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Responses to Change in the Global Political Economy of Innovation – The Role of Sub-National States in Industrial Transition

by Dan Herman

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A dissertation presented to Wilfrid Laurier University in fulfillment of the requirements for the degree of
Doctor of Philosophy in Global Governance

Supervisor: Andrew F. Cooper

Doctoral Committee Members:

Eric Helleiner, William Coleman, Randy Wigle

Abstract

This dissertation seeks to explore how sub-national levels of the state promote the development of new industrial sectors. To do so this dissertation builds on a series of theoretical perspectives on the role of the state in the economy and develops a unique view of how sub-national states coalesce and contrast within these perspectives. It does so through a series of empirical case studies focused on sub-national jurisdictions in North America that highlight diverse varieties of state actions that contribute, if not lead, industrial transitions and the development of new innovation-oriented industrial sectors. In so doing, the dissertation presents a complex interplay of roles and strategies that highlight the inadequacy of existing theoretical frameworks and the manner in which these frameworks are relevant at the sub-national level. The result contributes significant empirical depth to existing understandings of the role of the state and, in addition, builds new empirical and theoretical understanding of how the sub-national level interacts in processes of economic and industrial transition.

Author's Declaration

I hereby declare that I am the sole author of this dissertation. This is a true copy of the dissertation, including any required final revisions, as accepted by my examiners. I understand that my dissertation may be made electronically available to the public.

Acknowledgements

I am exceptionally appreciative of the support, insight and patience provided to me by my outstanding panel of committee members. My supervisor Dr. Andrew Cooper has been a constant source of both academic and personal mentorship since we met in 2010. The completion of this project would not have been possible if not for his insight, patience and diplomatic appeals for progress. Dr. Eric Helleiner has been an academic guide since I first sat in his global political economy class. His enthusiasm for his, and his students' work, is infectious. Dr. Will Coleman's was certainly my toughest critic and for that I am very grateful. His constructive critiques made the final product far better. And Dr. Randy Wigle played an important administrative role, as well as consistently reminding me of the economic arguments that I should be entertaining.

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My colleagues (and more importantly, friends) Warren Clarke and Adam Malloy both played important roles in this process. Warren in his capacity as a thoughtful reviewer of my work, and Adam in his role as a long-standing companion and confidant in office 345.

It must be mentioned that this research has been made possible thanks to the generous financial support of, at various times, the Government of Ontario and the Balsillie Fellowship Program. I thank both for their contributions towards this research.

Ultimately, however, the greatest thanks go to my ever patient partner and spouse, Meghan. This type of research endeavour is a necessarily selfish one, however it only succeeds with sacrifice made by another. Her willingness to allow me time and space to pursue this work has been the key to my success and I will be forever grateful. My only ability to repay this debt rests on the hopes that this work serves to show Julien and Xavier that with perseverance and hard work, they can achieve whatever they wish.

DH

Contents

Abstract.....	2
Author’s Declaration.....	3
Acknowledgements.....	4
Preface	7
Part I: Introduction.....	9
Methodology.....	17
Chapter 1: The existing theoretical landscape.....	22
The State in the Economy	23
Contemporary contributions	23
How States Compete	34
Levels of state – the importance of the sub-national.....	37
A plurality of actors.....	45
Chapter 2-The proliferation of industrial innovation capacity	53
The rise of new competitive actors.....	53
Zizhu chuangxin.....	58
From foreign to domestic innovation in India	62
An evolving global political economy of innovation	65
Part II: Case Studies of Sub-National State Activism.....	67
Chapter 3: Arizona’s quasi-state directed economic transformation	70
Drivers of change	71
Starting from the bottom.....	73
Arizona in a global economy.....	75
Two levels of competition.....	79
The state’s role in catalyzing transformation	81
Third-party facilitation	81
Pipeline entrepreneurialism	88
Explicit industry-targeting.....	91
Case Study: Renewable Energy.....	96
Case Study: Life Sciences	97
Towards a grow-your-own approach.....	100
Legitimized corporate support.....	103

Conclusion.....	104
Chapter 4: Ontario’s Innovation Agenda	108
Motivations and ideological debates.....	109
Driving forces	112
Sector targeting and commercialization.....	117
Operationalizing Targeting.....	126
Targeted Industries	131
Case Study: Green Technology & Renewable Energy	132
Case Study: Life Sciences and the Bio-economy.....	136
Entrepreneurial promotion.....	141
Conclusion.....	145
Chapter 5: Pennsylvania’s state-driven transformation	148
Driving Forces.....	149
Driving Transition: The Ben Franklin Technology Partnership.....	155
Towards endogenous growth	157
Doubling down on innovation	160
The state and private-market failure	163
Target practice	167
Innovate in PA.....	169
A history of targeting	172
Case Study: The Life Sciences and Biotechnology	177
Case study: A Rocky Path in Alternative Energy	180
Conclusion.....	183
Chapter 6: Quebec Inc.	187
Early Drivers of Change: The Quiet Revolution and the Birth of an Interventionist State	188
The Activist state matures	192
Case Study: Pharmaceutical Industry.....	192
Case Study: Digital Media.....	197
Quebec’s contemporary industrial policy.....	202
Conclusion.....	210
Chapter 7: Recalibrating theory and practice at the sub-national level.....	213
References	226

Preface

Debates regarding the role of the state in the economic activity that underpins it are by no means novel. The study of political economy is very much premised on competing visions of the state, its role and the evolution of both as they interact with exogenous and endogenous forces. Early in my academic career I approached this topic from the point of view of the developing economies. Here, the concept of the developmental state, and its activist role in shaping both public and private economic activity, is paramount in explaining the rise of certain economies and the laggard status of others. This activism is most often contrasted with a decrease in the role of the state in the economy in mature industrial economies as noted by the concept of competition state. After a stint working in a sub-national government office, notably one tasked with industry-government relations relating to regulation and competitiveness, I saw that the developmental state was not only a relevant concept for the developing economy context. Rather, elements of this activism apply in mature industrial economies. Moreover, while the competition state might hold more contemporary currency in these economies, what I saw led me to believe that the state, in particular at the sub-national level, was far more active than this theory gave it credit for. For what I saw during my time as a civil servant was a form of state intimately involved in shaping, framing and, at times, actively directing the activity of markets and their participants.

From then on I became fascinated by these competing visions of the state and how these lenses apply at the sub-national level. This dissertation emerged as a means of better understanding what the sub-national state is vis-à-vis the economy, and how it structures its engagement with the market. Initially I sought to study the Canadian context. However, it soon became clear that the integration of the Canadian economy with that of the United States, notably with regard to the competitive dynamic between the two, made a study of both sides of the border necessary. Moreover, while within the literature related to international political economy and international relations significant theoretical attention is paid to the role of national or federal level governments in the economy, far less so is paid to the role of provinces and states. Finally, while there are myriad areas of economic activity that could be studied and

researched in detail, this dissertation focuses specifically on one: how do sub-national levels of the state promote the development of new industrial sectors, in particular ones defined as innovative and knowledge-based?

This dissertation is an attempt to understand the sub-national state, and the policy makers who shape it, as an actor amongst many others that are facing a complex and rapidly evolving contextual environment. How do these sub-national states structure their involvement in the economy and the development of new industrial sectors? Is this engagement active or passive? And is it influenced by the rise of new competition from previously developing economies? And, more theoretically, how does the sub-national state fit within existing international relations and international political economy scholarship?

These questions point to an uncertain terrain for policy makers. They must seek to understand a complex interplay of local, regional and international forces in order to shape a particular role for their respective states as the state seeks to fulfill economic and social ends. These ends, while not standardized or codified explicitly, are nearly universally directed towards employment and economic growth. These ends rise above all else due in large part to their public, and therefore, political saliency. To create employment is good, to lose employment is bad. It is that simple.

However, the global economy within which this local dynamic is situated is anything but simple.

Part I: Introduction

This dissertation seeks to develop an understanding of how sub-national states, notably those in mature industrial economies, react to processes of change in both their local and global economic arenas. In so doing, it focuses on the concept of economic transition, or of Schumpeterian creative destruction, and how new forms of production and new areas of industrial activity emerge either alongside or in the place of previous ones. It examines this concept of transition, and of the state's role in it, through the juxtaposition of several relevant theoretical frameworks on the role of the state in the economy against practical reality as shown in four empirical case studies. These theoretical frameworks taken from the field of international relations (IR), however, are largely focused on the national level of governance. This dissertation thus seeks to test their relevance at the sub-national level by detailing how sub-national states facilitate industrial transition and industrial development in practice. This represents a significant contribution insofar as it addresses a major knowledge gap regarding the role and structure of sub-national economic and industrial activism, and the relevance of extant IR theory to this level of industrial governance. While the sub-national is better represented in other fields of study, notably in works classified as economic geography and domestic public policy, this dissertation uses an IR lens so as to develop the understanding of why the sub-national matters in IR and how it interacts in broader IR and global governance debates related to the state's role in the economy.

All together, this dissertation seeks to better understand how the sub-national state adapts and structures the adaptation of domestic industry. As Michael Porter writes in his work on the *Competitive Advantage of Nations*, "the nature of economic competition is not equilibrium but a perpetual state of change" (Porter 1990: 70). Understanding these processes of competition and change builds on existing theoretical contributions related to the competition state, the entrepreneurial state, the developmental state and, more generally, the evolving functional role of the state in the economy. While this work is focused generally on the national level of governance, this dissertation seeks to understand how the sub-national state applies such frameworks, whether fully, in part, or not at all. Across this theoretical work, two general themes exist. On one hand, the competition state and the Schumpeterian Workfare State focus on the general decline of the welfare state and transition to one that focuses primarily on improvements

to the general business climate. On the other, the entrepreneurial state and the developmental state concepts argue that the state remains active though in very specific ways that will be expanded upon. This dissertation finds that the sub-national state remains as active and activist as ever. It does so, however, by highlighting that the above theoretical frameworks fail to capture the complexity and diversity of actions and strategies employed by the contemporary sub-national state. And while the former view on the decline of the state remains a popular one, this dissertation will highlight that while many of the levers and channels for this economic activism have changed, the desired outcomes related to industrial activity and employment growth remain the same.

Four case studies are presented that detail how sub-national states in Canada and the United States structure and operationalize industrial transition and their respective roles in those transitions. The case studies focus on the provinces of Ontario and Quebec in Canada, and the states of Arizona and Pennsylvania in the United States. While this dissertation is ostensibly framed as one focused on North America, Mexico is omitted given its vastly different set of economic and fiscal capabilities. As Horsfall (2010:59) notes in his development of a sample of comparative competition-state countries, Mexico “can hardly be described as (an) advanced welfare state” and is thus an inappropriate subject for comparative study.

As will be shown, the social bargain or ability to finance economic and industrial transition and related employment in new sectors has not been removed by the evolving competition state. An analysis of the support provided to corporations by both American states and Canadian provinces highlights that the state, in this case the sub-national state, remains as active as ever. These engagements by the sub-national state into the affairs of firms and industrial sectors have taken new routes but aim largely to achieve consistent, industrial-policy ends. In particular, the sub-national state, here defined as those in decentralized or federated structures, plays a leadership role in the development of new innovative industrial sectors that are meant to transition economies forward. This concept of transition is tied to the thinking of Schumpeter as it relates to the question of how economic systems, embedded in their external environments, create the forces that bring about change and progress. As Schumpeter (1942:83) wrote,

“The Fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumer goods, the new methods of production or transportation, the new markets ... (which) incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism.”

Creative Destruction, based as it is on innovation and the search for economic novelty, is subsequently at the heart of the study of economic transition.¹ Innovation itself, measured within the confines of an economy, is commonly thought of as a product of endogenous factors related to competition, skills and investment (see Freeman 1997). It is, however, impossible to segregate these domestic factors from the impact of international ones related to the cross-border flow of people, ideas and economic effects. And, as this dissertation will seek to better understand, innovation and transition in one jurisdiction is by no means immune from the impacts of innovation and transition elsewhere. The maturation and evolution of jurisdictions previously focused on low-skill, lower-value economic activity into areas of high-value economic activity previously corralled by mature industrial economies is one such change. The subsequent globalization of high-value competition thus alters the sources and factors of national or regional level competitiveness (Porter 1990, Freeman 1997). In a given jurisdiction, contemporary innovation is therefore more than ever a product of the confluence of endogenous capabilities and international competitive forces. This dissertation will explore this competitive dynamic as a secondary aspect of the research. It will do so by looking at how international economic forces – notably those from China and India in high-value technological fields – influence the strategies enacted by the state to develop new industrial sectors.

Analyzing the relationship between economic transition and the role of the sub-national state is the primary purpose of this dissertation. This research seeks to study the reaction of mature industrial sub-national states in federated governance structures to the processes of economic and political transition underway that see ever-increasing competition in the pursuit and production of high-value innovation.

¹ And not simply profits and capital accumulation as theorized by others (for example Marx or Kondratiev).

For these reasons, this dissertation approaches these processes through the following research questions:

How do sub-national levels of the state in federated structures promote the development of new industrial sectors? And how are these actions influenced by an increasingly competitive global innovation economy?

By addressing these questions, this thesis seeks to better understand the role and shape of the sub-national state in the development of economic policy. The dissertation seeks to position this understanding relative to an IR perspective on the role of the state in the economy that are focused on the national level. In so doing, this research will both test the relevance of this theoretical work at the sub-national level, as well as help fill a significant knowledge gap related to our understanding of how the sub-national state operates and structures its economic activism.

As the following empirical work will highlight, the state's role in the face of economic change and transition is multifaceted. It can be both an enabler of, and direct participant in, the process of transition. In the face of increasing competition from beyond its borders, the state can choose amongst several paths of potential response. As the following literature review will highlight, these options including a focus on labour and regulatory flexibility as espoused by the competition state, or when paired with skills development as promoted by the literature on the Schumpeterian Workfare state, or conversely more activist and interventionist approaches such as the promotion of research and development and its transfer from public to private ownership as noted by Mazzucato (2013), export promotion (Eisinger 1988), or more intrusive forms of industrial planning attributed to the work of Johnson (1982) amongst others. The operationalization of these strategies, as will be shown in the case study chapters that follow, include the use of direct granting programs, third-party facilitating agencies, targeted entrepreneurial promotion, tax credits, and local content requirements.

To be sure, no path is mutually exclusive and every jurisdiction will combine strategic approaches to satisfy domestic imperatives related to immediate employment and longer-term competitiveness. As Zysman et al (2007:18) note, "to maneuver successfully in an environment of constantly shifting advantages and under pressure to rapidly create differentiated assets, they (states) need to be able to both sustain individual and collective learning processes and

implement the business, social and technological innovations generated by these processes.” The four case studies developed in this dissertation highlight this polycentric approach to industrial and innovation policy.

Table 1 provides an overview view of the respective approaches seen in each jurisdiction analysed:

Table 1: Jurisdictional approaches to state involvement in the economy

Jurisdiction	Theoretical Model
Arizona	Moderate presence of the competition state’s focus on labour and regulatory flexibility; moderate focus on entrepreneurship and skills development; moderate focus on public research; strong prioritization of stealth state approach.
Ontario	Minimal presence of competition state; prioritization of entrepreneurial state approach to research; development state approach to investment in specific firms; use of third party intermediaries for disbursement of state funds and sector priorities.
Pennsylvania	Minimal presence of competition state; prioritization of entrepreneurial state approach to research; development state approach to investment in specific firms; use of third party intermediaries for disbursement of state funds and sector priorities.
Quebec	Significant aspects of developmental state model for both industry and firm-specific direction, investment and ongoing support.

While each of these case studies highlights unique programs and initiatives, together they support a hypothesis that mature industrial sub-national economies will carve out protected space for innovation and the capture of innovation rents despite the presence of multilateral rules and domestic political rhetoric that would seem to restrict the space for industrial policy. While in

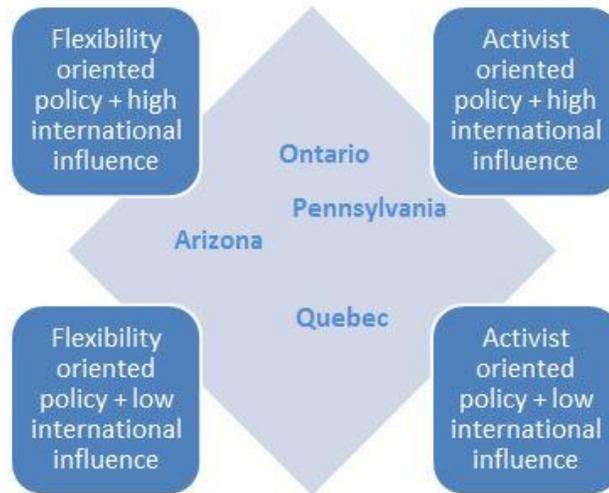
some cases the policies used to develop these sectors are explicit and transparent, as in the case of Quebec, in others they do so through the creation of *stealth industrial policies* that catalyze knowledge-intensive innovation in targeted sectors through a myriad of less visible means.² And across these cases, the results show these actions are broadly consistent, though not homogenous, across political parties.

The dissertation builds this argument through the presentation of four empirical case studies of sub-national states and their policy prescriptions for the development of new industries. These cases highlight the enduring presence of an activist state, one that actively shapes markets and technologies yet does so through intermediaries and in both direct and indirect fashion so as to lessen the focus on the state's role in the economy. The focus on the sub-national also allows for the development of a deeper understanding of how national and sub-national policy trends influence each other.

As the studies highlight, each possesses explicit state-level strategies aimed towards the development of "next generation" industries that seek to compete successfully with emerging and regional market competition. The analysis of their strategies serves to better our understanding of how these sub-national states position and structure such policies with respect to theoretical conceptions of the role of the state in the economy, as well as to delve into what motivates these policies insofar as local/regional versus international competition is concerned. This selection of cases is certainly not homogenous. As the matrix presented below will help delineate, cases differ broadly along two axes: the use of flexibility (or regulatory) oriented policy vs. activist (or interventionist) policy, and the predominant influence of either regional or international competitive forces.

²² This concept of stealth policy is alternatively viewed under the lens of the "Submerged State" as introduced by Suzanne Mettler (2011). She defines this as the torrent of "policies that lie beneath the surface of existing market institutions and within the Federal system... to provide incentives, subsidies or payments to private organizations".

Figure 1: How Select Sub-National States Operationalize Industrial Policy and Impact of International Competitive Forces



The resulting analysis highlights both common themes and unique features across these cases. And in so doing they highlight both congruence and contrast with the extant IR literature. In Arizona, the development of quasi-public third party agencies that channel funding directly to firms and the rhetoric of less government cover for an increasingly activist state. In Ontario, both direct and indirect funding to firms in targeted sectors is complemented by a strong focus on entrepreneurship as a means of enabling an explicit innovation agenda. In Pennsylvania, a longer run pattern of state involvement in industrial transition begins in the 1980s. Then, as now, the state uses third party agencies as a means of channeling funding towards explicit state goals. Finally, in Quebec, attempts to minimize public scrutiny of state involvement are not an issue. Instead, an explicit industrial policy is at the heart of the province's industrial strategy with respect to the development of domestic pharmaceutical and digital media industries. While unique approaches to economic and innovation-related activism exist in each, common threads related to the use of third-party intermediaries, the focus on domestic entrepreneurialism, the targeting of specific sectors, and the all-party political adherence to these themes cross the entire case study set.

This work thus provides several significant contributions to knowledge. It will add to the body of knowledge regarding how sub-national jurisdictions react to exogenously driven economic change (with the use of orthodox and non-orthodox levers). It will add to a body of knowledge regarding the evolution of the state's role in the economy, notably its activism, and of the role of multi-level governance as it relates to economic planning. And ultimately it will add to the field of IR a significantly nuanced view of how sub-national states govern their economies in light of ongoing processes of economic globalization and shifts in industrial capacity towards innovative sectors. It critiques and builds upon existing literature, in particular related to the competition state and the entrepreneurial state, and offers depth to the sometimes limited empirical basis upon which these theories are built by describing sub-national economic activism in four jurisdictions. This choice of jurisdictions further strengthens the dissertation's contribution insofar as the sub-national, and particularly the state and provincial level in North America, is far less studied in works of international relations and global governance than, for example, the national or municipal level.

To achieve these goals, the thesis follows the following path at the theoretical level. It begins with an in-depth review of the literature pertaining to the role of the state in the economy, and differing theoretical perspectives as presented in the field of international relations. While this literature is focused primarily on the national level, it provides the framework for a detailed study of sub-national states and how they fit (or not) within these theoretical lenses. This effort does not expressly seek to nullify or negate existing theoretical contributions. Rather it seeks to build upon them to extend their reach to the sub-national level and to more accurately portray the nuance and diversity of approaches utilized at this level of governance to catalyze industrial transition. These cases thus fill a significant empirical and theoretical gap within IR at the sub-national level with respect to economic activism.

Next the thesis explores the concept of economic transition by looking at what I call the democratization of innovation, or the spread of innovative capacity, to jurisdictions previously unable to compete in high-value economic fields. While this section is focused on national-level activities, it provides a basis for understanding the competitive dynamic currently and previously present in so-called innovative sectors of the economy. After a brief review of Japan's arrival as an influential economic actor in the 1960s and 1970s, and the subsequent policy responses

enacted by an American government fearful of employment losses and their societal repercussions, the chapter moves on to review two contemporary examples of this evolving competitive dynamic. The recent arrival of both China and India as key economic actors in high-tech fields provides the basis for subsequent inquiry in the case studies as to whether this international competitive dynamic influences the policies developed in mature sub-national jurisdictions.

This section provides the *segue* towards the heart of this dissertation – four case studies on how sub-national jurisdictions in North America have reacted to the processes of economic change underway around them. These case studies are the product of detailed field work and interviews with policy makers and industry stakeholders in each of the jurisdictions studied. They provide a contemporary look at how the sub-national state reacts to change as well as a contemporary analysis of what role this level of government plays in the economy and in processes of economic transition. In each case, an effort is made to tie the policy details reported to the broader theoretical debate outlined in the first section of this dissertation.

Finally, Chapter 7 concludes with a comparative analysis of these case findings, as well as a review of the cross-case relevance of present theory on the role of state and how it stands up to contemporary reality at the sub-national level. In so doing, the dissertation provides a more robust and nuanced conceptual framework for how we understand what the state is, and how existing theoretical frameworks apply beyond the national level. The sub-national focus of this work adds significant empirical depth to existing understandings of the role of the state in the economy. And in particular, this dissertation adds a significant and novel empirical layer to existing understandings of the role of sub-national states in the economy and in industrial transition as presented in IR. Beyond these empirical and theoretical contributions on the role of the sub-national state in the economy, the dissertation seeks also to shine light on the processes of policy making and the competitive dynamic that policy makers must juggle as they contemplate their roles and the policy levers at their disposal.

