Review of the proposed U.S.-Chile Free Trade Agreement. pursuant to Executive Order 13141 on *Environmental Review of Trade Agreements* (64 Fed. Reg. 63169, Nov. 18, 1999)

¹¹⁹ This characterization of Mexican legal infrastructure draws from Santos (2012), an interview-based study of Mexico's legal capacity in the area of international trade.

using anti-dumping measures to offset unfair measures in trading partners, for example—rather than advancing any development strategy.

In this way, Chile illustrates a way forward for developing countries seeking to deploy industrial policies to further their development agenda. Of course, this is not to say that policy autonomy is not more limited today for developing countries than it was in previous decades, but that there are potential opportunities to be exploited in the contemporary trade regime. Low-income countries, on the other hand, may benefit from limited ‘asymmetric protection’ under WTO rules, but typically lack the considerable resources needed to build ‘developmental legal capacity’ and advance their development strategies within the WTO system, and also in bilateral, regional, and multilateral trade negotiations. At the same time, because the developmental state literature has evolved to explain the relative success (or failure) of industrial development in various middle-income countries, these theories do not necessarily shed light on the types of interventions that are most likely to generate sustained industrial change in today’s low-income countries.

Still, it is clear that in successful cases of industrialization, the state’s role went well beyond the typical governance agenda. That is, the state did more than provide the basic institutional infrastructure for industry: markets, financing, contract enforcement, and property rights, as well as physical infrastructure. This dissertation advocates increased attention to the building and transformation of institutions that play a strategic role in industrial change. Thus, a priority for governance improvements concerned with growth should be enhancing the administrative feasibility of industrial policy, or designing institutions and policies to promote the development of new firms and industries, and building the capacity of countries to defend their development strategies within the international policy regime.

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