Methodology

This research builds on a qualitatively focused methodology consisting of semi-structured interviews relevant to a series of case studies that highlight sub-national economic

transformation strategies and the promotion of high-value innovation in the jurisdictions highlighted below. Interviews were conducted with senior policy makers and, in some jurisdictions, current and former elected officials associated with the programs under study in each case study jurisdiction. In addition, in order to gauge the underlying political economy of the policies studied, interviews were conducted with industry officials and associated stakeholder groups. Similarly, additional interviews with relevant Federal and Municipal agency staff helped develop a more holistic understanding of the mesh of levels of governance that helps shape and frame the economic and innovation policies referred to herein.

In total, fifty interviews are presented in this study. Interviewees were targeted to allow for an appropriate level of breadth and depth in the understanding of the state's interaction with other domestic actors as well as with more general forces in the global economy. While this sample is small, it allows for sufficient representation of actors within the political economy of each jurisdiction. Moreover, given the content and policy being studied, the available pool of potential interview subjects with both sufficient knowledge and context to speak on the topic is necessarily limited. Interviews were conducted following a semi-structured interview format, ranging in length from 30 minutes to 2 hours. This methodological approach must also deal with the realities and constraints presented when seeking to interview senior-level government staff. Given overarching political demands, the availability of such staff to provide comment and insight can be limited. Where this is the case, stakeholder interviews were used to provide adequate and broad understanding of policy decision-making goals and processes. Interviews were conducted with full ethical clearance by the Wilfrid Laurier University Research Ethics Board.

In each case, the data collected by the above qualitative process is supplemented by a comprehensive review of publicly-available policy documents in each jurisdiction, including where necessary, archival research related to historical legislative and political initiatives. These source materials are complemented by case-specific review of existing secondary research. Given the nascence of many of the programs studied, this secondary research is limited in analytical depth but does provide heuristic value insofar as it provides the starting points for the qualitative process outlined above. Wherever possible, quantitative data from verifiable sources is used to supplement and complement the qualitative evidence collected from the above process.

The value of this quantitative element, however, is necessarily limited given the processes studied in the dissertation encompass long-term economic transformations that require far more time to pass to provide conclusive evidence on impact.

Four case studies of North American sub-national jurisdictions are presented that analyze the respective approaches to global economic transition and industrial promotion in specific jurisdictions: Arizona, Ontario, Pennsylvania, Quebec. In each case, the analysis is focused on determining the drivers for state intervention in new economic sectors, and how these motivations are operationalized through funding and policy. These cases are split equally between Canada and the United States, and juxtapose jurisdictions where such policy behavior is more nascent (Arizona and Ontario) to others where it is far more entrenched (Pennsylvania and Quebec). As noted previously, Mexico is not included in this analysis owing to its less comparable economy.

To be sure, this selection of cases is by no means exhaustive. Economic development agencies operate in every US and Canadian state-level jurisdiction and the vast majority use a variety of implicit (and sometimes explicit) subsidy measures to attract investment. The case study jurisdictions studied herein offer a spectrum of political perspectives (Republican/Democrat (Liberal) as well as both right to work (Arizona) and pro-labour (Pennsylvania) jurisdictions. Moreover, it excludes states more significantly dependent on resource extraction (Texas, Louisiana, North Dakota, Alberta). Furthermore, the chosen jurisdictions represent those with traditional manufacturing economies that have long been the lifeblood of their respective national economies, and in sharing the trends of sectoral decline, are thus similarly challenged by renewal and necessary transition.

Across these four cases, the time period studied is broadly defined as that which follows a major period of economic dislocation. In Quebec and Pennsylvania this juncture reaches into the 1960s and 1970s respectively and each jurisdictions response to upheavals in social and economic status brought upon by political change (Quebec) and foreign competition (Pennsylvania). In Arizona and Ontario, by contrast, the respective junctures are defined more recently. Arizona's recovery from economic crisis in the early 1990s sees its longer-term economic challenges related to economic diversification and an under-developed knowledge base exposed. In Ontario, increasing regional and international competition in the province's

primary industrial sectors in the late 1990s and early 2000s produces a strong response from policy makers and politicians across party lines.

To be sure, it is important to acknowledge the certain differences in the powers of the states and provinces studied in this dissertation, and thus the methods of federalism employed in the two countries studied. In general, the U.S. model has seen a far stronger and far more centralized form of government and subsequent spending. In Canada, by way of contrast, the provinces enjoy a greater share of power (Field 1992: 107). For example, while the U.S. Commerce Clause gives the U.S. Federal Government near-exclusive rights over the governance of commerce and industry, the Canadian constitution has been interpreted to give the Federal government exclusive rights only insofar as international and inter-provincial trade is concerned (ibid 109). As will be highlighted in the following cases showcased in this dissertation, these differences in constitutional language, however, do not result in significant differences in the means or processes by which either type of sub-national state intervenes. The processes employed are largely similar across the jurisdictions studied, though in some cases they are complemented by more robust federal level action. What does differ, and differs significantly, is the aggregate volume of resources deployed towards these efforts by both state and federal-level agencies. In the U.S., a strong federal role in the funding of research and development sees annual state contributions of USD1.8 billion dwarfed by over USD100 billion in Federal research and development related appropriations (NSF 2014, NSF 2015). In contrast, Canadian provincial contributions of CAD2 billion are joined by only CAD5.8 in Federal funding (Statistics Canada 2014). Thus, while American states see their domestic firms benefit from significant state and federal-level largesse (see Mazzucato 2013), Canadian provinces have a far less activist federal partner. This difference in state-federal partnership may explain the more activist provincial approach seen in the two Canadian case studies that follow. To properly ascertain this difference would require more research across all U.S. states and Canadian provinces.

In the interim, this dissertation and the empirical case studies that follow, provide substance to the argument presented that the sub-national plays an influential role in the development of new industries, notably knowledge-intensive ones. While this research does not thoroughly analyze the motivations for this activism, it does provide insight as to the influence of local/regional vs. international economic forces and the impact on subsequent sub-national

policy in the states studied. Whether through direct or indirect means, these policies position the state as an active participant in the development of new industries and the evolution of domestic firms therein.

Chapter 1: The existing theoretical landscape

As a first step to understanding the role of the sub-national state in the economy and in the promotion of new innovative sectors, this dissertation begins with a review of the theoretical landscape related to this role. From an IR perspective, however, this literature is largely focused on the national level. Where the sub-national is highlighted in the IR literature is with respect to issues related to trade and foreign policy. See for example Kukucha (2008) and Skogstad (2002) in relation to Canadian provinces, De Boer (2002) and McMillan (2012) regarding US States, and Hocking (1986, 1993) more generally on the sub-national role in foreign policy. As it relates to intervention and economic activism, the sub-national is far less present. Evidently, other fields of study, notably domestic politics, economic geography and public policy, address the sub-national role more holistically. Rodney Haddow's 2015 work on the political economy of Quebec and Ontario is a recent example. In his work he asks whether sub-national states can still intervene in their economies. His work, like the case studies that follow, finds an entrenched culture of intervention in the two jurisdictions studied (Haddow 2015: 181). This dissertation, however, utilizes an IR perspective to look beyond a strict domestic policy approach and build a global contextual framework within which to analyze the role of the sub-national state in economic and industrial intervention. More practically-oriented work focused on the sub-national is presented in the second part of the chapter.

Together, these lenses provide the basis upon which contemporary understandings of the state and its activism are built. However, as the case studies that follow will show, these theoretical contributions are of limited practical value at the sub-national level given the diversity and complexity of sub-national policy approaches related to industrial and innovation promotion. The case studies presented thereafter, as well as the concluding chapter, aim to build upon these frameworks with insight specific to the sub-national state. In so doing, this dissertation builds a robust understanding of the sub-national state's role in the economy and in the development of new industrial sectors through an IR-centred perspective.

The State in the Economy

While the concept of the state's activist participation in the economy has, for some, "been written out of our descriptions and explanations of social, policy and economic relations under conditions of globalization" (Paul 2005:3), debates as to the role of the state in the economy and in the development of new industrial sectors have taken on contemporary salience thanks to the work of authors such as Mariana Mazzucato (2013), Ornston (2012/2013), Fred Block and Matthew Keller (2011) and Breznitz (2007) amongst others. Their work on the role of government as a central actor in innovation systems has shone a light on the activist role the state continues to play, despite rhetorical pronouncements against it. Across this work, however, the role of the sub-national is largely ignored. And thus while this chapter unpacks these theoretical understandings of the role of the state, it does so with a view towards understanding the gaps present in this literature as well as to understand its relevance to the sub-national level. Ultimately, the case studies that follow provide rich empirical depth to these existing works and provide the basis for extending their application to the sub-national level.

This chapter contrasts the contemporary work of the aforementioned authors with earlier contributions from Philip Cerny on the Competition state (1990, 1997, 2004, 2010) and Bob Jessop's thesis on the Schumpeterian Workfare State (1993, 2002). In order to effectively parse these contributions, the chapter includes the development of a taxonomy that, albeit in generalized form, defines these key contributions on the basis of their primary goals and forms. The chapter then moves on to address the issue of state competitiveness and the role the state plays in the development of more competitive micro and macro-economic factors. It does so, in part, by examining the architectural elements of the World Trade Organization (WTO) law that enable ongoing discriminatory policy, in particular as it relates to activities defined as innovative or research-related. Finally, the chapter moves on to look specifically at how sub-national levels of state are presented in literature on the role of the state in the economy, in particular in Canada and the United States.

Contemporary contributions

Amongst contemporary scholars none has captured attention and so focused her work on the role of the state in the economy than Mariana Mazzucato. Mazzucato (2013:2) frames her understanding of the state and its central role in the economy as a contrast to an orthodox understanding that sees "(b)usiness accepted as the innovative force while the state is cast as the

inertial one – necessary for the ‘basics’ but too large and heavy to be the dynamic engine.” Block (2011:2) begins with a similar contrast. In “Innovation and the Invisible Hand of Government,” he poses a series of questions that lead to his thesis on the role of the state as an especially activist one. Two in particular are worth reproducing here. He asks, “how does innovation actually work in the current U.S. economy?” and “what are the respective contributions of the private sector and the public sector in facilitating innovation?” In answering these questions, Block (2011:16) highlights the role of Federal government research labs in not only the basic research and discovery process but as central features in private commercialization efforts. This role is part of a decentralized yet cooperative system between public and private actors that began to take shape in the 1980s. It did so “when market fundamentalism began to dominate American political rhetoric” (Block and Keller 2011: 28). These authors go further to note that “highly visible civilian programs were subjected to intense scrutiny and repeated political challenges... Consequently, public awareness of and confidence in the government’s role in the economy was undermined, further reinforcing the dominant market-centered ideology” (ibid.) While these works privilege the national level, the frame with which they do so, notably the contrast of practice vs. ideology is equally relevant at the sub-national level.

This contrast between practice and ideal is one Mazzucato frames as defining the state as a provider of “basic” infrastructure (versus her thesis of the *Entrepreneurial State*). This view is neatly reflected by an editorial that appeared in *The Economist* in 2012. Its thesis on the role of government surmised that the state was distinctly unable to intervene productively in markets:

Government have always been lousy at picking winners, and they are likely to become more so, as legions of entrepreneurs and tinkerers swap designs online, turn them into products at home and market them globally from a garage. As the revolution rages, governments should stick to the basics: better schools for a skilled workforce, clear rules, and a level playing field for enterprises of all kinds (The Economist 2012).

The contrast between this supposed orthodoxy and the contemporary work of Mazzucato and Block and Keller is striking. While the latter pair (Block and Keller 2011: 30) build a cohesive thesis regarding “the fingerprints of government” in all major innovative areas of the U.S. economy, Mazzucato’s (2013: 8) work shows that the state’s role is “not only de-risking risk-averse private actors, but also boldly leading the way, with a clear and courageous vision.”

Mazzucato's argument, buttressed by the analysis of how leading consumer technologies have their roots in public funding and public innovation systems, concludes with the belief that the basic view of the state as promoted by *The Economist* and others like it fails to adequately convey the state's far more active role in the contemporary innovation economy. She writes,

What we have instead is a case for a targeted, proactive and entrepreneurial state, one able to take risks and create a highly networked system of actors that harness the best of the private sector for the national good over a medium- to long-term time horizon. It is the state acting as lead investor and catalyst which sparks the network to act and spread knowledge. The state can and does act as creator, not just facilitator of the knowledge economy. (Mazzucato 2013: 20)

This aspect of creation is, in her analysis, focused on the role of federal level agencies that provide the incubation space and funding for research and innovation. Examples such as the Defense Advanced Research Project Agency (DARPA), Small Business Innovation Research (SBIR), the Orphan Drug Act, and the National Nanotechnology Initiative are each presented as functions of the state proactively shaping a market in order to drive innovation that is eventually transferred to private or market participants. In her work, Mazzucato (2013: 83) expands on each of the horizontal initiatives listed above to show that "the US has spent the last few decades using active interventionist policies to drive private sector innovation in pursuit of broad public policy goals." She concludes forcefully that the role of the state in the modern innovation economy is not just to incent or coerce market participants towards a goal, and not simply to mitigate or dampen the effects of private market failure. Rather, the goal is to act as a "visionary" market participant that leads the development of new industries and technologies (2013: 193).

Breznitz and Zimmermann (2007:71) present a largely congruent view. They argue that "states have shown themselves to have the capacity to shape the capability-building processes of their high-technology industries." They define this as capacity "the state as strategic manager" where the state both aids in the creation of new capabilities and facilitates the distribution of those capabilities to private actors. Others, such as Ruttan (2006) provide further depth to this argument. He notes that "a closer look at the history of the emergence of new technologies reveals that government R&D spending played an important role in the development of almost

every general-purpose technology in which the United States was internationally competitive.” This role, he argues, is predicated on the exceptional ability of the public purse to subsidize and fund technological research without the trappings of short-term profit orientation. He notes that “(m)ost major general-purpose technologies have required several decades of public or private support to reach the threshold of commercial viability,” a luxury that privately held firms are unable to support. In a European context, Ornston builds a largely similar vision of the state’s role in the development of high-tech industry. This latter author terms the relationship between the state and its private partners as “creative corporatism” (Ornston 2012). The case studies presented in this dissertation serve to highlight how this activist role extends beyond the national level presented in the above literature to the neglected role of the sub-national state. This neglected role, however, is as rich and activist as what is presented above as a national-level endeavor.

These roles, however, are largely unknown to the public. Rather while the rhetoric of “small government” permeates political discourse, Mazzucato notes (2013:167), like Block and Keller, that “US taxpayers are virtually unaware of how their taxes foster innovation and economic growth.” As the case studies that follow will show, this contrast of public awareness versus practical reality is equally true at the sub-national level.

This perspective frames what I call a stealth or silent state. It operates actively in the market yet it does so in a fashion that leaves little trace or explicit signs of those activities. In her work “The Submerged State,” Suzanne Mettler (2011) describes a similar process of stealth activism. Her work highlights the relationship between federal policy in the United States and growing inequality through a process of prioritization that benefits private wealth first and foremost. This activism, however, is masked or “submerged” owing to increasingly un-transparent policy making processes that hide the extent to which the state acts in various segments of socio-economic life. As the case studies presented in this dissertation highlight, a version of this submerged state, a stealth one, operates at the sub-national level with respect to industrial development.

Mettler writes,

Over the past thirty years, American political discourse has been dominated by a conservative public philosophy, one that espouses the virtues of small government. Its values have been pursued in part through efforts to scale back traditional forms of social provision, meaning visible benefits administered fairly directly by government... Ironically, however, the more dramatic change over this period has been the flourishing of the policies of the submerged state, which operate through indirect means. (Mettler 2011:4)

The “stealth state” that I present in this dissertation as a sub-national trend and Mettler’s “submerged state” share significant theoretical ground. In both cases they respond to a public narrative regarding what the state should do. The translation and evolution of this narrative between public and political authors renders state activism, in particular economic activism, as an illegitimate role for the state. However, as this dissertation will highlight with respect to innovation and periods of economic transition, and as Mettler’s does with respect to micro-economic policy in the United States, what may be spoken to as illegitimate is by no means extinct. Rather, state activism has simply become far less transparent. It is instead increasingly constructed in ways that are difficult to decipher. As the following empirical case studies will highlight, the use of funding intermediaries, the focus on entrepreneurialism, and the growing prioritization of industry-academic partnerships are all part of this stealth aspect of the state. Across these areas, public funding and public leadership not only frames economic activity but oftentimes directs it and shepherds it into new areas.

These contemporary works provide necessary empirical depth to previous theoretically-inclined scholarship such as Philip Cerny’s work on the Competition state and Bob Jessop’s thesis on the Schumpeterian Workfare State (SWS). Both present unique, though not incongruent, visions of how the state’s economic agency has evolved.

At the heart of Cerny’s framework on the competition state is the assumption that the competition state has become “a pivotal agent of the erosion of many of those social and economic functions that capitalist states had taken on in the first two-thirds of the 20th century” (Cerny and Evans 2004: 59). Amongst the factors key to this erosion are the distancing of the state from intervention in markets and from the provision of welfare to strategic industries. In its place, the forceful opening of domestic markets to international competition paved the way for

domestic reforms that previously were achieved through direct industrial intervention. Therein the modus operandi of the competition state is shown to be driven by a pro-competitive, pro-market neo-liberal state, whereby the interventionist character of the states shifts away from basic strategic industries to broad support for regulatory flexibility and an improved business climate (Cerny 1997:250).

In so doing, this position presents a stark contrast to the literature on the developmental state popularized by Chalmers Johnson (1982) in his work on Japanese economic and industrial development. Therein, and in similar work by Amsden (1989), Wade (1990/2005), Woo-Cumings (1999) and Chang (2006), the state takes an explicit and activist role in financing, developing and the operational leadership of key economic and industrial projects. The state, in this literature, is hyper-focused on the development of those basic strategic industries. While most often limited to discussions of rapidly emerging, and hyper-centralized, Asian economies or historical state-led development, there are elements of this activist role – notably with respect to planning and financing - that remain relevant to any level of state, as will be shown in the case studies that follow.

At first glance, Cerny's representation of the state matches the contemporary rhetoric highlighted by *The Economist* earlier, and highlights the narrative that Mazzucato, Block & Keller, and others seek to critique and build upon. To be fair, Cerny does, however, accompany this focus on flexibility and competition with an acknowledgement of the state's role in promoting entrepreneurship and small business development. The competition state is therefore one that withdraws from the development of strategic or "basic" industries that are meant to "sustain the comparative advantage of the nation" and instead promotes the broad development of the basic infrastructure of economic development (1990: 205).

Cerny's later work asserts more richly that this change represents a philosophical shift in mission orientation. The state has transformed itself, he argues, from one that sought to develop a guiding mission based on an internally-constructed, welfare-oriented "raison d'état" to an externally-oriented competition state that prioritizes profitability and competitiveness over employment and labour security (Cerny 2010a). In so doing, an outward-looking "raison du monde" now drives the state's internal policy processes. Cerny's work, however, leaves much further exploration to be done. Notably, while theoretically rich, his definition of the competition

state lacks empirical depth insofar as it is based predominantly on single case studies. Furthermore, as it relates to the purpose of this dissertation, it omits any role for states or provinces at the frontline of economic and industrial activism. As Horsfall notes in his critique of the concept, “not only has the competition state thesis avoided (empirical) analysis, most of the commentary on the competition state thesis, including that led by Cerny and Evans ... has focused on the UK” (2010:58). “The competition state,” Horsfall notes, “purports to illuminate a global phenomenon, yet focuses largely on one country” (Horsfall *ibid*). Horsfall goes on to note that there will not be one uniform competition state but rather a variety of competition states that adapt and morph to common experience, both locally and internationally.

This critique is similar to that presented by Hay 2004. Hay notes that Cerny’s work, while theoretically accessible, “lacks subtlety, flexibility and sophistication” (2004:40). In particular, Hay notes the “scant evidence” used to build the competition state thesis and its view on the evolution of the state’s role (2004:38). And as Fougner writes “if by ‘competition state’ is understood a state geared towards international competitiveness, then there should be little doubt that many, if not most, contemporary states qualify for the label” (2006:151). This approach certainly applies to the sub-national given the focus on competitiveness and regional and international competition as will be shown in the following case studies.

This dissertation seeks to build on the critiques offered above and provide empirical depth to the varieties of the competition state and other theoretical models that exist, in particular at the sub-national level in North America. In doing so, it seeks to build an understanding of how sub-national states fit (or not) within the aforementioned theoretical frameworks. Does the sub-national state studied in this dissertation subscribe to the “competition state” outlined by Cerny (in particular in his early work) and if not, how do they differ in their activism? And subsequently, how does more contemporary literature from Mazzucato, Block and Keller amongst others, stand up to the analysis of state activism at the sub-national level?

To be fair to Cerny his work did not seek to be empirically rich. Rather it sought to build a theoretical framework for the increasingly porous nature of the nation-state, the polycentrism that has brought a variety of actors into the nation-states affairs and the subsequent transformation in the methods the state uses to promote domestic aims (Cerny 2010b:31-33; Coleman and Sajed 2013:62). Moreover, Cerny’s vision of the competition state is not static.

Rather, its original form as presented in Cerny (1997) evolves over more than a decade. His later work highlights both the evolution of his thinking as well as, perhaps, a response to these critiques. For example, in Cerny (2010), he more explicitly acknowledges the paradoxes that exist in his earlier work, notably as it relates to the transition of the state as driven by internal (*raison d'état*) to external (*raison du monde*) motivations (6). That transition does not equate to an either/or dichotomy but rather a shift in the balance of motivation and operationalization of the state's understanding of its place in the global economy. Moreover, the lack of empirical and theoretical depth for which the original competition state work was criticized is subsequently nuanced in Cerny's later work to better account for a pluralistic view of what constitutes a competition state. In Cerny (2014) he notes the flexibility of neoliberalism and the competition state. In particular, he acknowledges the "pick and mix" approach to policy and activism that the competition state entails (Cerny 2014:360). Based on context, some states will play more activist roles than others, and therein the full extinguishing of the welfare state is not a prerequisite of the competition state. Rather, the welfare state can continue to exist insofar as it supports activities that drive economic competitiveness and the global nature of contemporary competition. What does not change across Cerny's work, however, is a privileging of the state as one that adopts "pro-market regulation rather than planning or command intervention" (Cerny 2010:7).

Jessop's post-Fordist, Schumpeterian Workfare State (SWS) stakes out broadly similar ground to Cerny. He argues that the state has shifted its priority responsibilities from those focused on redistribution and welfare provision to ones facilitating labour force flexibility and the drive for innovation and competitiveness. Here Jessop concludes that the drive for full employment espoused by policy makers has been subsumed by a more powerful push for structural competitiveness (1993:18). Broadly, this thesis very much resembles Cerny's shift from an internal to an external gaze resulting from the forces of globalization or, in Jessop's words "the relativization of scale that accompanies globalization" (Jessop 2002:119). Yet where Jessop's work is most differentiated is with respect to his concentration on innovation and technological advance. While Cerny prioritizes the state's focus on the development of enabling infrastructure – both physical and human – to allow for global competition, Jessop instead focuses on the state's role in the adaptation by domestic firms to faster cycles of technologically-enabled innovation and competition (Jessop 2002:127). Enabling these firms requires the state to take a leading role in both the development of technological capacity and skills, as well as

directing funding and policy attention towards the development of new sunrise, as opposed to sunset, sectors of the economy. This focus on skills development and on the specialization of labour sees Jessop's work extend earlier work by Piore and Sabel (1984) on the shift from Fordist mass production to flexible specialization. However, while these original authors focus on firm level approaches to competitiveness and change, Jessop looks more intimately at the role of the state in this evolution. He notes "the crucial point is that state action is required to guide the development of new core technologies and widen their application to promote competitiveness" (1993:13). In his later work, Jessop again notes the role of the state in the promotion of innovation and competitiveness, stating "even in relatively neoliberal economies, it is recognized that many high-growth sectors are so knowledge- and capital intensive that their development demands extensive (public-private) collaboration" (Jessop 2002:127).

Here, again, the confused nature of the contemporary state is displayed. While the state's boundaries and capacities are increasingly contested by decentralizing trends that give greater priority to both supra- and sub-national actors, the state remains a necessary leader in the enablement of both macro and micro-level technology related competitiveness. Jessop, more so than the original Cerny work, addresses this by acknowledging the likely plurality of models and scales contained within the broad SWS framework (Jessop 2002:124).

Across both Cerny and Jessop's work, the focus is on the extinction of the Keynesian welfare model and its replacement by a more singular focus on competitiveness. However, a change in language and policy levers should not obscure continuity in desired outcomes. Their focus is subsequently quite unsatisfying. For what matters are the aims of this competitiveness. And here the welfare of the state's citizens remains central. Across each of the case studies in this dissertation, the goal of state activity in the economy is directly related to the creation of stable, high-wage employment. This reflects an ongoing form of welfare, albeit welfare for those who can participate in specific sectors of the economy. Welfare, understood in the language of Schumpeter, is thus for those able to attach themselves to the waves of disruptive economic activity that the state attempts to catalyze. Does this in turn satisfy the commoditizing aspect of the state that Cerny envisions? Given the use of specific types labour – whether it be low-cost, high-quality, or science and technology focused – as an inducement to attract investment into

targeted sectors, this commodification is accurate. This should not obscure the continued activism and employment-related goals of the state.

These critiques notwithstanding, both Cerny and Jessop contribute significantly to an understanding of contemporary state agency that provide an important departure from the perspective marked by the “almost universal loss of faith in the capacity of any individual state to intervene decisively and effectively” (Phillips 1992:104). This latter narrative lends itself to the view that the state is solely reactive to the effects of globalization, a thoroughly unsatisfying account that privileges the divorce of the state from its exogenous influences (Palan and Abbott 1996:13). Rather, as both Cerny and Jessop introduce, and as Mazzucato and others highlight in more contemporary literature, states use both proactive and reactive strategies to manage the various interactions of the domestic realm with the effects of globalization. These actions highlight a renewed awareness of state agency, albeit in different forms, and as Jessop emphasizes, at different levels or scales of governance.

Across this body of IR literature, four clear theoretical frames appear: the competition state, the development state, the entrepreneurial state and the Schumpeterian workfare state. While these four are each viewed as unique contributions, a fifth, the stealth state, is a procedural variant insofar as it applies to any of the previous four. The following table generalizes these works. These generalizations gloss over obvious nuance. This generalization is done in an effort to build a broadly comparable set of key defining characteristics to be applied to the subsequent case study analyses. Moreover, while other works are relevant to the sub-nationals role in the economy, in particular that of Fosler (1988) and Eisinger (1988), neither of these works offer a broad, foundational approach to understanding how and why states act in a contemporary fashion.

Table 1: Taxonomy of state involvement in the economy

Type	Defining Characteristic
Competition State	Focus on regulatory flexibility, general business climate intervention, and entrepreneurship.
Developmental State	Explicit state control, financing and operational leadership of key economic/industrial projects.

Entrepreneurial State	Focus on government-funded and facilitated technological research and its exploitation by private users.
Schumpeterian Workfare State	Focus on labour-market flexibility and the support of innovation-oriented activity through skills development and technological capacity development.
Stealth State	A variant of each of the above where domestic and/or international constraints necessitate a less visible state role and thus the prioritization of third-parties for the disbursement and operationalization of state funds and strategies.

As the case studies will highlight, the jurisdictions studied do not fall neatly in any one theoretical framework. Rather, each highlights a diverse mix of elements that prioritize different aspects along a spectrum of state involvement that ranges from the light state defined by the competition state and the SWS to the more activist end that includes the entrepreneurial state and the explicitly interventionist developmental state. As Table 1, reproduced below, highlights, there is no standardized model within which these sub-national states fit.

Table 1: Jurisdictional approaches to state involvement in the economy

Jurisdiction	Theoretical Model
Arizona	Moderate presence of the competition state's focus on labour and regulatory flexibility; moderate focus on entrepreneurship and skills development; moderate focus on public research; strong prioritization of stealth state approach.
Ontario	Minimal presence of competition state; prioritization of entrepreneurial state approach to research; development state approach to investment in specific firms; use of third party intermediaries for disbursement of state funds and sector priorities.
Pennsylvania	Minimal presence of competition state; prioritization of

	entrepreneurial state approach to research; development state approach to investment in specific firms; use of third party intermediaries for disbursement of state funds and sector priorities.
Quebec	Significant aspects of developmental state model for both industry and firm-specific direction, investment and ongoing support.

How States Compete

Studying how states, including sub-national states, seek to “compete” is subsequently central to understanding the contemporary role of the state in IR. As Fougner argues, this role is increasingly underlined by a belief that the competitiveness of jurisdictions is the central objective and central resolution of “more or less” all other problems of the state (2006:165). This narrative is congruent with the work of Michael Porter on the *Competitive Advantage of Nations*. While focused on firm-level performance, Porter develops a model of state level attributes that enable them. In particular, he notes that the state’s role should be focused on “shaping the context and institutional structure surrounding companies and in creating an environment that stimulates companies to gain competitive advantage” (Porter 1990: 624). This approach is broadly similar to Cerny’s focus on the state as a provider of enabling infrastructure. Porter adds, “Government’s aim should be to create an environment in which firms can upgrade competitive advantages in established industries by introducing more sophisticated technology and methods and penetrating more advanced segments” (ibid). Huo (2015) contextualizes this enabling role in his work on *How Nations Innovate*. While focused predominantly on the actions taken by firms and intermediaries in the dissemination and exchange of knowledge, Huo notes that an “exclusive focus on firms will no longer be sufficient, because the state also wields strong influence over institutional selection and design” (Huo 2015: 213). The focus therein, however, is largely on enabling investments that build human capital and the workforce for a knowledge economy. Across this work, the lens is again focused on the national level. However, in decentralized or federated jurisdictions, responsibility for infrastructure and other related enabling investments lies equally, if not more, at the sub-national level. In this respect, the role

and focus of the state, as understood by Fougner, Porter and Huo, is the same whether it be a national or sub-national state.

This dissertation seeks to investigate this enabling role, and to better identify and define how sub-national states fit within the various types of state defined in the aforementioned IR literature. While Porter notes that firms not nations compete (*ibid*), nations (and sub-national states) do compete with each other insofar as they attempt to shape industries, and the domestic firms in those industries, into globally competitive ones. To return to Schumpeter, the state at any level actively seeks to facilitate the Schumpeterian creative destruction that gives birth to new firms and new industries. The question is how it chooses to structure its role in these activities.

Borrowing from the literature on the role of the state in industry, responses at the national level waver between offensive and defensive intervention. The former is delineated by offensive subsidies to foster new competitive industries whereas the latter seeks defensive subsidies targeted towards distressed and uncompetitive ones. Atkinson and Coleman (1989) present a similar dichotomy of reactions but define them as active versus reactive models of state intervention. These models of state intervention are most commonly associated with the East Asian model of development and the success of Japanese, South Korean and, now, Chinese efforts towards upgrading (for example Chang 2006; Wade 2005; Amsden 1989). Therein, the protection of domestic firms and sectors, notably uncompetitive ones, is near universal in their application. However given the location of trade policy at the national level, even in decentralized federations, the ability for sub-national levers to protect domestic firms is limited. Instead, and as will be shown in the case studies that follow, sub-national policy is more acutely focused on offensive subsidies aimed at industrial promotion and development.

Setting aside the particular type of response utilized, what is more consistent is the fact that global economic transition and the concomitant rise and decline of competitiveness in certain jurisdictions is feeding the interventionist tendencies of states. This subsequently creates the political climate (especially in mature industrial economies beset by increasingly stubborn rates of high, and long-term, unemployment) for the use of both offensive and defensive subsidies as a form of economic development and of renewed embedded liberalism (Weiss 2005; Herman and Cooper 2012). Dosi, Pavitt and Soete's remark that "it might not be too long until

Americans rediscover Hamilton, List and Ferrier,” is proving quite apt (1990:259). These perspectives contrasts with what Weiss (2005) calls “an influential view (that) holds that deepening economic integration tightly restricts policy options for upgrading the nation's industry, investment, and export profile, causing the state's role in economic governance to recede to the margins” (Weiss 2005 724). Ruggie (2008) noted that globalization had, in fact, made it impossible to reconstitute the social bargain at the national scale, let alone the sub-national. And others have similarly noted that state activism in the economic arena has been disabled by the mesh of rules-based multilateral, regional and bilateral trade frameworks (Held et al 1999; Ostry 2000). In a hierarchy of rule makers, the sub-national has little sway over such higher-order levels of governance.

Yet as Rodrik (2011a) notes, the reach of global governance is often oversold based on its theoretical as opposed to empirical reach. His earlier work presented the argument that increasingly pervasive and invasive global governance structures for trade and economic activity promoted the hollowing out of the state measured by its decreasing ability to finance distribution to those negatively impacted by the forces of economic globalization (1997). His more recent work argues, however, that the state (at the national level) remains an integral economic actor (Rodrik 2011a). In so doing, he argues that states can and must remain activist in the development of policy and initiatives that best suit their respective contexts (2011a, 2011b). While Rodrik does not extend this perspective to the sub-national, this dissertation proposes that the same contrast exists at the sub-national level between the supposed decline out of sub-national activism and continued practice. Ultimately, that the sub-national state remains an active benefactor in the creation of new economic sectors and in supporting specific firms is the thrust of the following investigation. As the case studies presented in this dissertation highlight, the social bargain or ability to finance transition and employment in new sectors has not in fact been removed. It has, however, evolved. In particular, the pairing of industrial policy with developing economies, popularized by List, Hamilton and Gerschenkron long-ago and updated most prominently in the East Asian-focused works of Amsden (1989), Wade (1990/2005) and Chang (2006) or the emerging market focus of Breznitz (2007), ignores a vibrant arena for such policies in advanced industrial economies, notably at the sub-national level And thus Soete’s finding that while “emerging economies are discovering the benefits of industrial policy, the concept has basically disappeared from the official policy language in some advanced countries” needs to be

contextualized relative to the use of strategic and stealth policies that use different language to promote the same industrial-policy goals at a variety of levels of governance (Soete 2007:282).

Levels of state – the importance of the sub-national

While this literature is near-exclusively focused on the national level, as it relates to economic development, the state is much more than the national level. Rather, the state is more accurately analyzed as a mesh of federal, regional and municipal actors. The focus on the national level that marks much of literature related to the role of the state in the economy, including the literature on the competition state, the Schumpeterian Workfare State and the Entrepreneurial State, overlooks the wealth of actions and influence that reside at other levels, in particular at the state or provincial level in North America. More broadly across the extent of literature on industrial policy, the same gap emerges. This is especially true for federated structures such as those in Canada and the United States. Moves towards openness at the national level, notably competition driven employment policy and the shift away from basic supporting industries, can either be attenuated or complemented by sub-national forms of strategic economic policy that continue the legacy of the targeting and strategic industrial development.

This interplay between national and sub-national levels of state, however, is not widely studied nor reported in the field of IR. As noted earlier, there are exceptions with respect to trade and foreign policy, however with respect to industrial activism, there is far less presence of the sub-national. This gap, however, is not limited to the sub-national. The concept of industrial policy, here defined as a government's intervention in the market to promote specific industries, is not thoroughly studied in works related to U.S. and Canadian economic policy in the late 1990s and throughout the first decade of the 21st century.

Where it does exist, the focus is largely on the Federal state and its role in industrial promotion rather than transition. The work of Atkinson and Coleman (1989) remains the most in-depth analysis of Canadian industrial policy. It concludes that Canada lacks a coherent, anticipatory industrial policy (with the exception of space technology), a finding that is likely to continue to hold. Moreover, they find that Canadian industrial policy in most sectors is reactive and defensive in nature, with little appetite for the active direction of high-risk Schumpeterian firms. And while this work is undoubtedly helpful, their focus on federal policy and federal initiatives leaves a significant gap as it relates to the role of Canadian provinces, both how it

stands today, and how it evolved since their work in the 1980s. Howse and Chandler (1997) look at both Canadian and US versions of industrial policy and industrial policy-like instruments. They confine their analysis, however, to the national level. In both jurisdictions they see an overall reluctance to pick winners, be it sector or firm specific, but note a generalized shift towards the use of policy towards the promotion of domestic competitiveness in the face of growing international competition (Howse and Chandler 1997: 246). Howse (1999) adds to this perspective with a focused work on the Canadian state's role in high-tech development but again limits the analysis to the federal level. In far earlier work, George (1983) does address the question of provincial industrial policy but finds that, generally, no Canadian province has targeted specific industries for its high-growth prospects, and finds a generally congruent Provincial-Federal policy stance. He does note that Quebec has developed a unique, dirigiste stance, and that Ontario has, at times, applied "shots of oil" to industry. Generally, however, offensive or anticipatory approaches have been sidelined in favour of defensive or reactive approaches to intervention. And as previously referenced, Haddow's 2015 work on Quebec and Ontario provides a more contemporary analysis, albeit with less depth on industry-specific efforts.

More recent work has been led more often than not by urban geographers whose work has focused on clustering and the geographies of production in particular sub-regions. Wolfe and Vavakova (1999) are of more relevance to this dissertation insofar as the two authors focus their work on regional efforts towards the development of innovation economies. Their research includes the Province of Ontario and the policies used to promote research and innovation therein. This work argues, however, that Ontario's policies with regards to research and innovation are largely adapted from Federal-level models or initiatives. This dissertation presents a significantly differentiated perspective on this regional or provincial role. Related work by Wolfe and Gertler highlights a similar focus on Ontario's attempts to respond to growing competitive forces through a shift towards "a more knowledge-intensive economy that can compete effectively" (1999:2). The sectoral focus of this latter work, however, is largely on incumbent industries and not the development of new ones. Others such as Bradford (2005, 2010) and Savoie (2003) present more in-depth studies of the regional and sub-regional. Therein, however, these authors focus primarily on the socio-economics and asset bases of particular

places and redistributive efforts aimed at strengthening the economies of those sub-regional places.

Research on the US context in the 1980s is framed by a series of scholars associated with the University of California at Berkeley, notably Robert Reich, John Zysman and Laura Tyson (for example see Reich 1991, Tyson 1992; Zysman and Tyson 1983). Their work, especially as it relates to the rise of Japan and the subsequent competitive pressures in the US, is foundational and provides a tremendous historical analogy for more contemporary challenges. Yet like the majority of Canadian focused literature, its Federal focus hides the increasingly rich role of sub-national levels of government in promoting industrial policy.

By way of contrast, in *The New Economic Role of American States*, R. Scott Fosler details the increasingly influential role of the sub-national in the navigation of economic upheaval in traditionally strong U.S. states. He writes,

New technologies are creating new industries and transforming traditional industries; and the United States confronts an unprecedented degree of integration with the world economy. To the surprise of many, initiatives at the state level have been among the most creative and energetic of any American institutions in responding to this challenge (Fosler 1988: viii).

Fosler acknowledges that sub-national states “cannot control the powerful forces that are transforming the world economy; nor can they be expected to compensate for the inadequacies of the federal government or the private sector” (ibid: 329). His work, however, outlines how the sub-national plays an important role in establishing the foundations for private sector performance and competitiveness. This work, however congruent, paints the role of the state as one focused primarily on the development of enabling infrastructure, both physical and knowledge-based. Fosler notes that a creation strategy, defined as a third stage process after the maintenance and recruitment of firms, “is gambling on a process that few understand... (and) contains considerable risk and a great deal of uncertainty (ibid: 109).” Where Fosler’s analysis is focused on the state’s role in creation (in Michigan and Massachusetts), the time period studied renders the analysis less in depth given that the strategies employed are acknowledged as less

developed. While exceptional for its time, this work requires updating as to the competitive dynamic now present thanks to industrial upgrading around the globe.

What Fosler's work certainly does, however, is shine a light on the role of the sub-national state in the U.S. economy. Moreover, it is done at a period of time where the narrative of small government dominated the political discourse. Fosler notes that the traditionally reactive role played by American states began to shift towards a more aggressive, proactive one owing to federal retrenchment in domestic policy that was accelerated under the Reagan administration (Fosler 1988:12). Small government at one level led to bigger government at another. Here we see that a more accurate depiction of the levers of power on economic policy must examine the sub-national state relative to increasingly powerful and autonomous sub- and supra- national levels of governance.

Similar, but more recent, work on the role of American states in economic development is put forth by Paul (2005) and Thomas (2000, 2011). Paul highlights the power of US states in investment attraction, noting that between 1984 and 2000, the number of foreign US state economic development offices more than quadrupled, bringing the aggregate US state total equal to the number of US Federal foreign embassies and consulates. Paul's case-based analysis of the sub-national is largely focused on the pursuit of foreign capital investment, and the interaction between sub-national politicians and trans-national corporations in support of that pursuit. He points to Sklair's (2001) four-party framework of the transnational capitalist class, and of "globalizing bureaucrats" that fuse state and corporate *raison d'états*. This fusion of class interests is reminiscent of a Gramscian-type analysis of ideational hegemony, and its roots in the integration of political and civil societies (Paul 2005:99).

Thomas's (2000, 2011) work on capital attraction and the competition for capital amongst US states follows a similar tread. He builds on Guisinger's concept of the market for investment by extending his analysis to the information asymmetries that privilege corporations over their would-be jurisdictional hosts (Thomas 2011:6). Thereafter the "unclosable can of worms" sees unfettered competition amongst sub-national states inflate the cost of intervention to inefficient levels. Beyond investment attraction, however, this work looks at industrial policy in a very limited lens. The question of anticipatory industrial development or offensive industrial promotion, and its roots in legislated policy beyond private investment, is thus left unanswered.

This gap feeds the notion that industrial policy as defined as the direct intervention and planning of industry has receded to the margins of investment attraction and export promotion.

Other sub-nationally focused research, albeit less recent, includes Eisenger's work on *The Rise of the Entrepreneurial State* (1988) (not to be confused with Mazzucato's more recent use of the same terminology). In his analysis of US economic development, he looks beyond investment attraction and highlights the sub-national role in export promotion, notably the state role as a path finder to new markets, and a cursory look at high-tech promotion. His work mirrors Fosler's in many respects, especially insofar as the state began to expand its activism in the 1980s. However, this latter analysis, while helpful in delineating the then-nascent role of the state in industrial high-tech promotion, is quite limited given that it ignores the drivers of such policy and the manner in which different levels of government policy coalesce. Finally, a third, more theoretically inclined stream of state/provincial literature includes Gough and Eisenschitz (1996) who look at local economic initiatives as a neo-Keynesian means of intervening to mitigate the detrimental effects of neo-liberalism. In a similar vein Brenner (2004) looks at sub-national regulation but determines it to be experimental rather than structural in nature and thus solely serving to facilitate the "uploading of local regulatory failures" (274). These perspectives add necessary nuance to the questions this dissertation asks about the shape and motivation of sub-national industrial promotion and targeting.

Across this sub-nationally focused literature, the thrust is focused on the operationalization of the sub-national state rather than the theoretically-focused work introduced previously. All together, by analyzing the state at a sub-national level, we see that the ethos of domestic transformation supposedly catalyzed by the national-level competition state is far more complex than a one-level affair. Rather, it competes intensely with a sub-national perspective that shows the state intimately involved in the operations of private firms. Thus while some, notably the OECD, have noted that state subsidization of corporate actors has been on a "global long-term downward trend, as most countries shifted away from government intervention to an increased reliance on market mechanisms" (OECD 2010:18), the reality is far more complex. For example, in the United States over USD80 billion is allocated annually through incentives, grants and subsidy programs at the state and municipal level to private firms (New York Times 2012). A further USD68 billion has been allocated since 2000 through Federal economic development

agencies (Mattera and Tarczynska 2015:2). And in Canada, Milke (2013) shows that the country's primary industry-related Ministry (Industry Canada) disbursed CAD5.5 billion to private firms over the period 2000-2009. Milke's research also shows that sub-national subsidies in Canada have remained largely consistent over a broader three decade period (1981-2009).

Much of this fiscal outlay to private hands is structured either as support for research and development in innovative sectors or as incentive to establish or invest in a particular jurisdiction. In theory, subsidies, as defined as a financial contribution or regulation (for example, export promotion or government procurement) enacted by a government that confers benefits upon its recipients and is specific to a company, industry or group of industries, are prohibited under WTO law. However, while actionable, such subsidies are subject to action at the WTO's dispute settlement body wherein specific harm attributable to the subsidy must be defined. Given the lag between the provision of such support and the development of commercial applications that may cause harm, this definition is difficult to establish. More importantly, during the WTO's Uruguay Round negotiations, changes were made as to what was defined as permissible support for research and development funding for firms and research institutions. By allowing a broader definition of pre-competitive development research, the state has been enabled to take on a far more activist role in the creation of new technologies and subsequently the competitiveness and innovation of domestic firms. As Fred Block (2010) writes, "By allowing subsidies to cover up to 75 percent of the cost of industrial research, governments can have a major influence on technology development by firms...and can play a major role in helping firms to transform new technologies into actual products." Block goes on to note that the U.S. has structured this support in a fashion that leaves other jurisdictions with little ability to prove that it may be circumventing WTO thresholds.

In particular, Block (2010) argues

government provides considerable in-kind support to private firms through publicly funded research facilities. The network of federal laboratories, mostly created during the Cold War, plays a central role here. Technologies on the federal payroll use the state of the art resources of these labs to help thousands of firms to overcome specific technological barriers.... Moreover, the details of these agreements between firms and

federal laboratories – including the amount of money that changes hands – are not publicly disclosed.

Despite supposed non-discriminatory treatment of firms, it is clear that jurisdictions have so far not been disabled in their privileging of domestic ones. This view is supported by Weiss (2005) who notes that since the 2000 WTO non-agreement on the extension of non-actionable subsidies, a much more acute focus has been placed on the provision of support for high technology, knowledge-based industries (KBI) amongst mature economy policy makers. She concludes that the state has therefore seen its role significantly transformed, weakened in some aspects but provided with escape routes for others (Weiss 2005:722). Funding for new, research intensive industries is one such escape route. The state's resilience, at both the national and sub-national level, in the face of global agreements seeking to end discriminatory treatment, is based in large part on using research and development and innovation funding as tools for transition. As the case studies that follow will highlight, this is exceedingly true at the sub-national level.

To contribute a novel and meaningful input into this literature and area of study, this dissertation goes beyond the simple acknowledgement of these subsidies. Instead it analyses how sub-national states operationalize this funding, in which sectors it does so, and ultimately how these actions are situated in the extant literature on the role of the state in the economy.

Doing so also provides a contrast to recent work by Schrank and Whitford (2009). These authors highlight the persistence of what they term meso-level industrial policy. They define this policy approach as a decentralized one that coordinates both public and private research activity through federal bodies such as the US National Institute of Health (NIH), Small Business Administration and National Institute of Standards and Technology. In contrast, this dissertation hypothesizes that although federally-designed industrial policy may have become increasingly horizontal, sub-national policies have continued to target sector and firm specific outcomes, in particular nascent industries that hold significant innovative promise. This work thus builds on the future-oriented vs defensive matrix that Aikinger develops for European policies (Aikinger 2007).

While the role of the sub-national is often neglected, it is an increasingly influential part of the spatial rescaling of international political economy that expands the sites of action

upwards to the supra-national and downwards towards the sub-national (Paul 2005). The result is the growth of sub-national agency in economic development and international competition. As the US National Governors Association (NGA) notes, “Huge new overseas competitors like China and India are competing for the same pools of cash and people as (US states)” (NGA 2007:6) Sub-national action is thus portrayed as a necessary strategy in the face of these sources of competition.³

This sub-national role is, however, not novel. David Parkhurst, Staff Director and General Counsel of the Office of Federal Relations at the NGA, notes when interviewed that while U.S. states are increasingly active in both domestic and international economic affairs, this activism is a product of long-standing tensions between levels of government.⁴ He adds, “The division of responsibility between states and the federal government is dictated by the tensions within the constitution on the 10th amendment that dictates federalism.”⁵ Therein, while the Federal level has often attempted to direct competitive activity, these attempts go against what Parkhurst believes is a natural advantage for the state level. He notes, “The state level is closer to the source, to their firms, and thus knows their needs far better. The Federal government shouldn’t initiate, rather they should follow and facilitate. But it’s the state or local that needs to drive economic initiatives for they have a better understanding of local assets and resources.”⁶ However, while the opportunities for states to be activist has long been present, Parkhurst believes that this activism is on the upswing. He notes that “since 2010, a new crop of governors, very pragmatic, are rethinking the structure and function of state level economic development.”⁷

In so doing, this activism often drives intervention that may infringe or circumvent the U.S. Commerce Clause and its explicit limits on the discriminatory treatment of products and services from other states. Therein the use of tax policy or other fiscal incentives for business attraction and relocation are judged discriminatory. Parkhurst notes, however, that “states use it on everything.” He calls it a form of “state-on-state violence,” and notes that it is driven by

³ The Council of the Federation is the Canadian equivalent of the U.S. NGA insofar as it provides a forum for dialogue for Canada’s 13 provinces and territories. It lacks, however, the policy guidance and research activities that are present in the NGA.

⁴ Parkhurst, David. 2014. Personal interview (telephone), January 31.

⁵ Parkhurst 2014.

⁶ Parkhurst 2014.

⁷ Parkhurst 2014.

simple political imperatives. “Nobody wants to be #50 in the rankings. Public displays of collaboration hide competition. It’s bad policy as you’re just shifting costs, not creating net new jobs. But political actors want to remain in office.”⁸ Through the case studies presented in this dissertation, Parkhurst’s broad assessment of the tension between states and of their increasingly specialized activism is highlighted as accurate, though with distinct features in each jurisdiction studied.

Increasingly, however, the use of fiscal incentives to attract out of state industry is being phased out. Instead, Parkhurst notes, and is corroborated by the research that will be presented shortly in this dissertation, the trend amongst states is firmly towards state-level investments in “growing your own” firms and entrepreneurship. Parkhurst notes that this approach “is rooted in a type of post-financial crisis pragmatism.”⁹ He continues, “State governors need to see a good ROI on their investments and they can’t roll the dice that someone that wasn’t interested in their state before, will be over the long-term because of a tax break. Instead, why not invest in those that are already here.”¹⁰ As to the question of targeting of specific industries, Parkhurst notes that “states look to forward/future oriented sectors because they want industries that 1) have staying power, 2) provide the highest return with least impact on current budget, and 3) are a source of sustainable jobs going forward.”¹¹

A plurality of actors

This focus on the sub-national must be understood within a wider literature on a diverse mix of state and non-state actors. In particular, many others have focused on the role of non-state actors and trans-national networks that support Strange’s (1996) thesis on the retreat of the state and its subservience to the market. This analysis, however, is more concerned with the different roles played by levels of government within the state rather than that of different non-state actors.

Subsequently, and whilst returning to the literature on the state and the economy, Cerny’s original work on the competition state treats the state’s sovereignty as one which is blurred only

⁸ Parkhurst 2014.

⁹ Parkhurst 2014.

¹⁰ Parkhurst 2014.

¹¹ Parkhurst 2014.

by its increasingly external orientation and the punctures that are inflicted on its power as a result(1997:12). Internal divisions along political institutional lines, notably levels of sub-national governance, are insufficiently explored as contextualizing, mitigating and competing notions of the competition state at the national level. Cerny does acknowledge the diversity present within states, noting the plural and often competing interests within them. However, in so doing he privileges groupings of actors, notably the transnational capitalist class, as opposed to levels of governance enshrined constitutionally (Cerny 1997: 15). And thus while acknowledging the loose and fragmented nature of US federalism, the limited empirical depth behind Cerny's competition state means that it is most easily understood with respect to national-level initiatives. This subsequently leaves a gap in the understanding of how sub-national levels of government interact with the same forces that shape the competition state. This dissertation seeks to address that gap.

Jessop's take on the transition from the Keynesian welfare state to the Schumpeterian Workfare State provides necessary nuance to this perspective. Jessop acknowledges the potential role for sub-national elements of the state, noting that "(d)uring the Fordist era, local states operated as extensions of the central Keynesian welfare state" (Jessop 1993:24). He adds that in the transition to the Post-Fordist SWS, the sub-national is increasingly the central node in state economic policy, having "risen from the ashes" of national-level state involvement that marked the KWS (ibid). This acknowledgement aside, greater priority is given by Jessop to the role and influence of various levels of meta-governance or supra-national governance. There, the state becomes a subordinate on overarching policy, albeit retaining its central role in facilitating Schumpeterian transition (Jessop 2002:172-215). Jessop's concept of multi-scalar meta-governance and its privileging of size approximates the "strategy of size" model introduced by Palan and Abbott (1996:53,76). The latter note that countries that find themselves under competitive threat are likely to shift to enlargement and cooperation strategies as means of defense. The European Union, MERCOSUR, NAFTA and ASEAN are subsequently noted as vehicles for "deepening multilateralism" and the enhancement of strategic trade competitiveness (ibid, 56).

Across other works, notably Mazzucato's, the sub-national is absent despite what will be shown to be a very vibrant area of activism led by sub-national states and provinces. And thus

while Paul opines that the “state has been almost wholly written out of our descriptions and explanations of social, policy and economic relations under conditions of globalization” (Paul 2005:3), a more nuanced view holds that even where the state has been included in such debates, it largely fails to properly represent how different levels of the state operate under such conditions. This omission, I argue vis-à-vis the jurisdictions studied in this dissertation, is due to an increasingly stealth or under-the-radar approach to activist economic and industrial policy. For what this dissertation investigates is how the sub-national state promotes the development of new industrial sectors, notably those identified as innovative and technology-focused. The results highlight that focused intervention on strategic high-tech industries, albeit far from extinct at the national level, have increasingly come within the purview of sub-national levels of government, in particular the state and provincial level in North America. As the following will annotate, North American state and provincial interventionism in strategic industries for economic development purposes, while having adopted some of the attributes of the competition state and its focus on flexibility and external economic orientation, is far more complex and chameleon-like in its construction. Attributes from each of the core theoretical frameworks depicted in Table 1 are found across the case study results. This complexity is focused on strategic industries, in particular novel, high technology ones, despite belief that such approaches would be set aside with the supposed end of the welfare state. This is not meant to negate the empirical value of the competition state nor its theoretical competitors but rather to highlight that understanding the state in any type of constitutional structure requires the analysis of state policy at multiple levels of governance and the tensions and contrasts between policy and theory that exists between levels.

The state is therefore more accurately utilized as a depiction of the set of political relations between levels of government within a bordered territory, be they national, provincial or municipal. And across this mesh of levels of governance, *raison d'état* and *raison du monde* compete for authority as the primary motivating force.

Where the role of the sub-national in economic development has been most thoroughly studied is in the literature regarding the ascendancy of cities as subjects of political and economic study. Here the pioneering work of Saskia Sassen builds the image of the municipal level as one possessing both agency and leverage, notably through her juxtaposition of the hyper-

mobility of global capital with the “deeply embedded” human and natural resources of place (Sassen 1994:631). Her work and subsequent adaptations by Castells (1996) highlight the networked behaviour of global cities, and the information and people-related flows that traverse national boundaries between them. Scott (2001) further adds to this body of work, highlighting the role of Federal decentralization attempts on the growth of increasingly independent and quasi-autonomous cities. The ascendant city is therefore juxtaposed with changes in the role of the nation-state. Taylor (1997, 2011) presents a more thorough analysis of world city networks by expanding beyond demographic indicators to the full economic impact of 525 world cities and their population of firms. In particular, Taylor et al’s (2011) analysis lays bare the role of service sector firms in the processes of globalization and the networks formed between cities. This focus on city-networks highlights the “territorial synergies” produced across cities that leverage advanced services providers and their subsequent role in shaping competitive advantage for both nation-states and local economies (Taylor et al. 2007:106).

In the Canadian context, David Wolfe adds to the conceptual role of cities with a focus on regional innovation systems (2004, 1999) and municipalities (2009, 2011). In this more recent work, Wolfe notes the shift in economic agency that began in the 1990s as cities perceived themselves as under-represented in the provincial policy discussions that most affected them (2009:113). Therein the adaptation of agency by cities has facilitated their growth as the central nodes for economic development and Schumpeterian reinvention. Notably, he argues that the diversity of resources, in particular human ones, present at the local level enables them to reinvent themselves and their local economies (2009:38). Cities, he therefore argues, are the critical actors in innovation and regional and national economic success. His argument effectively minimizes the role of other levels of government, acknowledging the need for policy alignment but largely limiting their role to that of reactive funding partners. Wolfe’s earlier work on regional innovation systems in manufacturing tells a more nuanced story of the role of different levels of government. While some of this work is focused on the adoption of new technologies in incumbent manufacturing sectors (for example, Wolfe 1998), other work including Wolfe & Gertler 1999 highlights the provincial role in facilitating transition between those incumbent sectors to novel learning-economy sectors. This latter work is very congruent with the aims of this dissertation and provides support to the contextual argument regarding the

Province's role in facilitating industrial transition as presented in the case study on Ontario that follows.

Across the more contemporary city-focused literature, influence is heavily weighted towards private sector decisions. This is particularly the case in the analysis of connectivity done by Taylor et al 2011 and the focus on local civic agencies by Wolfe (2009, 2011). Insufficient attention is paid to the to the weight of public investment as it emanates from various levels of state, and how it serves to catalyze, cement and/or support the monopolies of place that are implicit in much of the world cities literature. To be sure, as Van der Wusten notes, the aggregation of economic statistics at the regional or national level belies important place-based or city-level diversity (2011:198). However, across these works, too little attention is paid to the interaction between levels of government and how each acts to support or nuance the efforts of the other.

Moreover, the focus on city-to-city connectivity presented by Taylor et al (2007) ignores the role that public dollars play in the competition for employment and investment amongst various levels of governance. So while first tier cities such as New York and London might act as centres of gravity for investment, the level of connectivity amongst lower tier cities in North American is unlikely to create strong enough incentives to negate the need for financial subsidies provided by government. This is key to the hypothesis advanced in this dissertation, that industrial policy-like strategies are enacted at the State and Provincial level in order to build new globally competitive industries. These steps in the name of future-oriented industrial development, given the jurisdictions under study, are largely devoid of the Alpha cities that possess gravitational-economic pull themselves. Thus, and as Taylor et al 2007 acknowledge, "research focus on one scale should be seen... as a pedagogic decision, a means of circumscribing reality to create a manageable, and still coherent, research agenda" (2007:14). The rise of the city in the study of global political economy is thus no less a pedagogical decision than previous singular focus on the nation-state. In his critique of the theoretical vacuums built around both the nation and the city, Brenner provides a helpful theoretical perspective (1999:53). He notes that "state territoriality currently operates less as an isomorphic, self-enclosed block of absolute space than as a polymorphic institutional mosaic composed of partially overlapping levels" (ibid). More recent work on the role of global cities shifts towards this polymorphic

understanding. For example, the Globalization and World Cities (GaWC) Research Network highlights the role cities play in linking regions and states into the world economy (GaWC 2014).

All together, this dissertation seeks to add to Brenner's vision of the polymorphic state, in particular as it relates to economic development and industrial/innovation policy. These policy fields are subsequently envisioned as the product of a mesh of levels of governance, albeit, and as the focus of this dissertation, increasingly driven by policy decisions at the State/Provincial level. This is not meant to marginalize the focus on the municipal nor on the Federal state but rather to better understand the role of the State/Provincial government level in their success. It is also meant to test how this level of analysis either gels or contrasts to prevailing theoretical frameworks.

This work subsequently reprioritizes the state in studies of global governance, emphasizing its centrality in the discourse of economic development. This research provides a competing perspective to the growing body of scholarship that emphasizes the growing importance of economic networks and private sector actors at the expense of the jurisdictionally-defined state. Moreover, it does so in a fashion that borrows where necessary from existing theoretical contributions but highlights how these definitions fail to capture the complexity and nuance of the contemporary states' role in the economy. In particular, it does so by addressing a significant gap in extant IR literature related to the role and function of the sub-national state and provincial level of government. In so doing it develops the understanding of the North American activist state that operates as both actor and agent in the name of jurisdictional competitiveness and employment.

The final outcome of this work provides a granular analysis of how sub-national states and provinces in North America have sought to play key roles in the development of new industrial, high-tech sectors. These cases highlight how the contemporary sub-national state structures its engagement in the economy and its transition to new areas of industrial focus. In so doing, the dissertation fills a significant gap in the extant literature related to the state in the economy. This literature has largely neglected the role and actions of the sub-national level in its approach to understanding how the state has evolved. This dissertation provides a significant empirical contribution to fill this gap. It does so with reference to several theoretical frameworks,

notably the competition state, the developmental state, the entrepreneurial state and the Schumpeterian Workfare State.

What emerges from the empirical work that is presented in this dissertation is a highly contextualized definition of the sub-national state in the economy that borrows elements from each of those theoretical approaches. And thus while education and infrastructural provision are traditional levers of sub-national economic policy, contemporary strategies at the sub-national state level highlight novel approaches to building private capacity. Therein the role of government is far less strictly defined as an enabler (as Porter would have liked) and, in some cases, morphs into a participant in market activity. This participant role can be defined as *light* insofar as traditional export and marketing assistance is provided, and where investment is non-discriminatory, or *heavy* whereby the sub-national state provides direct investment into particular sectors of the economy or particular private enterprises.

In between these two extremes of participant activity is the role of the sub-national state in the development of research organizations as “pipelines” for innovation. This focus locates universities and other research organizations as central nodes in industrial clusters that create corridors of knowledge that end with private industry. This triple-helix relationship highlights the embedded nature of the public, private and academic realms – all together inseparable as it relates to both funding and outcomes. This inseparability, however, can equally be viewed as a means of obfuscating the role of public dollars in private outcomes. The funding of such innovation corridors, and the focus placed on commercialization therein, clouds the distinction between what is a public and private recipient of state investment. Financial assistance, largely in the form of grants for commercialization, seeks to achieve the subsidization of private activity and the subsequent facilitation of growth and employment, no matter whether this funding is directly distributed through sub-national state assistance offices or channeled through academic or third-party organizations. What differs, however, is the legal definition of that financial assistance as direct corporate support versus educational or scientific research. This approach to understanding the role of the sub-national state in the economy mirrors that presented by scholars such as Mazzucato (2013) and Block and Keller (2011). Therein government research funds are appropriated by private firms for private gain. Where this research goes further is both in its

approach to understanding the role of the sub-national level, as well as looking beyond research funding to other means of direct public investment into firms.

In analyzing the relationship between public dollars and private commercial outcomes, this dissertation will look at three, sometimes distinct, sometimes overlapping angles of analysis. The first is the creation and subsidization of third party commercialization organizations who sit at the intersection of public and private activity. The second is the prioritization of public research institutions as pipelines for commercialization and private economic activity. The third is the support directed towards targeted industries identified as “high-value” or “high-quality.” By bettering our understanding of these three complementary lines of intervention, we will develop a more nuanced and accurate understanding of how the state, in this case the sub-national state, has re-invented its participation in private markets, albeit in a fashion that allows its political representatives to avoid what would previously have been an explicitly direct or visible role.

Generally, while elements related to a reduction in the welfare state are present in each case, they each highlight the explicit engagement and leadership of these sub-national states in the targeting and development of new, innovative industrial sectors. These activist approaches to economic transition nuance existing understandings of how the state, broadly defined, structures its engagement with domestic and global actors. What remains constant across time, however, is the state’s desired outcome. The language of competitiveness may now be prioritized, however in both the previous welfare state model as well as the contemporary competition focused model, the desired end of economic policy is stable employment. And that *welfare* can only be provided through *competitiveness*.

Chapter 2-The proliferation of industrial innovation capacity

Given the role that competitiveness, and the perception of changing competitive forces, play in the literature reviewed in Chapter 1, this chapter moves on to look at how the competitive balance of innovation-related capability is shifting globally. It does so with an eye towards understanding the international competitive dynamics that may motivate state intervention in the economy. In so doing, it leans on a hypothesis that the domestic policy environment regarding the economy and industry in the sub-national jurisdictions studied for this project is the product, at least in part, of interpretations of relative competitiveness. While this relative perception of standing may be formed against both regional and international competitors, the chapter focuses on two national economies, China and India, whose domestic industrial and scientific sectors have quickly upgraded to become globally competitive. The rise of such new competitive players in arenas of economic activity traditionally reserved for mature industrial economies, notably the sub-national jurisdictions studied here, has the potential to dramatically alter those perceptions.

This chapter presents both historical and contemporary examples of these dynamic competitive processes. It first looks briefly at the historical case of Japan's increasing competitiveness in the 1970s and 1980s, and the subsequent policy response enacted in the United States and United Kingdom. While this competitive dynamic is framed at the national level, it is instructive for this research project insofar as it highlights how the rise of new competition abroad is interpreted in the economies previously defined as 'more competitive.' The chapter then moves to a presentation of two contemporary examples of equivalent changes in competitive pressure. The arrival of both China and India as high-value, technology sector competitors presents a new set of challenges for mature economy jurisdictions. Does this matter? The subsequent case studies will interrogate whether these new challengers influence the industrial and innovation strategies embarked upon in the four case study jurisdictions.

The rise of new competitive actors

While rents associated with high-value technological fields have long been concentrated in mature industrial economies (MIEs), progressive shifts in economic activity both there and abroad, have seen a dispersal of these rents away from MIEs and towards formerly developing

economies. As a result, belief in the technological superiority of developed industrial economies is evolving in response to what Lynn and Salzman refer to as a change in the “patterns of geographical stickiness” of technological development and innovation (Lynn and Salzman 2007:16). These authors continue,

A disjunctive “innovation shift” to emerging economies is rapidly occurring. This innovation shift is disjunctive in that it includes a shift in the control of innovation value chains away from Triad Multinationals, and away from the Triad – rather than enhancing control by the Triad Multinationals as in the past... Geography still matters for technology, but the forces of attraction and retention are changing. The forces that caused high-end technology to be concentrated in the Triad are weakening as emerging economy entrepreneurs and technologists find it easier to move their activities to their home countries” (ibid).

The result of the weakening bonds of geographic stickiness is a rapid proliferation of innovation potential, and subsequently, a far more distributed global competition for competitive advantage in industrial sectors identified as high potential or future-oriented.

This contemporary evolution is perhaps a repeat of earlier phases of a similar shift in competitive and technological capacity. In the 1960s and 1970s, Japan emerged quickly as a competitor in high-technology fields. It is worthwhile to look back at this historical precedent to examine how mature states reacted to the rise of a new competitive actor. In particular, the U.S. and UK response to the rise of Japan in the 1970s and 1980s highlights the motivations that drive both defensive and offensive policies in these mature economies. While this analysis is one focused on the national level, it is instructive insofar for this study of the sub-national as it details the reflexive process between the evolution of one economy and response elsewhere.

Japan’s innovative rise is best captured by Freeman (1987) who presents a detailed picture of the institutional and organizational factors that helped Japan more than double its share of U.S.-issued patents between 1975 and 1985,¹² a statistic that Freeman finds significantly tied

¹² While Japan’s share of patents issued in the U.S. doubled from 8.9% to 17.9% between 1975 and 1985, the US share decreased commensuratively from 64.9 to 55.5% (Freeman 1987:21).

to the country's competitive trade performance (Freeman 1987: 56).¹³ For example, Japan overtook the U.S. in automotive patents in 1976, a harbinger of the distribution of automotive trade shares to follow (Altshuler et al 1986). Ostry and Nelson add, "By the mid-1960s Japanese industry was able to staff itself with sufficient numbers of qualified engineers to begin its strong run on the American technological lead in automobiles, and particularly electronics. By the early 1980s Japanese technology was up to world-class levels in many areas" (Ostry and Nelson 1995:41). The result in the U.S. was an acknowledgement that, "American firms can no longer merely concern themselves with their domestic rivals, as they did under the old system of oligopolistic "fair" competition with each other or with their rivals in Europe. Now they face strong competition from Japan and the Asian tigers" (Ostry and Nelson 1995:10).

Japan's evolution as a primary competitor on high-value technologies, facilitated by government-sponsored policy of "jôhô-ka" or the push towards an information society,¹⁴ prompted a series of policy responses, primarily defensive in the United States with a concomitant push for cost-cutting as opposed to long-run adjustment (West 1996:12; Zysman/Tyson 1983). In the United Kingdom, a similar reactionary focus saw the development of strategic technology policy (the Alvey Programme) as a response to potential Japanese leadership of fifth generation computing (Freeman 1987:126).

With these defensive reactions came the rise of a "competition narrative", namely one that perceived the competitiveness of western high-technology design and production at risk. As the 1985 U.S. President's Commission on Industrial Competitiveness then-noted, "The United States is losing its ability to compete in world markets. A close look at U.S. performance during the past two decades reveals a declining ability to compete, a trend that, if continued, would lead to a lower standard of living and fewer opportunities for Americans." (CIC 1985:1). In particular, the report points out that the U.S. had lost its perceived competitive superiority in 7 of 10 high-tech sectors analyzed. This concern is highlighted by Ostry and Nelson who note that

¹³ Ultimately Freeman finds that "no other society where such attention is devoted to the future direction of technical and social change" as in Japan (1987:56). This comment could well be directed towards contemporary China's innovation policies as defined in the country's most recent (12th) Five Year Plan and the focus on "innovation and development of new strategic industries such as energy conservation and environmental protection, new-generation IT, biological industry, high-end equipment manufacturing, new (renewable) energy and new materials."

¹⁴ One might find commonalities between this and contemporary Chinese indigenous innovation policy.

“the great concern in the United States... was that high-tech trade was moving out from under its sphere of control” (Ostry and Nelson 1995:10). Re-capturing this trade was subsequently the intent of significant public and political attention.

In particular, the development of a near-singular focus on state competitiveness and state innovation, popularized by Porter (1990) and Freeman (1987) respectively, followed. As Porter writes, “Competitiveness has become one of the central preoccupations of government and industry in every nation. The United States is an obvious example, with its growing public debate about the apparently greater economic success of other trading nations” (Porter 1990:1). Reflecting on the relative evolution of the U.S. economy and its competitiveness vis-à-vis other industrialized and industrializing nations, Ostry and Nelson add that this push relied primarily on a “high-tech fetishism” that built on an unabashed belief that such industrial activity was “a cure-all to slowed economic growth and rising unemployment” (Ostry and Nelson 1995:60). This belief builds on the understanding that long-term trends in trade performance are “essentially determined by different degrees of innovativeness and technological dynamism” (as noted by Dosi, Pavitt and Soete 1990:191).¹⁵The arrival of Bill Clinton’s administration in 1993 saw public support for industrial research and development “no longer a no-no but rather a perfectly legitimate act of government” (Ostry and Nelson, 1995: 84). This view pushed aside previous approaches, notably those of the Reagan administration, that saw “funding of basic research as fair, but that anything that subsidized commercial technological development was not” (ibid).

This historical case highlights that the concepts of transition and reaction are paramount in understanding how changes in the global political economy of innovation land in incumbent countries. The increased participation of emerging economies in the definition, rather than adoption, of innovative products and processes presents what Dosi, Pavitt and Soete called the “unique window of opportunity” for significant changes in the balance of technological and economic advantage between countries (Dosi, Pavitt and Soete 1990:254). Therein the focus shifts to new technological paradigms or a kind of Kuhnian-style paradigm shift that requires changes to the accompanying institutional and social frameworks (Perez 1986).

¹⁵ And more broadly speaks to Solow’s finding that 85% of economic growth comes from innovation as opposed to increased input.

Moving forward, how do shifts in the technological capacity of some states affect others today? And in particular how does such change land in the sub-national jurisdictions studied for this dissertation? While this dissertation is focused on how sub-national states in Canada and the United States operationalize policy to develop new technological paradigms, it also seeks to understand what shapes, in part, the understanding of the need to do so. Are sub-national states attuned to international competitive forces from abroad or are regional competitors more influential? In examining this thread as a secondary component of the primary research question, this dissertation seeks to broaden our understanding of the role sub-national states and provinces play in the global political economy of innovation and industrial transition.

Today several developing economies present industrial and innovation related strategies that are similar, if not indistinguishable, from their advanced economy peers. Like Japan in the 1970s, China and India present aggressive state and private investment strategies aimed at transforming their economies along a Schumpeterian innovation cycle no different than what is seen in advanced economies across North America and Europe. A brief analysis of the evolution of their innovation related capacities and capabilities is instructive insofar as it helps frame whether the rise of new economic competition influences the policy being developed in the four case study jurisdictions. While the operationalization of the strategies utilized in both countries is done in a decentralized fashion, the outcomes are presented here in aggregate form.

As a report by the Berger Group (2012) notes, “China and India have substantially boosted their share of global R&D spending. Between 2007 and 2012, they doubled their spending from USD 100 to 200 billion (China) and USD 21 to 40 billion (India). These two countries now account for almost 20 % of global R&D spending.” These two relative newcomers to the global race for innovation-powered economic and employment growth are not, however, alone. The Berger Report adds that “Between 2000 and 2010, emerging country patent registrations in Europe and the US grew significantly. Not only do well-known innovators such as China and India show double-digit patent registration growth rates, but countries such as Brazil, South Africa, Russia and Saudi Arabia also record similarly high figures” (Berger 2012).

For the purpose of this dissertation, however, just China and India will be studied in more depth. As will be shown, their competencies in the same innovative industrial sectors promoted by the mature sub-national jurisdictions studied as part of this dissertation, provides helpful

context on the changing global environment for economic competitiveness that faces advanced industrial sub-national economies in North America.

Zizhu chuangxin

Although often dismissively referred to as a copy-cat innovator, in reference to a previously strong propensity to copy or imitate advanced economy innovations, China is emerging as a significant creator of industrial knowledge. This evolution is the result of explicit policy initiatives that aim to transform the country's place in the global economy. For example, indigenous innovation programs like China's zizhu chuangxin explicitly aim to upgrade the country's knowledge infrastructure in order to reduce its reliance on foreign technology from 80% in 2006 to 30% by 2020 (Dahlman 2010). This aim is part of China's *National Medium to Long-Term Plan for Science and Technology Development* (MLP) launched in 2006. The plan calls for the development of an innovation-oriented society by 2020, and to position China as a world leader in science and technology by 2050 (Cao, Suttmeier and Simon 2006).

Achieving this goal has prioritized an intense, multi-faceted approach to knowledge development, notably with respect to science and technology education. For example, the number of engineering PhD's in China has tripled since 2000 and the number of science-oriented researchers has grown by an average 12% per year (NSF 2012). Chinese scientific research in peer-reviewed journals has similarly grown by 16% per year since 1995, with the Chinese share of published scientific articles now reaching 9% of the global total (ibid). China's share of high-value triadic patents¹⁶ has experienced similar growth, increasing more than seven-fold between 2000 and 2007,¹⁷ while its share of U.S.-granted patents has grown from below .5% in 1992 to over 3% in 2010 (ibid). These metrics build on the foundations for knowledge creation that are embedded in what Jakobson (2007) finds are the country's over 5400 government science and technology institutions, 3400 university-affiliated research institutions, 13,000 research institutions operated by major state enterprises and 41,000 non-government research enterprises.

In terms of broad research and development (R&D) expenditures, the pace of China's R&D growth has eclipsed a 20% annual growth rate between 1999 and 2009 (NSF 2012)

¹⁶ Patents applied for/granted in the United States, Europe and Japan.

¹⁷ India has experienced the second highest growth rate in Triadic patents over the last decade, growing at 28% per year (Dahlman 2010:44).

comparison, the US has experienced an annual R&D growth rate of just 5% (ibid). The impact of these investments on China's output is similarly significant. China's share of global high-technology manufacturing rose from just 3% in 1995 to 19% in 2010, with its total share of high tech exports reaching 22% in 2010, up from 7% in 1998 (NSF 2012). Its share of global knowledge and technology intensive (KTI) services rose from 3% in 2005 to 7% in 2010 (ibid). The broader UNIDO measure of competitive industrial performance (CIP) shows China to have made the largest strides amongst large industrial performers. Since 2000, it has more than doubled its CIP score, whereas the United States and Canada recorded drops of 12% and 15% respectively (UNIDO 2013).¹⁸ Agarwal's (2011) attempt to aggregate a variety of economic development indicators shows that China has made significant progress relative to the United States as it relates to human capital development, tertiary enrollment, patents, and research and development expenditures.

The following table borrowed from Jakobson 2007 highlights the significant increase across innovation-related metrics in China over the period 1997-2005:

Table 2 – Selected Science and Technology indicators of China

	1997	2001	2005
GERD (USD billion)	6.1	12.6	30.1
GERD/GDP %	.64	.95	1.34
Government Science & Technology appropriation (USD billion)	4.9	8.4	16.4
Scientists & engineers (1000 FTEs)	588.7	742.7	1119
Number of patent applications (Chinese)	114.208	203.573	476.264
Percentage of high-tech product in total exports	8.9	17.5	28.6

*GERD: gross domestic expenditure on research and development

¹⁸ UNIDO's Competitive Industrial Performance (CIP) index is calculated on the basis of the following components: industrial capacity, manufactured export capacity, impact on world manufacturing value add, impact on world manufactures trade, industrialization intensity, and export quality (high-tech intensity).

China's pursuit of innovation-driven economic growth is targeted at a series of industries deemed "frontier technologies." The MLP contains a particular focus on biotechnology, information, new materials and aerospace.

A tangible example is China's pursuit of high-tech success in nanotechnology (see Bhattacharya and Bhati 2011; Appelbaum and Parker 2008; Bai and Wang 2007). This new paradigm of technological capability has seen an aggressive state-directed investment strategy aim to take advantage of this "window of opportunity" in the early stages of market development. The sector has benefited significantly from the USD400 million earmarked for the sector as part of the central government's 10th Five Year Plan (2000-2005). China now leads in the number of research publications on nanotechnology (having surpassed the US in 2008), and is home to over 800 domestic nanotechnology firms (compared to just 80-100 foreign-owned firms), vying for China's USD31 billion domestic nanotechnology market. Bai and Wang (2007) highlight that the government's prioritization of this sector has led to significant research and commercial efforts, and a subsequently increasing stature in the global nanotechnology race.

Beyond China, sixty countries have explicit nanotechnology strategies (ICTC 2011). While the US continues to lead in total (private and public) funding and sector patent issuances, thanks in large part to federal funding that has grown from USD464 million in 2001 to USD1.9 billion in 2010, its ability to commercialize is seen as comparatively mediocre. Moreover, its long-term competitiveness in the sector has been increasingly questioned as a result of comparatively declining enrolments in graduate science and engineering programs (Lux Research 2010). As Clayton Teague, Director of the US National Nanotech Coordination Office (NNCO) notes, "our leadership (in nanotech) is being strongly challenged ... without significant support the US could fall behind in this extremely important race" (USCSST 2011). Similar sentiment is offered by James Tour from the Smalley Institute for Nanoscale Science and Technology at Rice University. Tour opines, "If we do not adopt and deploy an aggressive strategy to encourage the growth of nano-manufacturing immediately, we will find ourselves losers to China, India, Russia, Singapore and other places where government funds and supports the use nano-manufacturing to create jobs and wealth" (USCSST 2011).

That China leads developing country innovation in a variety of fields should not surprise. While the scale of state investment is certainly a significant factor in the country's economic

evolution, so too is the country's long history as an industrial innovator. A 2013 Booz & Company report on China's innovation economy reminds readers of this history, noting that its contemporary rise as a "center of 21st-century innovation excellence" is a return to its historical place as "the nation that brought the world such inventions as water-powered mills, paper money, and explosives" (Booz & Company 2013:4). The report adds that this return to innovation-prominence is unlikely to be short-lived given public and private investment in research and development. The report also finds that in 2011 firms headquartered in China increased their R&D spending by 26.5 percent. The report notes that this represents "more than double the global average, five times as much as European firms, and 11 times as much as Japanese firms" (ibid:6). And while R&D in China may still be dominated by foreign companies (there are now over 1,500 R&D centers set up in China by foreign companies) these data highlight that Chinese companies are increasingly driving domestic R&D activity.

As Yip and McKearn (2014) highlight in a June 2014 *Forbes* article, both supply and demand factors are driving these investments and the subsequent emergence of a powerful innovation economy in China. Supply factors include the aforementioned increasing supply of knowledge creators. Demand factors include increasingly pressing needs for solutions to health, environmental and social challenges across the country. A secondary set of demand factors look beyond the domestic Chinese market. Survey data collected by Booz & Company (2013) highlights that the direction of Chinese R&D investment is increasingly focused on competing in higher-margin Western markets. Two of the case studies that follow include specific reference to this emerging Chinese competition.

These successes and transformations notwithstanding, China's economic evolution towards a knowledge-driven economy is not without its problems. As Kroeber (2007:37) writes, the country's high-tech exports are still predominantly lower-value ones. Gupta and Wang (2011) offer a starker assessment, noting that the country's significant innovation-related inputs have not been matched by similar outputs. This situation, however, is changing and, as was the case with Japan's progression from low-to-high value in electronics and automobiles, the process can be quick and has significant economic impacts on other economies. More significant challenges include institutional factors related to intellectual freedom and intellectual property

protection (Jakobson 2007:23). And as Miller (2013) writes, the country's ability to attract and retain top talent suffers significantly because of these institutional barriers.

These words of caution, however, do little to alter an increasingly strong consensus that sees China not just attempting, but progressively succeeding in its attempts to become a leading innovation-economy. In so doing, it highlights the democratization or spread of such economic prowess away from a centre of gravity moored for several decades in a small set of advanced economies. Given these processes of change, will China's advance in high-technology sectors of the economy have the same impact on incumbent economic leaders as did Japan's rise in the 1970s and 1980s? The following case studies will interrogate this role.

From foreign to domestic innovation in India

While China has emerged as the most significant technological and innovation based challenger to traditionally leading Western economies, others are making significant strides. India's quantitative innovation inputs and outputs are in a different, and lesser, category than China's. However, it too presents a valuable example of how the global context for innovation and economic transformation is shifting. In particular, India's maturation as a host for ICT and life science based innovation positions it to compete directly with the mature economies studied in the case studies of North American innovation and industrial policy that follow.

As Mathew (2010:38) writes, "India began gaining a seat on the global stage largely due to globalisation and the opportunities it presented firms from the developed world." In particular, the country's innovation oriented technology sectors grew in prominence and capacity thanks to pre-2000 developed economy fears of a Y2K systems meltdown. Lynn and Salzman (2007) note that "the general story of the globalization of IT work to include important activities in India and emerging economies is widely known. Much outsourcing was begun in the 1990s, primarily for the maintenance of legacy systems and to make Y2K modifications." Mathew (2010:34) adds, "A decade ago the idea of Indian IT services industry reaching revenues of USD20 billion was a dream. Today (2012) the industry has tripled in size." Moreover, as Srivatsa Krishna (2013) writes in *The Times of India*, "Bangalore today is the world's second largest IT cluster in the world, second only to Silicon Valley. According to the Karnataka ICT Group 2020 study, by 2020 India will become the largest collection of talent in a single location on the planet" (Karnataka 2013:19).

Thanks to this evolution in economic activity, Krishna goes on to note that India has positioned itself at the heart of a global race for competitiveness and innovation in IT. Kunam and Paranam (2011) write in a piece entitled *The World's Secret Silicon Valley* that “India is positioned to be recognized not just for successful offshore services, but as the next global innovation hub.” This position as a key actor in the world’s innovation economy is more than simply India’s emergence as a service centre for international firms. Rather, as Kumar and Paranam note, it is indicative of a wholesale shift in the country’s economic infrastructure that has seen it develop the foundations for indigenous innovation. According to the Battelle Group (2013), multinational companies have been setting up their R&D units in India since 1985. As of 2014, over 870 international firms have R&D facilities in India. The motivations for these investments are primarily “access to large burgeoning market, availability of large talent pool and cost effectiveness in conducting R&D” (Battelle 2013:10). The domestic benefits of this foreign presence is the ongoing development of domestic capacity and domestic firms in high-tech fields previously dominated by foreign firms. Mathew (2010:32) notes that the result is a series of internationally recognized brands that compete aggressively in international markets. Firms such as Ranbaxy, InfoSys, Reliance and Mahindra are part of this cohort.

Moving forward, India’s desire to catalyze a domestic innovation economy is explicit in policy documents. In 2008, India’s Department of Science and Technology introduced the Indian Innovation Act as a means of funding and rewarding indigenous innovation. The Act provided fiscal and tax incentives for both the creators of new knowledge, and for the sources of capital behind them, as a means of reaching a desired R&D spending target of 2 percent of GDP. The Act was designed to “to facilitate public, private or public- private partnership initiatives for building an Innovation support system to encourage Innovation, evolve a National Integrated Science and Technology Plan and codify and consolidate the law of confidentiality in aid of protecting Confidential Information, trade secrets and Innovation” (IDST 2008:3).

As of 2012, the Act had not produced the doubling of spending sought. However, India's Twelfth Five Year Plan proposed in early 2012 earmarked USD24 billion for research and development in six key sectors over the ensuing five year period. This represents over 2.5 times what the country spent over the previous five-year period. This strategic plan also includes a series of quantitative metrics deemed indicative and necessary for the emergence of domestic

innovation capacity. In particular, the plan seeks to increase the number of PhDs produced domestically from 8,900 to 12,500, and seeks to increase the number of full-time researchers from 154,000 to 250,000. The global reach of Indian scientific research is also targeted to rise to account for “at least 5% of the world's total by 2017 (up from around 3% today), improving India's global ranking from ninth to better than sixth” (GOIPC 2012:235). This plan includes an explicit targeting of innovation and scientific and technological development in a series of sectors deemed strategic. They are (in order of their share of allocated investment): climate change technologies, nano technologies, pharmaceuticals, solar energy technologies, water related technologies, and security technologies.

India's progress as a centre for innovation is far less explicit than China's. While overall R&D expenditure in India has doubled since 2007, it has yet to reach the aforementioned 2 percent of GDP target. However, visible progress is seen in the number of Indian patent registrations in the U.S. and Europe. For example, according to the Battelle Group, patent registrations in the U.S. from India grew from 94 in the year 2000 to 465 in 2010, and registrations in Europe increased from 7 in the year 2000 to 200 in 2010 (Battelle 2013:21). According to Agarwal (2011), this patent growth is India's primary advantage vis-a-vis the United States; however, he finds that it continues to lag in other indicators of economic progress. Moreover, while India is still perceived as a technology importer, the Battelle Group notes that as of 2013 the country is a R&D services net exporter to Europe with a trade surplus of nearly CAD1billion in this category.

The successful evolution of the country's domestic knowledge-creation capacity in ICT services and pharmaceutical products is now used as a framework for how the country must push ahead in its approach to economic development. The Battelle Group report notes that “Buying 'proven' technology from abroad sets India behind by a number of years and makes us dependent on provider of technology. India needs to take a holistic approach for development of technologies across sectors for self-reliance and a sustainable future” (Battelle 2013:12). The significant investments in domestic capacity in targeted sectors are aimed at addressing this foreign/domestic balance, like China's goals under *zizhu chuangxin*, and in promoting India's innovation economy. And in so doing, these investments make India a significant player in the global innovation economy. In particular, the country's advances in the life sciences and

pharmaceutical sectors make it a key competitor for sub-national North American jurisdictions seeking to build similar competencies. Amongst the case studies that follow, Pennsylvania in particular highlights India's impact on sub-national industrial policy.

An evolving global political economy of innovation

All together the policies developed in China and India to promote domestic innovation capacity, and the upward trajectory of innovation- and knowledge-related output metrics such as patenting, highlight the increasingly distributed nature of contemporary innovation. To be sure, the data presented above is far from exhaustive. However, these short case studies on emerging market innovation serve to highlight a process of economic transition underway in economies previously defined as low-value producers. Long-held suppositions regarding the material advantages held by mature industrial economies in the transition to new, high-value sectors and services are immediately less relevant in a global economy where innovation potential is broadly distributed. As Zysman et al. note, this represents a “globalization with borders, where new competitors, and new and often unexpected loci of innovation and production bring new processes, products and business models to the international marketplace” (2007:7).

As innovation economies flourish elsewhere and begin to gain a greater share of global high-value production, mature economies, notably those such as the sub-national U.S. and Canadian jurisdictions studied in this dissertation, have seen their share of global high-tech exports and knowledge and technology intensive services simultaneously decline, with significant implications for employment in high-technology manufacturing and services (NSF 2012).¹⁹ And while many have opined that high-wage and high-skill labour markets like those found in Canada and the United States would retain a supremacy in high-value design and development (see Freeman 2002), the one-time “enormous advantages” enjoyed by such countries related to high-technology computing and life sciences sectors are dissipating. This chapter is included in this dissertation as a means of highlighting this increasingly competitive dynamic for high-value, innovative production around the world and a means of analyzing how sub-national states react to the development of competitive actors elsewhere (regardless of whether they are sub-national or national level). However, as the following cases highlight, while these shifts in global competitiveness are indeed felt in the jurisdictions studied, the degree to

¹⁹ Between 2000 and 2010, US high-technology manufacturing employment dropped by over 687,000.

which these emerging markets of innovation prowess impact policy towards the development of new industrial sectors in the sub-national jurisdictions studied varies greatly. This variation aside, what is consistent is a view that the sub-national state is an actor in the global economy of equal significance vis-à-vis competitors framed as a higher-order of government.²⁰

In the following section we shift our attention to these sub-national states and provinces that are the subject of this study. How do they seek to facilitate or enable economic transition? And how do the economic and industrial transitions underway elsewhere, notably in emerging market economies such as China and India, influence the policies in these mature sub-national states?

²⁰ To be sure, both China and India operate federal-style economic approaches that delegate significant authority to various sub-national levels. The analysis of this chapter, however, is meant solely to reflect how sub-national states in North America gauge who their competition is.

Part II: Case Studies of Sub-National State Activism

Adapting to periods of economic transition and to the changing competitive balance in the global economy is by no means standardized and allows for a wide array of policy interventions. As highlighted in the extant literature reviewed earlier, some see this intervention focused on the development of labour and regulatory flexibility, and the provision of enabling infrastructure. Others go further and see the role of the state more squarely directed towards the development of innovative, knowledge-intensive sectors. And to be sure, no approach is necessarily mutually exclusive. The following case studies on the U.S. states of Arizona and Pennsylvania and the Canadian provinces of Ontario and Quebec will highlight how intervention is structured and operationalized in these jurisdictions. In so doing, these cases will provide an empirical basis for judging the merits of the competition state thesis as well as the other theoretical frameworks focused on the role of the state in the economy as highlighted in Table 1, and how they may be reproduced or nuanced in different jurisdictions. And thus while more recent literature on the role of the state in the economy by, for example, Mazzucato (2013) and Block and Keller (2011), sees a more activist and direct role for the state in the funding and operationalizing of innovation-related research and early-stage finance, how do such trends in policy exhibit themselves at the sub-national level? And does the supposed end of the welfare state mean that a developmental state approach towards strategic industries is extinct? Returning to our core research question, these case studies will provide answers to the question of how sub-national states in Canada and the United States structure and operationalize industrial transition and the development of new industrial cum innovative sectors. The cases will also examine whether regional or international competitive drivers are of more importance in the development of these strategies and actions.

Table 1: Taxonomy of state involvement in the economy

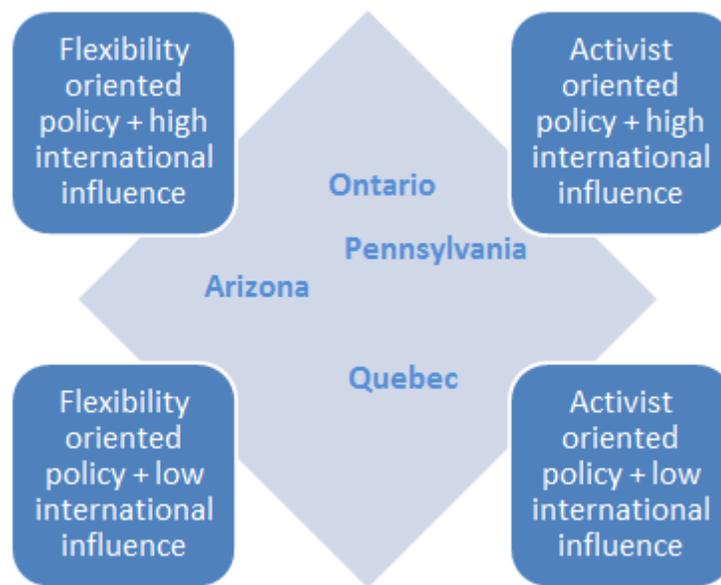
Type	Defining Characteristic
Competition State	Focus on regulatory flexibility, general business climate intervention, and entrepreneurship.

Developmental State	Explicit state control, financing and operational leadership of key economic/industrial projects.
Entrepreneurial State	Focus on government-funded and facilitated technological research and its exploitation by private users.
Schumpeterian Workfare State	Focus on labour-market flexibility and the support of innovation-oriented activity through skills development and technological capacity development.
Stealth State	A variant of each of the above where domestic and/or international constraints necessitate a less visible state role and thus the prioritization of third-parties for the disbursement and operationalization of state funds and strategies.

What becomes clear across these case studies is that intervention is the norm in the sub-national jurisdictions studied. The theorized retreat of the state to the margins of economic policy at the national level is not supported at the sub-national level given the evidence shown in these cases. Rather, in all of the cases studied herein, the sub-national state plays an activist and leadership role in the development of new industrial sectors. Moreover, in all but one case, the labour and regulatory flexibility that is the most distinguishing feature of the theorized competition state does not appear. Rather, this focus on flexibility is far less influential than that of direct activism. Satisfying employment related goals is premised far more often on the active participation of the sub-national state in the creation of new markets and new firms. And thus while the competition state literature posits the role of the state as, primarily, a provider of enabling infrastructure rather than a more active participant in markets, across all four cases we see reality to be far more nuanced and complex. Rather, in all four cases, the state supplements enabling investments that are meant to serve their entire economies with substantial targeted investments and follow-on activity in those targeted sectors. Aspects of the entrepreneurial state and the Schumpeterian Workfare State are clearly seen across these cases. Moreover, in three of four cases, the language of industrial policy is avoided by policy-makers. A stealth-state approach dominates the

operationalization of policy in each case study except in Quebec. The use of third-party intermediaries and a focus on entrepreneurs allows for the obfuscation of the state’s role. These actual policies may be in the name of entrepreneurship or innovation; however, they are shown to be industrial policy in all but name.

Figure 1: How Select Sub-National States Operationalize Industrial Policy and Impact of International Competitive Forces



The matrix provided in Figure 1 reviews the two axes of analysis for these cases. The cases each look at the mix of flexibility vs. activist policy orientations, as well as the role of the impact and influence of international competitive forces versus more local or regional ones.

Chapter 3: Arizona's quasi-state directed economic transformation

Long reliant on a combination of its five “C’s” (cattle, citrus, cotton, copper, and climate), Arizona is attempting to reinvent itself as a host for high-value, innovative technology and renewable energy industry. It has done so through a variety of means. While the state’s right-to-work labour framework positions it along the lines of the flexibility-thesis promoted by Cerny, it has taken a highly activist role in the development of particular sectors and even particular firms. These layers of intervention highlight that even in the most rhetorically neo-liberal states, a type of economic dirigisme still exists and still frames the most crucial aspects of the state’s role in economic development. This activism notwithstanding, amongst the case studies in this dissertation Arizona is the most akin to the orthodox competition state presented by Cerny insofar as it attempts to attract investment through cost and tax related advantages. However, as the following will highlight, Arizona’s embrace of this approach is half-hearted and leaves significant space for an innovation and industrial policy approach to the development of several key targeted sectors. In so doing, it highlights a policy model that is more closely tied to Jessop’s vision of the Schumpeterian Workfare State and its combination of both labour-related flexibility and innovation and knowledge-related upgrading.

Arizona’s attempted economic reinvention is premised on a series of political decisions, from both sides of the political spectrum, that have sought to restructure the state’s competitiveness and the diversity of the state’s economy by targeting key “high-value” industries. In so doing, a coalescence of political and ideological views has created an economic strategy that rhetorically promotes the flexibility and expertise of the private-sector, all the while extending the role of the state into targeted private industry.

The state of Arizona thus highlights the persistence of industrial policy, albeit in a differentiated and almost stealth process. This process sees third parties and the rhetoric of less government cover for an activist state. This activism is operationalized through attempts to lead a transformation agenda focused on the creation of an innovative, knowledge economy able to withstand the forces of inter-state and international competition.

In order to develop this argument, I begin by analyzing the driving forces for change in Arizona. Notably I look at the internal perceptions of Arizona's place in both the global economy as well as within the U.S. economy. Thereafter the chapter moves on to look at the strategies enacted by Arizona policy makers to catalyze a transformation of the underlying factors that drive the state's competitiveness. In particular, the chapter analyzes the targeting of specific industries, including renewable energy and the life sciences, and the process by which these targets are supported through both direct and indirect state-funded channels. All together these sections build support for the argument presented that the sub-national state is significantly engaged in the development of new industrial sectors, and of particular firms therein. A final section of this chapter explores how this role has been legitimized and concludes with a discussion of how Arizona fits within our matrix of types of state activism.

Drivers of change

Broadly perceived as a pro-business state replete with lax taxation and labour (right-to-work) laws, Arizona has not been a historically big spender on research and development (R&D), and is not traditionally viewed as an "innovative" or knowledge-oriented jurisdiction (ABR 2005; Read 2013). Yet like many other North American jurisdictions, the decline of employment in traditional sectors such as manufacturing and real estate has forced state officials to rethink the state's position in the global economy. This review has led to a shift towards higher-value knowledge and technologically-focused sectors. Arizona is subsequently spending significant amounts on R&D in an effort to lay the ground work for future economic growth (NGA 2007), albeit from a significantly disadvantaged latecomer position (Riley 2009). This reprioritization of state-funded R&D comes as Federal contributions towards Arizona's research capabilities, as measured through National Science Foundation (NSF) and National Health Institute (NIH) funding, have stagnated (NSF 2012).

Efforts to transform the Arizona economy from physical to knowledge assets began in the 1990s in the form of a Governor-led effort by then Governor Jane Dee Hull (R). Hull established the Arizona Partnership for the New Economy (APNE) which brought together 36 participants from the public, private and academic realms to "examine ways in which the state could become

more competitive in the so-called “new economy” (APNE 2001, 1).²¹ A driving motive for this analysis was, according to stakeholders interviewed, the collapse of financial and real estate activity that accompanied the Savings and Loan Crisis (Zylstra 2013). As a Barron’s Magazine headline read in 1988, “Phoenix: Boomtown Gone Bust” (Laing 1988). Suzanne Kinney, now Vice President Policy of the Arizona Chamber of Commerce, notes that repeated crises in real estate and climate-oriented industries (tourism) have allowed for the development of an understanding that economic diversity is necessary to the state’s economic prosperity and that “it would be poor judgment to depend on business as usual.”²²

This perspective on the need for diversity drove the APNE. The project presented four primary elements of a competitive “new economy” framework for the state: one that enables learning through “getting the basics right” via investments in (1) education and (2) infrastructure, as well as positioning the state for “new economy leadership” via investments in (3) research and development and (4) entrepreneurial financing. This framework for future growth was premised on the changing nature of technology, notably the impact of telecommunications and information technologies that “reduced production and transportation costs and created new markets” (APNE 2001, 1). While the report makes mention of “global competition” and the subsequent premium now placed on “the ability to improvise, adapt, and create”, it provides no geographic focus or jurisdictional hierarchy related to this exogenous pressure (APNE 2001:12). Rather the impetus for change is positioned as an evolutionary challenge focused on exploiting the opportunities presented by technological change. The APNE suggested that meeting the needs of Arizona’s future economy would be based in large part on the facilitation of technology commercialization. As the report indicates, the state possesses knowledge assets across a broad spectrum of industries but must improve the rate of commercialization therein.²³ Facilitating this improvement is positioned alongside a set of “New Economy Principles” that focus in large part on tax reform and industry neutrality (APNE 2001:17). These principles highlight the early

²¹ At the time, Arizona ranked 10th in the Progressive Policy Institute’s 1999 State New Economy Index – 3rd in fast growing companies and 12th in high-technology jobs, 23rd in R&D investment and 30th in STEM professions.

²² Kinney, Suzanne. 2013. Personal Interview with Suzanne Kinney, Vice President, Policy, Arizona Chamber of Commerce, Phoenix, Arizona, February 21, 2013.

²³ The report thereafter identifies 11 clusters of industrial activity: bio-industry, environmental technology, food, fiber and natural products, high-technology, minerals and mining, optics, plastics and advanced composite materials, senior industries, software and information, tourism, and transportation and distribution.

precedence of a flexibility and regulatory-focused policy approach in Arizona. While target industries are developed, funding is only nominally increased to operationalize this targeting.

Starting from the bottom

In the years that followed the issuance of the APNE report, a series of complementary initiatives were launched by the state, and by relevant industry stakeholders, aiming to fulfill the state's purported potential. Amongst them was the Governor's Council on Information Technology (GCIT), created in 2002 by then Governor Dee-Hull, and subsequently confirmed by Governor Janet Napolitano. GCIT sought to be "a catalyst for developing new economic development strategies, focus(ing) primarily on improving Arizona's knowledge-based economy" (Dee Hull 2002). With a focus on "monitoring changes in global economic conditions which might justify a re-orientation of the state's technology programs, the GCIT recommendations focused largely on tax-measures (credits) and finance (venture capital) as a means of stimulating Arizona's knowledge sectors" (ibid).²⁴

Over the same time period, a number of reports were produced by the Arizona-based Morrison Institute for Public Policy (MIPP) at the University of Arizona on the state of Arizona's competitiveness. The contrast between the findings of these reports and the GCIT recommendations highlight a disconnection between a natural comparative advantage and a constructed competitive advantage.²⁵ In particular, the MIPP analyzed Arizona's knowledge-economy sectors and the nature of what MIPP termed a "50-state race for advantages and leadership in science and technology" (MIPP 2003:1). In 2003, the MIPP noted that Arizona lagged far behind its regional and national peers in science and technology, highlighting that regional competitors in California, Colorado, Utah, and Washington "are in a much better position than Arizona is to succeed in a technology-led economy" (ibid, 2). Lacking a natural or previously constructed advantage in high-tech fields, the report noted that Arizona, a catch-up state, "will need to develop a different logic of collective action ... (that) requires larger,

²⁴ The GCIT recommendations include: Tax credits for individuals or corporations investing in early-stage technology research and companies; Renewal and expansion of the state's research and development tax credit to encourage research in Arizona by private companies; A "supercredit" for in-state university research ;A USD100 million statewide "fund of funds" to raise venture capital for start-up companies; A state strategic-investment board to manage venture funding; Strengthening of the Arizona Department of Commerce; Passage of a Constitutional amendment to allow universities to take equity in spinoff firms emanating from their scientific discoveries.

²⁵ With reference to "constructed advantage" as an additional category alongside comparative and competitive advantage (Cooke and Leydesdorff 2006).

sustained multiyear investments to develop the culture, education, training, and socialization that have already occurred in leader states” (ibid, 3). It is made clear in these reports that Arizona began the 21st Century at a significant competitive disadvantage vis-à-vis the national average, let alone its regional competitors, a standing attributed in part to the state’s reliance on tax cuts as a stimulating measure rather than other levers of economic growth.

A 2002 report commissioned by the Arizona Department of Commerce, “Arizona’s Economic Future,” is more blunt, noting that: “Arizona ranks near the bottom for a number of critical measures of comparative advantage indicating a need for further investment and policy considerations in the years to come” (ADC 2002:1). The report highlights particular deficiencies in human capital, infrastructure and venture capital that led to a last-place ranking amongst regional competitors for the ability to develop or attract technology-based industries. Similar findings were reported by the 2000 Governor’s Task Force of Higher Education, which noted the state’s likely “inability to compete in the global, knowledge economy” without a dramatic reprioritization of innovation and education (GTFHE 2000), and The 2001 Report of the 78th Arizona Town Hall noted Arizona’s “inadequate knowledge infrastructure” and subsequent follower status on measures of economic progress (ATH 2002).

Constructing a knowledge-economy in Arizona was therefore not premised on the notion of expanding the state’s natural or traditional areas of comparative advantage. Rather this was a near-explicit project in constructed competitiveness, albeit one that required the overcoming of significant knowledge-asset deficiencies.

This structural argument for economic evolution was continued across the late 1990s and early 2000s as successive Republican and Democratic leaders saw an economy premised on the “5 C’s” as unsustainable.²⁶ While transformation was not impossible given the presence of several research universities which provided complementary resources, Arizona sought to transform itself for the 21st Century from a position of distinct disadvantage vis-à-vis its regional competitors. And over the course of 2000-2008, for example, Arizona’s placement in National rankings improved only slightly. For example, while above the national average in patents issued per GDP, it trails benchmark states and has largely plateaued whilst the national average for annual patent growth approaches 10% (Battelle 2009). Orchestrated attempts at reinvention or

²⁶ Harris, William. 2013. Personal interview with William Harris, President and Chief Executive Officer, Science Foundation Arizona, Phoenix, Arizona, February 20, 2013.

economic transformation are thus far from assured. Yet as the following analysis will highlight, such uncertainty has done little to reduce the role of government in such transformative efforts.

Arizona in a global economy

In contrast to the endogenous driving forces behind the APNE, in 2007, then-Governor Janet Napolitano explained the nature of the economic challenge facing her state, and more generally, the United States, as follows in her testimony to the Subcommittee on Education and Labor of the U.S. House of Representatives:

“Today’s economy is increasingly global and highly competitive. While the United States remains the world leader in innovation, formidable competitors have emerged – and continue to emerge – as technology breaks down barriers and accelerates change... Americans no longer solely compete against each other for jobs; they increasingly compete against well-educated and cheaper labor abroad. The only way the United States can compete in this global economy is to out-innovate the competition. Our growth, and ultimately our success, will be driven by our ability to develop new ideas and technologies and translate them into innovations” (Napolitano 2007).

Central to her perspective is the rise of emerging economies, and their increasing prominence as creators of knowledge. In particular, Napolitano notes China’s position as the world’s leading exporter of information technology products and the country’s nominal advantage in STEM related graduation rates. More recent initiatives by the Arizona Commerce Authority build upon a similar exogenous theme. The ACA notes,

As we enter the 21st century, Arizona companies face new kinds of competition from China, India, and other countries that are shifting their emphasis from providing low cost products and services to developing high-technologies and innovation. Fostering science, technology and innovation is the key for Arizona to retain its competitive edge (ACA 2013).

This exogenous pressure, and the subsequent framing of the subnational as an autonomous global actor, is shared by stakeholders outside government. Science Foundation Arizona (SFAz), a non-profit organization tasked with coordinating Arizona’s public innovation and science

investments, highlights a similar theme in its 2010 analysis of Arizona's innovation ecosystem. The SFAZ notes that what is driving the necessity of economic restructuring and industrial change in Arizona is the presence of "new economic giants like China and India (who) loom over the international landscape; and heavyweights like Brazil, Russia, Mexico and South Korea (who) are building the infrastructure needed for a competitive economy" (SFAZ 2010:6) William Harris, President and CEO of the SFAZ, notes that these new economic powers require jurisdictions like Arizona to acquire a "new level of sophistication and internationalization," in order to compete.²⁷

In testimony to the Arizona Commerce Committee on Economic Development, John Murphy, then-President of the Flinn Foundation (a non-profit foundation focused on building Arizona's bioscience capabilities), noted that "building and attracting knowledge resources to Arizona is a competitive race against other jurisdictions" (Murphy 2006). A general theme emerges in this more contemporary commentary that exogenous pressures from both domestic American competitors and, increasingly, international ones are a new force driving state-level economic policy. In 2012, the Morrison Institute of Public Policy noted in its assessments of Arizona's economic development landscape that "today's globalized economy means that Arizona competes not only with North Carolina, Massachusetts and Washington, but also with China, Europe, India and Sub-Saharan African nations" (MIPP 2012:8).

Similar sentiment is espoused by industry stakeholders interviewed for this dissertation. Steven Zylstra, President of the Arizona Technology Council, notes that China's evolution from "copycat to innovator" highlights the new reality of what global competition means for Arizona.²⁸ Barry Broome, President of the Greater Phoenix Economic Commission, notes similar economic pressures coming as a result of "China and India being on the scene in innovative, high-value sectors."²⁹ Suzanne Kinney, Vice President Policy, for the Arizona Chamber of Commerce, adds: "local competitiveness requires an understanding that domestic business attraction and relocation (from neighbouring states) isn't sufficient. Competition is global with

²⁷ Harris 2013.

²⁸ Zylstra, Steven. 2013. Personal interview, President and Chief Executive Officer, Arizona Technology Council, Phoenix, Arizona, Feb 20, 2013.

²⁹ Broome, Barry. 2013. Personal interview with Barry Broome, President and Chief Executive Officer, Greater Phoenix Economic Commission, Phoenix, Arizona, February 19, 2013.

China, India and Indonesia, amongst others, at the fore.”³⁰. Economic adjustment is no longer premised as either an opportunity or a natural evolutionary process, but rather a systemic-necessity brought upon by exogenous economic pressures emanating from changes in the global economy and their effect on local competitiveness. The theoretical work of Schumpeter and Porter vis-à-vis competition and the dynamics of industrial change are very relevant here.

These perspectives place the sub-national state as an independent economic actor in the global economy. It is influenced, aided and restrained by federal-level policies, but relatively autonomous in the development of economic policy that will facilitate state-level economic growth. This autonomy – and the inter-jurisdictional competition amongst US states – is represented by Arizona’s approach to international trade and international capital. Congruent with the work of Paul (2005) and Thomas (2000, 2011) on the role of US states in investment attraction, Arizona has actively sought to attract emerging market capital to the state. In so doing, however, Arizona has focused on capital investment that aligns with its stated key sector priorities – notably renewable energy and the biosciences. These recruitment efforts are subsequently best termed a search for complementary or strategic international capital. In September 2011, Governor Brewer led a 25-person delegation to China to “bang on doors” in the hopes of attracting Chinese foreign investment to the state. The Governor noted that the state “must reach out to the Chinese because they are manufacturing and investing – they have money. We need to encourage them to come to Arizona and encourage them to create jobs here in Arizona, especially in areas such as solar” (Brewer 2011).

There is, however, a limit to what the sub-national state can do on its own. When interviewed, Fernando Jimenez, the Vice President of International Trade for the ACA, noted that the agency is seeking to streamline its investment attraction efforts by more actively using Federal resources and Federal partners in international markets.³¹ He noted, “rather than having to worry about which cities in China and Brazil to set up an office in, we worry only about reimbursing Federal agencies for their assistance in those markets.” Moreover, Jimenez adds that to compete effectively in emerging markets requires “a level of sophistication that is much more intense than what is required for more local and regional efforts” (ibid). This point of view

³⁰ Kinney 2013.

³¹ Jimenez, Fernando. 2013. Personal interview with Fernando Jimenez, Vice President International Trade, Arizona Commerce Authority, Phoenix, Arizona, February 22, 2013.

certainly contextualizes the role of the subnational and the ongoing collaboration necessary with other orders of government.

The state's efforts have subsequently focused more on a domestic strategy aimed at attracting businesses from neighbouring states, as well as investment attraction from Canada and Mexico. Jimenez terms this approach a means of focusing on "low-hanging fruit" and as being necessitated by a constrained fiscal environment (ibid). These cross-state recruitments or poaching efforts led by the state are best exemplified by the development of an aggressive recruitment campaign aimed at attracting California enterprises seeking to avoid that state's increasing tax regime. While the U.S. Commerce Clause places explicit limits on the discriminatory treatment of products and services from other states, in practice there is no constitutional code on inter-state poaching (unlike the Canadian Agreement on Internal Trade which was designed as a code of conduct related to the use of investment incentives and as a curb on inter-provincial poaching). Moves to attract out-of-state enterprise by Arizona are subsequently not considered illegal.

In November 2012, when California legislators passed tax increases via Proposition 30 and Proposition 39 as a means of raising USD6 billion towards the state's budget woes through a combination of increased sales and personal taxes, Arizona sought to take advantage by developing its "California Attraction and Business Development Strategy" (Watson 2011). The strategy calls for the opening of two offices in California to recruit would-be relocations with a sales-pitch focused on Arizona's low-tax, low-regulation environment. Jimenez explains the move as follows: "Our focus on California makes sense due to both our geographic proximity and the regulatory and cost of operations advantages that we have here in Arizona. They have their reasons to raise taxes, and I admire that, but we need to take advantage."³² Kinney adds that "California is viewed as low-hanging fruit whose policies are understood as having created an opportunity for us."³³ ACA President Sandra Watson supports this view, noting that the attraction of business from other states is the first leg of a three stage economic development and job creation strategy for the state of Arizona, and highlights the establishment of two offices in California as the means of facilitating it (Watson 2013A). She lauds "State leadership (that) has armed us with a suite of incentives and economic tools to create the foundation to be competitive

³² Jimenez 2013.

³³ Kinney 2013.

in these areas.” As of the end of 2012, the ACA estimated that 18% of its pipeline of potential business starts would be relocations from California. (Watson 2013B). This strategy highlights the precedence of a push for regulatory flexibility, notably as it relates to wages and taxation, as a tool for industrial promotion.

Two levels of competition

Two valuable insights emerge from this review of the domestic and international drivers that shape Arizona’s role in the global economy. On the one hand there is an explicit acknowledgement of the pressures created by emerging economic actors such as China and India on domestic companies. As noted by several industry stakeholders, there is a broad agreement on the competitive threat posed by these evolving innovation economies, and the subsequent need to re-strategize Arizona’s policy response. Related to this process of strategic refocusing is an acknowledgment of the need to diversify away from what is described by both government and third-party stakeholders as “low value” industries (construction and tourism) towards “high value” industries (science and technology). Accompanying this acknowledgement of international competitive pressures is an understanding of the state as a distinct and autonomous economic actor who competes equally with other U.S. states. Jimenez notes, “At the end of the day we’re all competing for the same pool of foreign companies who might set up shop in the U.S.”³⁴

The subsequent policy responses take two shapes. The first is what one senior-level interviewee at a state university termed a “shoot anything that moves” approach that focuses on poaching and relocation efforts from neighbouring states, irrespective of industry.³⁵ Fernando Jimenez admits this is, in part, true, explaining that while the state is loath to invest significant incentives into low-wage industrial relocations, “we still want them.”³⁶

The second is a medium and long-term approach focused on the attraction of high-value industry and the development of such industry at home. As Jimenez notes, “the majority of our incentives are geared towards the development of high-quality jobs in our targeted sectors”

³⁴ Jimenez 2013.

³⁵ Interviewee wished to remain anonymous.

³⁶ Jimenez 2013.

(ibid). We now turn to an analysis of these developmental efforts and how they meld the public and private into a collective competitive effort.

In her 2007 State of the State address, Napolitano builds an argument for an active economic role for the state beyond providing the basics of enabling infrastructure. In particular, she develops a narrative around an expanded state role, notably as an investor in nascent private enterprise. She notes,

“The commerce and economic development commission has a strategic investment fund that has been used recently to pay for the agency operations rather than to jump start businesses across our state. Product development cycles are moving so much more quickly today than ever before which means startups and existing businesses alike need to train workers just as quickly and modify infrastructure in order to keep up...The right investment at the right time can make all the difference and can literally be the difference between the creation of the next Microsoft and an inventor whose product never leaves the drawing board in his garage” (Napolitano 2007B).

The sub-national state herein is far more than a provider of educational and economic infrastructure, and more than an export-promotion or capital attraction agency. Rather by becoming a direct or indirect investor in domestic enterprise, the sub-national state becomes a market participant, helping shape the prospects for competition in a very direct manner.

The 2010 Arizona Governor’s Commerce Advisory report goes further, noting that “(a)s states compete globally, they must use every resource, tool and asset they have to recruit new companies, retain existing ones and help them grow” (GCAC 2010:8). Beyond the state as investor, the state becomes both creator of new markets and supplier of resources, be they financial and knowledge-related, to those markets. This role is far more interventionist than what is proposed in the related theoretical literature. Survival in this environment is subsequently positioned as requiring controlled adjustment in policy and industrial-focus. And while much is made of Arizona’s right-to-work status and the labor cost advantages this affords, as well as the states push for low personal and corporate taxation, business cost competition is viewed as insufficient to facilitate this transformation. As Rex and Hoffman (2012:1) state, “The United States, and each of its states, cannot compete for these industries on the basis of cost, with

competition now coming from countries such as China and India. In the past, Arizona attempted to attract cost-sensitive operations but that strategy is no longer viable, even though the state's labor costs are less than the national average. Instead, Arizona ... in the 21st century must compete based on innovation and the development of new and better technologies.” Success in this environment thus requires the state to play a more complex role than what is envisioned by Cerny. Jessop's SWS and Mazzucato's work on the Entrepreneurial State are far more relevant but on their own, they too likely understate the leading and diversified role of the state in the development of the new technologies, new sectors and new firms.

The state's role in catalyzing transformation

Since the mid-2000's, Arizona's push for adjustment has followed this path and has focused on developing a knowledge-economy able to withstand the competitive pressures emanating from both international economic forces and more local structural ones. As then-Governor Napolitano noted in testimony to the US House of Representatives Committee on Education and Labor, “The answer (to America's competitiveness challenge) is innovation, and the solution lies in our states... we believe states are the engines for change” (Napolitano 2007A). She goes on to note that states are “major investors in the essential tools” required to create an innovative economy. These tools are primarily educational and premised on the provision of primary to post-secondary education, and an ongoing focus on science, technology, math and engineering (STEM) therein. However, beyond the basic foundational element, Napolitano extends the role of the state to include its role as “the architect of policies that cultivate innovation” (ibid).

Third-party facilitation

Central to the state of Arizona's transformation from its traditional '5C' drivers of economic activity to a desired knowledge economy is Science Foundation Arizona (SFAz), a third-party, non-profit organization established in 2006 with funding derived from primarily public funds, though with significant private additions. SFAz provides research funding to partner universities but also operates several technology-focused programs that channel funds directly to private enterprises. This funding is aimed towards the development of company formation and high-tech job creation.

SFAz was created in 2006 as part of House Bill 2477, sponsored by Republican representative Richard Koponicki, which established the *Arizona 21st Century Competitive*

Initiative Fund (hereafter referred to as ‘the Fund’). The Bill sought to appropriate state funds (USD35 million agreed upon after an initial request of USD50 million) “to build and strengthen medical, scientific and engineering research programs and infrastructure to enhance the state’s competitiveness in the global economy” (Arizona 2006). In so doing, the Bill responds to various public and private views on the state of Arizona’s competitiveness and the transformation the state requires in order to compete in the global economy. In comments related to the need for such a funding mechanism, Don Budinger, the founding chairman of the SFAz and a private-sector stakeholder on the Governor’s Council on Information Technology, noted “we will need to develop statewide proficiencies in the industries of the future so our citizens are prepared to be competitive and prosperous with the economic realities of the 21st century” (Budinger 2006). Funding for the SFAz is premised on this basis, and was first proposed as part of a 2006 initiative by then-Governor Napolitano to address the perception that Arizona was unprepared for these economic realities. As Charney et al (2007:3) note, “the overarching goal of SFAz is to serve as a catalyst in the construction of a knowledge infrastructure in the state of Arizona that will help position the state to meet the challenges of the global economy.”

Governor Napolitano’s “Innovation Arizona” initiative (which was eventually pushed aside by parallel House-led efforts on the Fund) sought to transform the state into the “high-tech powerhouse it can be,” by investing in research and innovation that “will transform us into a nerve center of new ideas” (Napolitano 2006). Her plan focused on several key industries, notably sustainable systems technology, nano-tech, bio-tech, defense-tech, aerospace tech or new communications and information technologies. Negotiations between Arizona Republicans and Democrats eventually saw Innovation Arizona give way to the House sponsored HB2477. Unlike Federal funding agencies such as the National Science Foundation that funds basic research with no focus on commercialization, the Fund and SFAz explicitly seek “to support research with near-term commercial value” (Charney et al 2007:3). Moreover, the funding provided through the Fund is in the form of direct grants, not venture capital investment or loans. And while a portion of the Fund is reserved for horizontal, institutionally-based research, Fund components

such as the Small Business Catalytic Funding program and Strategic Research Groups (that both seek to facilitate technology transfer and commercialization) prioritize direct corporate grants.³⁷

While in Committee the Bill and its central tenet of state support for research was contested due to perceptions of overt state activism, in public it received largely bi-partisan support. Said Tim Bee, then-Arizona Senate President (Republican), "To compete in the 21st Century global innovation economy Arizona will need to stay on the leading edge of technology, create and attract new companies, and build a high quality workforce...Our state cannot be competitive on a global scale without investments like this (SFAz)" (Alltucker and Benson 2007).

In his presentation of the Bill to Committee, Senator Koponicki compares the technological infrastructure that it seeks to enable with efforts begun at the turn of the 20th century to develop a system of canals whose irrigation capacity helped usher in the state's agricultural development. State investment in technological research is presented as a similar, foresight-driven initiative which portends long-term economic development (Koponicki 2006). The role of the state is therefore positioned as enabling the infrastructure (research) necessary for growth, rather than a direct participatory role in that growth.

However, and as several Arizona representatives note in their response to the proposed Bill, defining research as infrastructure is highly subjective, and depends in large part on the ownership of said research assets. Where commercialization and private ownership are the ends of research activity, the public can be perceived as having created not public infrastructure but rather a private good. This begs a clearer definition of public and private, one that is highly confused in the SFAz. For while the actual legal structure of SFAz is as a non-state entity, its funding sources and funding recipients highlight the participant role that the subnational state adopts vis-a-vis industrial promotion and the provision of corporate support to targeted industrial sectors. As Napolitano noted in her testimony on the establishment of the SFAz, "organizations like SFAz give states the flexibility to adjust to new paradigms more quickly and efficiently, and stay competitive in a global economy" (Napolitano 2007). And as will be shown throughout this

³⁷ Direct granting through the SFAz is complemented by the 2001 introduction of Proposition 301 which created a 0.6% sales tax increase for education which is directed to Arizona universities via the state's Technology and Research Initiative Fund. Between 2002 and 2007 the tax is estimated to have raised over USD112 million for investment in the State's horizontal efforts.

case study, the rhetorical call to flexibility that third-party organizations such as the SFAz or the more recently established Arizona Commerce Authority (ACA) afford, has become a means of distracting what is in effect a more interventionist or activist role of government in the development of new sectors of the economy. For where taxpayer dollars are used to selectively subsidize business activity or business formation, the evident conclusion is a participatory role for the state in the economy.

William Harris, President and CEO of the SFAz, describes the organization's creation and the blurred lines of public and private authority therein as follows:

“The design of the SFAz was meant to be independent of government in some respects, such as day-to-day management, but ultimately was meant to be the tool that could execute on the aspirations of the state to create a diversified economy. The state suggested areas of need and focus, and given they were the source of our funding, they quite heavily regulated or guided where and how we operated. We were third party to government but because of the source of our funding, we were very much tied to their wishes and had to ask their permission on strategic investments and initiatives.”³⁸

What is subsequently presented by the state as a private or non-government agency which invests in specific targeted industries and enterprises is thus in reality a quazi-public, if not fully public, agency that allocates public revenues towards private economic activity.

Senate documents highlight that this contrast between stated rhetoric and actual practice was evident at the time of the organization's creation. Opposition to HB2477 was then premised on the Bill's active promotion of industrial activity and its perceived intervention in the market by using research funds as a cover for private gain. For example, while generally supportive of the Bill's aims, Senator Ken Chevront questions the use of public funds for private industrial activity, noting

“At what point do we stop infusing public tax dollars and let the market work... I can only be concerned when we use state dollars for private and corporate gain but underfund

³⁸ Harris 2013.

our research universities. We should be giving people the tools to succeed not giving companies (in particular sectors) an unfair advantage” (Cheuvront 2006).

Cheuvront interprets the Bill not as providing infrastructure for public economic and academic activity that may eventually yield both public and private gain but rather as subsidizing a private good to select private market participants. Thereafter the sector specificity included in the Bill, notably the prioritization of the bioscience sector, is seen as “picking winners” and a direct state intervention in the economy through the discriminatory subsidization of one set of market participants at the expense of others (Blendu 2006). As Senator Barbara Leff, chair of the Senate Commerce Committee for Economic Development, notes “Through sector specific policy, we pick winners and losers while the rest subsidize them. Government shouldn’t be choosing individual businesses” (Leff 2006). This selectivity or subsidization comes in the form of both direct grants to private companies and private-public partnership, as well as sector-specific tax policy that provides significant tax advantages to industrial participants in the areas of economic activity the state has chosen as key to its future: the life sciences, renewable energy and technology.

In response to the aforementioned critiques, Representative Koponicki states explicitly that the state has a direct role in economic issues, “not to interfere in the marketplace but rather to create a marketplace” (Koponicki 2006).³⁹ The market is therefore viewed as the infrastructure upon which public and private economic gains can be made. Were the role of state simply to provide export or marketing assistance, this perspective could be interpreted as consistent. However, by subsidizing the supply of private goods in that market, whether directly through private enterprise or indirectly through the triple-helix model, as well as directing the specific choice of industries which benefit from state funding, it is clear that the state has taken on far more than simply an infrastructural role and rather has become a distinct actor in the determination of prices in these markets for knowledge.

In both the House and Senate, despite explicit reservations and critique of the Bill’s prioritization of specific sectors and selection of private-sector recipients, the Bill was approved

³⁹ The debate over the role of the state in the economy in Arizona is not new. In 2006, the Arizona Department of Commerce issued USD350 million in taxpayer-backed bonds on behalf of the municipality of Chandler, Arizona to finance the expansion of Intel Corporations local facilities.

overwhelmingly by both Republicans and Democrats. Her critique of “picking winners” aside, Senator Leff goes on to note that government can, however, “pick the way we want to grow and technology and new ideas are the way of the future” (Leff 2006). The language of industrial policy or of picking winners is thus used as a means of creating a public record of supposed fiscal propriety all the while ensuring the continuation of such policies through the enactment of the Bill.

The establishment of the SFAz, and the vigorous debate which accompanied it, highlights the tension that exists between light and heavy market participation by the state and the all-together ambiguous definition of public and private in the realm of economic development. While HB2477 approved the creation of the SFAz, and in so doing quietly approved a more activist role for the state government in economic planning, it did so despite prevailing political rhetoric against corporate welfare or the subsidization of private activity. A willingness to remove the state from an activist role in the economy is thus largely confined to political rhetoric but not legislative action.

A secondary question thus emerges as to what explains this schizophrenic (and bipartisan) support for measures identified by both sides as picking winners? A potential explanation lies in the public support voiced by Arizonans for science and technology investments by the state. A March 2006 survey of 736 Arizona residents by the Morrison Institute for Public Policy highlights this broad support (MIPP 2006). In particular, the survey finds that 63.5% “would be more likely to vote for an Arizona candidate for statewide office who places a high priority on strengthening science and technology research in the state.”⁴⁰ ⁴¹ Only 9.6% believe such investments to be reason to vote against. And while this support is highest amongst high-income, male, Democrats, the survey sample’s bipartisan self-identification builds credibility for the argument that investments in technology and research are interpreted by the public as broad public goods. Moreover, while traditionally presented as a right-wing, less government state, the survey reports that over 70% support “paying more in taxes if that money

⁴⁰ Such views largely mirror national survey results whereby more than 80% of those polled say they are more likely to vote for a gubernatorial candidate who supported strengthening science and technology.⁴⁰

⁴¹ In a previous January 2005 survey, forty-two percent of Arizonans said the state was “not as good as most other states” on the “availability of good-paying jobs. The political repercussions of this perception should be not discounted.

were used to support science and technology research that creates new jobs in Arizona” (MIPP 2006).

Belief that such investment will facilitate the creation of new jobs is equally high. Over 85% of respondents feel that “developments in science and technology contribute to the creation of new high-paying jobs” (ibid). The importance of job creation in public investment decisions is further supported by survey results that highlight that 82% of Arizonans polled ranked “creating jobs in Arizona” as “extremely” or “somewhat important” as it relates to the development of alternative energy industries (MIPP 2011). The Morrison Institute concludes that “Arizonans seem to assume that our economy must be based on leadership in science and technology...In turn, Arizonans support science education and are open to spending more on science and technology to get more.”

This support for spending more on science and technology, and the support for politicians who advocate for such strategic funding, thus provides significant space for political actors on both sides of the Arizona spectrum to support initiatives like the SFAz. This support can take place no matter their reservations regarding the ideational or ideological merits of the program. Those with significant constituent opposition to the subsidization of private activity can frame their support as it relates to the provision of public goods through research and development conducted at public universities. The perceived minimization of the role of private industry in that research, and most important, silence related to the eventual private commercialization of this public research lends itself to the mitigation of potentially negative constituent feedback. Electoral concerns, a primary driver of political actor-ness, are thus minimized in this pursuit of economic transformation.

The SFAz has thereafter played an important role in the state’s efforts towards industrial transition. While this dissertation does not set up to evaluate the effectiveness of the policies being studied, it is instructive to delve into a brief analysis of the SFAz in relation to stated goals and mission upon its inception. Since its creation in 2006, the SFAz has allocated USD120 million in direct grants - USD37 million for educational initiatives and over USD80 million for 101 research and innovation projects conducted by university and private-sector recipients. This latter research allocation is held up as responsible for the creation of 22 new private enterprises, 179 patents, 16 technology licenses and 1776 direct new jobs created. Moreover, the SFAz’s

analysis states that these new employment opportunities far out-earn state wage averages with a USD75,000 average wage versus a state-average of USD42,000. A third-party study conducted by the Battelle Institute estimates that the SFAz is responsible for a total economic impact of USD592 million (Battelle 2013).

Despite these benefits, and despite the fact that the focus on transformative economic policy has been largely bipartisan, the SFAz has not escaped budget pressures. Thus in 2008, in the midst of the North American economic crisis, the Arizona Senate sought to appropriate funds from the Fund in order to cover lost revenues. Arizona Senate Bill 1001, signed into law on January 31 2009, emptied the fund of USD22.5 million and dumped it into the state's general fund (Ross 2009). This fiscal rationale, however, was accompanied by an ideologically-underpinned argument from Republican senators such as Sam Crump related to the perception that the SFAz and the 21st Century Competitive Initiative Fund acted as forms of direct intervention into markets. Crump led the initial push to pull funding from the Fund noting that rather than providing necessary research infrastructure, it operated to "give millions of dollars to private ventures" (Crump 2009). While initially successful in appropriating money from the Fund through the legislative budget process, SFAz CEO Harris notes that thanks to efforts by the Governor and the Speaker of the House, both Republican, the appropriation from the SFAz was overturned and with it, the provision for private industrial support through public funds left intact.⁴²

Pipeline entrepreneurialism

The establishment of the 21st Century Competitive Initiative Fund and the SFAz provide contemporary evidence for the role of public dollars in private entrepreneurial activity. This highlights the role of the state as a participant in chosen economic markets, whereby the state heavily influences both the supply of entrepreneurial activity through a push for the commercialization of public research, as well as the cost structure that these private participants face with an assortment of funding mechanisms and tax incentives. Despite rhetorical opposition to the economic activism of the state by some members of the Arizona House and Senate, the policies enacted have continued relatively unimpeded by ideological reservations. In so doing, Arizona has continued to position public tax revenue as central to the transformation of private

⁴² Harris 2013.

economic activity, notably in specific knowledge-economy or innovation-focused sectors of the economy. This application of public funds to a discriminatory industrial strategy is enabled by successive political regimes which have publicly defined support for private innovation as support for public research. Such efforts began in November 2000 when Arizona voters approved Proposition 301 which mandated a .6 percent sales tax increase to be directed towards statewide education efforts. At passage, it was estimated that Proposition 301 would contribute USD460 million annually to the state's education system in years 1 through 4 and upwards of USD780 million by year ten (MIPP 2001). In so doing, Proposition 301 was positioned as a means of improving the state's theretofore weak ranking in K-12 education metrics, as well as to better prepare students for the high-value, high-knowledge economy which was anticipated as the state's future. Alongside these K-12 efforts, however, was a twelve percent contribution of aggregate Proposition 301 funds specifically earmarked for university research and development efforts. Like the subsequent *21st Century Competitive Initiative Fund*, these funds are directed to the state's university research institutions under the guise of public research and development. Thereafter, however, the Proposition's explicit prioritization of private industry involvement, as well as language and criteria that promotes commercialization and technology transfer to the private sector, highlights the very immediate private impact of such public funding. This programme most closely resembles Mazzucato's (2013) thesis on the *Entrepreneurial State*.

Basic research remains eligible for funding, however, the focus is placed on targeted industrial purposes in targeted industry. As of 2012, this contribution, known as the *Technology Research Initiative Fund (TRIF)*, is directed primarily towards three areas of industrial research: bioscience, renewable energy and sustainability, and optical sciences (ABR 2012).⁴³ These funding priorities are unsurprisingly mirrored by the key sectors identified by the state as integral to Arizona's ongoing economic development. Since 2002, TRIF has distributed an aggregate USD572.5 million to the state's public research institutions. The breakdown of this funding by industrial focus is as follows: USD180 million for life sciences (bioresearch), USD34 million for renewable energy, and USD15 million for optical sciences (ibid).

More interesting than aggregate funding, however, are the results of the TRIF focus on technology transfer and commercialization. An analysis of annual funding reports issued by the

⁴³ An additional, and significant, share of TRIF funds are allocated towards e-learning and other educational research initiatives.

Arizona Board of Regents since the introduction of TRIF funding in 2002 allows for the development of a comprehensive picture of how public funds are channeled into private enterprise. The following table highlights the aggregate number of patents, licenses and startup companies formed with TRIF funding, by industrial sector.

Table 2: TRIF Outputs 2002-2011 by sector (ABR 2012)

Industry: Lifesciences / Bioscience	2002-2011
• Patents issued	246
• Start-up companies formed	57
Industry: Solar/Renewable Energy	(since 2007)
• Patents issued	10
• Licensing agreements	7
• Start-up companies formed	5
Industry: Optical Sciences	2002-2011
• Patents issued	222
• Start-up companies formed	11
Industry: Other TRIF-related Technology transfer	2002-2011
• Patents issued	142 ⁴⁴
• Start-up companies formed	51

While statistics are not kept on the number of employment opportunities created as a result of this research output, the aggregate number of start-ups created (124) as well patent issuances (622) indicates that the commercialization aims of TRIF are relatively well served by the process of institutional-industry partnerships defined therein. Stakeholders interviewed noted that entrepreneurial activity has “exploded” over the past decade.⁴⁵ William Read, Vice President at the Flinn Foundation, argues when interviewed that “without a very large R&D pipeline that comes from the university sector, we cannot effectively support the growth of markets in the

⁴⁴ Patent numbers for 07-11 are not available and are thus approximated based on 02-06 trend.

⁴⁵ Zylstra 2013; Harris 2013.

biosciences.”⁴⁶ Moreover, as William Harris of the SFAz argues, criticism directed at public funding of industrial research misses the mark. Read notes, “Traditionally we have had an industrial policy formed through the Department of Defense and the NIH. Both are industrial support systems without calling them such. And while you don’t want to get caught picking winners and losers, you need to do research to stimulate innovation and entrepreneurship. It builds the industry infrastructure necessary to compete” (ibid).

And to be sure, the type of technology transfer present in Arizona is not necessarily unique. Universities exist to create knowledge. However insofar as the aims of the TRIF and of this component of Proposition 301 are focused on commercialization over and above traditional funding for basic research, it provides a valuable example of how the subnational state has become more explicitly active in economic promotion, albeit in somewhat stealth or indirect fashion. By targeting specific economic sectors for this commercialized research strategy, the state has blurred the line between what is defined as industrial or economic funding and what has traditionally been viewed as basic scientific or academic research. Moreover, interviewees noted that this explicit prioritization of commercialization depends significantly on the brokering role of the SFAz.⁴⁷ As one (anonymous) interviewee noted, “Collaboration with the universities, that is commercialization of public research, allows the state to avoid delving into the conversation about picking winners.” Again the distinction between public and private is opaque and renders our understanding of the state as one that is far more active or entrenched in private activity than is commonly thought.

Explicit industry-targeting

Further blurring the public-private divide is the structure and status of the state’s economic development agency, the Arizona Commerce Authority (ACA), and its prioritization of four key industry sectors. Like earlier iterations of Arizona’s transformation strategy, the ACA is premised on the need to transition “the Arizona economy to one that is more diversified across core industries and growth sectors like science and technology, aerospace and defense and renewable energy” (Arizona 2010). While the aerospace and defense industries build on longstanding competencies, and large corporate anchors, the other two are considered by both

⁴⁶ Read, William. 2013. Personal interview with Williams Read, Senior Vice President Research, Flinn Foundation, Phoenix, Arizona, February 21, 2013.

⁴⁷ Zylstra 2013; Broome 2013.

government and non-government stakeholders as “new” constructed sectors that are actively being promoted for their revenue and employment growth potential. Attempts to extend favourable incentives to other sectors, notably the film industry, have failed owing (according to industry stakeholders) to the “low value / low quality” perception of wages/employment in the industry.⁴⁸ ACA Vice President Fernando Jimenez, notes: “The incentives we bring to the table are designed towards high-quality jobs in our targeted sectors. We’ll welcome other jobs but the incentives at our disposal are reserved.”⁴⁹

Before delving into the issue of targeting, a review of the ACA’s evolution is instructive insofar as it, again, points to the permeable public-private boundaries that exist, and as this dissertation argues, are encouraged as part of the state’s economic evolution. While previous iterations of Arizonan state economic policy saw the Department of Commerce (DOC) take the lead, in 2010 new Governor Jan Brewer formed the Arizona Commerce Authority (ACA) as a “more flexible and efficient” replacement for the DOC (Brewer 2010). Created by a Gubernatorial Executive Order, the ACA is designed “to grow and diversify Arizona’s economy and create quality jobs for its citizens by supporting and attracting business in targeted, high-growth clusters” (ACA 2012). This language is little differentiated from previous language describing the role of the DOC, nor from the driving forces behind the *21st Century Competitive Initiative Fund* as described earlier.

Developed by the Governor’s Commerce Advisory Council (GCAC), the ACA is envisioned as a “quasi-public” state authority whose mandate, while largely similar to previous Department of Commerce mandates, would be more effective as a result of its private-sector leadership and a-political operational structure (GSAC 2010). Commissioned by Brewer, the GCAC was premised on the following perception of Arizona’s economic position: “Like all other states, Arizona is in a competition for the improvement of our economy, and yet, we have limited resources to compete for and attract new jobs – not only with forty-nine other states, but with a global market” (Brewer 2010B). It seeks to overcome what the GCAC, and the majority of stakeholders interviewed for this dissertation, identified as an absence of a clearly defined

⁴⁸ Kinney 2013.

⁴⁹ Jimenez 2013.

economic develop vision, insufficient funding, and persistent cutbacks that had hampered the Department of Commerce.⁵⁰

Don Cardon, the first, and since replaced, chief executive of the ACA, noted that the authority was developed to “significantly and deliberately advance Arizona’s economic future into a pronounced global competitiveness position” (ACA 2010). Doing so, and doing so more effectively than the traditional public sector Arizona Department of Commerce, was premised on the development of a public-private partnership developed via the ACA’s 31-member board of directors which includes 19 private sector CEOs, the President of the State Senate, the Speaker of the House of Representatives and the Governor, who serves as chair. As Governor Brewer noted upon its inception, the ACA is designed to “transition to a private authority to the greatest degree possible” and in so doing, create a “new model (that) governs and administers outside of tired old politics ... and looks to entrepreneurial minded people to overcome many of the challenges institutional thinking simply falls short of accomplishing” (ACA 2010B, ACA 2010C). Appointed industry leaders oversee committees formed over each key sector and are tasked with the development of recommendations for public policy.

However, while these structural changes have added a layer of private oversight and engagement to Arizona’s economic development policy, what these changes mean in practice are far less clear. The ACA’s goals related to the long-term advancement of the Arizona economy are no different than those of the previous Department of Commerce. A primary focus on tax reform and the “establishment and preservation of the economic tools that are vital to advance Arizona’s global competitiveness” is largely undifferentiated from the previous regime (ACA 2010C). Moreover, while much is made of the Authority’s semi-public status, the ACA itself notes “the need for a state-led retention program in Arizona cannot be overstated,” and boasts of a portfolio of 18 state programs and tax credits available in the aforementioned knowledge-industries (ACA 2010C). When questioned on the ambiguous status of the ACA, Vice President Jimenez admits that “we’re quazi-private but ultimately represent the state’s economic development efforts and work on a state mandate and through state funding.”⁵¹

⁵⁰ Broome 2013; Zylstra 2013; Kinney 2013.

⁵¹ Jimenez 2013.

The line between public and private is thus exceptionally unclear and mimics the presentation of the SFAz and public-research commercialization as private. Furthermore, the operational funding for the ACA and its funding programs is still fully taxpayer provided, as are grant funds available from the ACA administered Arizona Competes Fund. And while semi-private oversight has sought to increase the effectiveness of the commerce authority, it now costs more to do it. Full-year operational funding for the previous Department of Commerce was USD6,083,500 for FY 2010 while in 2012 the ACA was allocated a full-year operational budget of USD10 million.

Moreover, while the introduction of the ACA is designed to eliminate waste, it does not (nor does it purport) to reduce the use of subsidies or support for corporate entities. A common refrain in interviews with industry stakeholders is the importance of the “tools” now available to the ACA to attract and develop competitive private economic activity. These tools, in particular House Bill 2001 passed in July 2011, the Governor’s landmark Arizona Competitiveness Bill, provide a series of supply-side tax reforms aimed at lowering the cost of business in the state. Such reforms however have a definite quantitative impact on state revenues and must subsequently be considered as costs to the state. Moreover, given inter-jurisdictional competition for capital and business retention, the nature of such fiscal benefits enjoyed by recipient organizations are indeed a type of state subsidy, albeit one currently beyond the definitions utilized in most analyses. When asked whether the prioritization of industry sectors and the apportioning of public funds to private enterprise created any controversy internally, Jimenez responds as follows:

“It’s not controversial as we have safeguards in place based on metrics, be it job creation, salary levels and benefit components. The money we invest in a company has to be matched by what we believe their return to the state will be. And if they don’t hit predetermined milestones, we have the right to claw back funding.”⁵²

The right to claw back funding can be interpreted as a means of mitigating the definition of such targeted preference, and transforming what can be perceived as direct investment into a contingent grant. Furthermore, what is unique within HB2001 is the presence of the Arizona

⁵² Jimenez 2013.

Competes Fund (ACF), colloquially known as a “Deal Closing Fund”, that provides USD25 million in funding to attract and retain “business projects that stimulate and promote industries that provide stable, high-wage jobs” (ACA 2013B). The fund is noted as integral to improving the state’s ability to compete for business and investment in all of the targeted industries (Klein 2010).

Accounting for both the tax reductions included in HB2001, as well as the direct and conditional transfers to private firms, Arizona’s Joint Legislative Budget Committee found that the measures contained in HB2001 would cost USD38,200,000 in Fiscal Year (FY) 2012, growing to USD538,000,000 in FY 2018, when all the provisions are fully implemented (Arizona Legislature 2011). Given the nascence of the Bill and its funding mechanism, there has been no economic analysis of the funding heretofore provided. This package, however, highlights the mix of flexibility and activist inspired strategies used by the state.

The significant budgetary impact of the Bill was the premise for vigorous debate between House Democrats and Republicans prior to the Bill’s passing in February 2011. Critics of the ACF, notably groups advocating for free enterprise and minimal governance (Americans for Prosperity and the Goldwater Institute), highlight such programs as a new form of sector-privileging industrial policy (AFP 2012). In contrast, Representative Jack Harper (chair of the House Ways and Means Committee) and the Bill’s primary sponsor then-House Speaker Kirk Adams, defended the Bill as a great example of supply-side economics, noting that it was designed to better position Arizona “to compete with other states and other countries for capital and jobs” (Adams 2011). In comments made at a Special Session of the House Ways and Means Committee prior to legislative debate of the Bill, Harper commented that the state government must “bring manufacturing back to Arizona, and bring back “Made in America,” and this Bill was a means of doing so (Harper 2011). Public stakeholders who testified in favour of HB2001 in front of Legislative Committee included Glen Hammer, the President of the Arizona Chamber of Commerce, who noted that the proposed legislation would better position the state as “the solar and renewable energy capital of the world” because of the state’s forward thinking policy environment (Hammer 2011).

As of early 2013, the ACF had disbursed USD7.2 million to six companies whose operations are listed as renewable energy, healthcare, and technology (Watson 2013B).

Allocations of the USD25 million Arizona Competes Fund are limited to these industrial sectors thus indicating the depth of preference allocated to these industries. ACA CEO Sandra Watson justifies the investments made into ACF recipients by noting that “these, innovative high-growth industries bring with them high-wage, quality jobs and foster future-focused, cutting-edge research and development” (Sunnocks 2013). A further USD3 million in direct grants are available through the ACA’s Innovation Challenge, again targeted at the aforementioned key growth industries.

Across state programs, two industries in particular are highlighted as targets for funding and for industry development. The following short case studies focus on the development of Arizona’s renewable energy and life sciences industries respectively, and showcase the role of the sub-national state in their emergence.

Case Study: Renewable Energy

The state’s solar industry has become a national leader based on industry employment thanks in part to generous policies that provide preferential tax treatment for the sector, worth upwards of USD70 million per year. The “Renewable Energy Tax Incentive Program” went into effect in January 2010 and seeks to “encourage business investment that will produce high quality employment” in the sector in Arizona (Arizona Legislature 2010). The program offers up to USD70 million in annual credits tied to the creation of employment in the state, of which a minimum fifty percent share is mandated to be high-wage. High-wage is defined therein as job creation at 125% or more of the state’s annual wage. According to Governor Brewer, the privileging of the solar industry is premised on this high-wage employment creation as well, as the view that the solar industry “employs 15 to 30 people per megawatt of power installed compared to six to 8 people in traditional energy sources” (Eckhart 2011).

The focus on renewable energy is part of the ACA’s strategy “to bring industries of the future” to Arizona, a strategy that Cardon notes will ensure “high quality, high-paying, stable jobs” to the state (Brewer 2010C). Brewer notes that since 2010, when Arizona’s Renewable Energy Tax Incentive Program became effective, nine renewable-energy companies have located or expanded operations in the state creating more than 2,100 jobs and over USD1billion in capital investment. On aggregate, the industry contributes over USD2 billion to Arizona’s economy and accounts for approximately 16,000 jobs (O’Grady 2012). The aforementioned

2010 tax reforms that sought to privilege the sector received significant support from stakeholders including the Greater Phoenix Economic Commission (GPEC), and the Arizona Association for Economic Development. Barry Broome, President of GPEC, notes that his organization's support for the policy stems from a structural analysis centred on the need to create a viable export-oriented industry in the state.⁵³ This support includes what Broome notes was a significant role in the development of the language of the legislation. He adds, "On solar and renewable energy, we recommended that the sector be supported and developed here in Arizona, not because of global warming or the desire to lower our carbon footprint, but rather because we have a dearth of export opportunities in Arizona and need to develop new ones" (ibid). Support for renewable energy can also be attributed, in part, to public belief in Arizona that the industry is likely to provide significant job creation (MIPP 2011). More broadly, polling conducted by the National Science Foundation indicates that a majority of Americans said "the government spends too little on developing alternative energy sources, and most favor providing incentives for using solar and other alternative energy sources" (NSF 2012).

The focus of the state's effort with regards to the renewable or clean energy sector has been focused on a reduction in taxes. This focus on business climate and the regulatory environment in which this sector operates is certainly congruent with the competition state thesis. And while funds made available through programs such as the Arizona Competes Fund (ACF) and TRIF research commercialization program have complemented this business climate focus, the development of Arizona's renewable energy sector has focused primarily on the attraction of out of state investment through these aforementioned tax levers.

Case Study: Life Sciences

Equally targeted by ACA policy for preferential treatment is the bioscience sector. In contrast to the primary use of tax incentives seen in the development of the state's renewable energy sector, Arizona's bioscience sector has been developed thanks to a far more activist role played by the state.

While of little consequence to the economy beyond the immediate hospital and healthcare sector prior to 2000, the sector now generates near USD29 billion in annual economic activity in the

⁵³ Broome 2013.

state including payment of USD1.1 billion in state and local taxes.⁵⁴ As several industry stakeholders pointed out when interviewed, while Arizona's economy lost over 350,000 jobs over the course of the post-2007 economic crisis, and while private sector job growth in the state has averaged zero percent since 2009, bioscience sector employment has grown by over 11 percent. These figures are found across both state and industry communication efforts, an evident means of justifying state investment into the sector through the ACA, as well as complementary efforts via the SFAz and philanthropic organizations such as the Phoenix-based Flinn Foundation. This latter group is credited with building the framework for industry development that has subsequently been adopted by the state.

Dr. William Read, Vice President of the Flinn Foundation, states that his organization, along with external consultants, developed a road map for the industry in 2000 and subsequently advocated for its adoption and support by the state. "We wanted to use (the roadmap) as a means of getting everyone – public and private – speaking the same language."⁵⁵ Dr Michael Crow, President of Arizona State University, describes the industry's development as follows: "Ten years ago, leaders from the public and private sectors launched our state on an ambitious trajectory towards economic competitiveness ... in the conviction that Arizona could become one of the nation's foremost biomedical research and bioscience commercial centers" (Crow 2013). And while Read notes his apprehension as to the ongoing commitment of the state towards the industry, the results so far seen speak positively and reflect in part several billion dollars worth of public investment in both direct and indirect funding for the industry. Proposition 301 has allocated USD185 million towards the sector, and has facilitated the creation of 246 patents and 57 startup bioscience companies. Funding from the Arizona Competes Fund administered by the ACA has facilitated the creation and retention of 1000 private sector jobs in the sector. And funding from the ACA's Innovation Challenge and EZ Grant programs has seen more than forty percent of total funding allocated to the sector. The Flinn Foundation notes that since 2002, jobs in the non-hospital bioscience sector have increased by 56% in Arizona, compared to the industry's average 12% growth in the United States over that period. Over the same period, the number of Arizona based bioscience firms has increased 31% versus the US

⁵⁴ Koerber-Walker, Joanne. 2013. Personal interview with Joanne Koerber-Walker, Chief Executive Officer, Arizona Bioscience Organization (AZBIO), Phoenix, Arizona, February 22, 2013.

⁵⁵ Read 2013.

bioscience average of 23% (Flinn 2012). This adds up to what Dr. Crow describes as having “succeeded beyond all expectations” (Crow 2013).

Moreover, these results speak to more than just the rapid development of an industry, and rather highlight that competitiveness is the product of specific strategies and policies geared towards giving the state a competitive advantage both globally and within the United States. As Suzanne Kinney, Vice President Policy at the Arizona Chamber of Commerce notes, building a competitive sector has meant “positioning the state against the strength of the Eastern US bioscience sector. Our newcomer status has meant we have had to identify our niches and opportunities so as not to get drowned out in the market.”⁵⁶

The industry’s development has subsequently been facilitated by a two-pronged strategy that has used public funds, including the Arizona Competes Fund, to help attract and anchor large bioscience tenants all the while priming both the university-led research pipeline and private entrepreneurial activity with additional funding through Proposition 301, the SFAZ and ACA programs such as the Innovation Challenge. This latter program sees USD3 million made available annually for small private enterprises in the aforementioned targeted sectors. The program was established January in 2011 as part of Governor Brewer’s focus on Arizona’s economic competitiveness. The Governor noted at the programs outset, “Nationwide, the success of small technology ventures leads to quality employment, attraction of outside capital investment, export sales and wealth creation” (ACA 2011).

This focus on firm development, and the state’s role in helping subsidize both research and operational activity therein, highlights how the state’s bioscience sector has benefitted from a far more activist state than seen in the state’s renewable energy sector. Across both the state plays a leading role in the development of the sector. However as highlighted in these short case studies, the means by which the state has sought to do so differs and highlights the important role played by the business climate initiatives prioritized by Cerny, the knowledge-related focus of Jessop and the research related activism of Mazzucato.

⁵⁶ Kinney 2013.

Towards a grow-your-own approach

While these cases highlight the diversity in policy approaches used in the development of these sectors, one over-arching theme emerges from this research and the interviews conducted to support it. Corporate support in Arizona, while traditionally viewed as support for large industrial players, is increasingly shifting to small, nascent enterprises. In so doing, such investments follow a growing body of empirical evidence that job growth is primarily facilitated by small, high-impact firms. Across the U.S., U.K. and Canada the available research concludes that between 40% and 60% of job growth is driven by just 4-6% of total firms (Herman 2013). Large industrial actors are in fact found to be sources of long-term employment decline. Subsequently, the ACA focus on smaller private actors provides an evidence-based approach to facilitating growth. As then-ACA president Don Cardon noted, "This is an investment in our future. Arizona technology businesses are the prime engine for economic growth through wealth and job creation. Across the state, our future is being created in garages, campuses, labs, incubators and in the minds of entrepreneurs" (ACA 2012B). Eligibility for the AIC is limited to organizations between 2 and 30 employees and with a maximum of USD10 million in net assets. The focus is thus on early stage companies.

Through three tranches of grants (USD4 million total / USD250,000 per recipient), 16 recipient enterprises have received funds. The sectoral breakdown of these grants is as follows: 8 high-tech (software and advanced manufacturing), 6 bioscience and medical, and 2 renewable energy. Similarly, the AZ Fast Grant program provides small grants to nascent in-state technology companies to initiate the commercialization process. Eligibility is limited to companies with less than 30 employees and less than USD2 million in revenue. While smaller in value (USD175,000 per annum), the fund provides seed funding for upwards of 25 companies per year. The breakdown of 2012 grant recipients includes 12 technology companies, 8 bioscience, 3 advanced aerospace, and 2 renewable energy.

Across these programs, corporate support is premised on the link between innovation and job creation, though these current programs highlight that the relative size of recipients has shrunk and the number of recipients grown. This strategy comes as a distinct contrast to past state investments, and corporate development assistance, which has prioritized large corporate actors. For example, in 2006, the Arizona Department of Commerce issued USD350 million in

taxpayer-backed bonds to finance the expansion of Intel Corporation's local facilities and led fundraising efforts towards a USD100 million fund established to found the Translational Genome (TGen) Institute. Contemporary support is instead now focused on developing high-growth small and medium enterprises whose growth prospects may infer a lower, long-term per job investment cost. However, while the processes of funding may have been adapted, the motive, namely to encourage domestic job growth, remains the same.

Going forward the state's role in these direct funding mechanisms look unlikely to recede. Across both academic and industry stakeholder interviews, a narrative emerges that the continued development of these targeted industries, and thus their continued contribution to employment growth, will require significantly enhanced public investment. As William Harris of the SFAz notes, "Today we need the state level to retake a role and to once again understand the link between education, research and economic prosperity. Public investments allow risks to be taken that companies can no longer do."⁵⁷ Such views mirror the official position of the state. Sandra Watson of the ACA notes that the competitiveness of the state is directly tied to the investments made by state leaders, and in particular the investments made into targeted industries facilitated by the ACA (Watson 2013A).

Moreover, stakeholders from various industries are committed to ensuring this mesh of public and private interests continues. Joanne Koerber-Walker, President of the Arizona Bioindustry Association, highlights her organization's lobbying activity vis-à-vis increased state funding for research commercialization and early stage capital. Noting that Federal NIH funding is expected to decrease (on a per firm measure), she is working with state and industry officials to build a "creative investment vehicle" that would allocate upwards of USD1 billion to targeted "high-value" industries.⁵⁸ Current legislative proposals include a Bill (H.B.2646) that would allocate tax revenues from insurance premiums to establish this fund.

This proposal has drawn public criticism, notably from pundits who see the proposal as a means of picking winners and losers. An editorial published in the Arizona Republic presents the case against such strategies. It notes, "In recent years, the Arizona Legislature has plunged deeply into industrial policy, the notion that economic growth occurs through government

⁵⁷ Harris 2013.

⁵⁸ Koerber-Walker 2013.

offering preferential treatment to selected businesses.... Republicans supposedly believe that government shouldn't be picking winners and losers in the economy. There couldn't, however, be any purer an example of picking winners and losers than a state venture-capital fund that invests in a handful of businesses in only one sector of the economy" (Tobin 2013).

In response, the rationale for public investment is presented as necessary to promote the survival of high-risk, early stage companies whose track records are insufficient to attract private funding. Responding to critiques of H.B. 2646, and calls for its rejection owing to its "picking winners" strategy, Koerber-Walker notes that "some emerging technologies would never see the light of day simply due to the perception that other less risky investments are a safer bet for investors."⁵⁹ . Public funds are thus positioned as a means of mitigating a market failure that allocates insufficient capital to young firms in industries that are the product of policy as opposed to natural competitive advantage. Koerber-Walker goes on to state that "investors are called to pick winners and losers every day and if the state of Arizona is committed to truly invest in our future, that is what we must do" (Koerber-Walker 2013B). This explicit acceptance of an interventionist state government is further supported by Dr. Michael Crow, President of Arizona State University, who notes that "Arizonans will have to discard outmoded laissez-faire attitudes and embrace a competitive new global mindset matched with commensurately robust public engagement" (Crow 2013).

Steven Zylstra, President of the Arizona Technology Council, agrees, noting in a public response to the aforementioned critique that given the competitive strategies used by neighbouring states, Arizona has no choice but to allocate public funds to private economic activity, albeit in regulated fashion (Zylstra 2013B). When interviewed, Zylstra agreed that "picking winners and losers is problematic. The solution, he noted, "is to get better at just picking the winners."⁶⁰ The evident tension between the rhetoric of less government and private sector leadership and the subsequent calls for increased public investment are repeated in interview with Barry Broome, President of the Greater Phoenix Economic Commission. While noting that "government needs to get of the way of entrepreneurship and innovation," he subsequently identifies public funding, and direct public investment, as the key to ongoing development of the

⁵⁹ Koerber-Walker 2013.

⁶⁰ Zylstra 2013.

four targeted sectors.⁶¹ In particular, Broome notes that the state's advantageous, low-debt, fiscal situation positions it to make significant investments into "a contemporary economy" that can compete with India and China.

Legitimized corporate support

Across the interviews conducted for this dissertation, competitiveness in an evolving global economy is positioned as requiring an active role for the state. Beyond traditional export assistance or investment attraction, this role includes explicit funding mechanisms directed not just to research but rather direct funding to private enterprises in the hopes their growth will lead to broad employment gains. The state is thus far more than a passive facilitator and regulator of economic activity. While regulatory and tax flexibility aids the state's strategy, overt activism sees the state become a participant in markets, alongside private participants. Through its choice of targeted industry and targeted enterprises, the state has effectively positioned itself as a competitor to other, non-targeted private sector interests. Government activism in the name of economic growth and employment creation is subsequently presented across the political spectrum and by both political and public stakeholders as legitimate so long as the ends (employment) are justified.

This justification stems in large part from significant demand for industry prioritization and a near-explicit acknowledgement of the value of "picking winners" from across public and private stakeholders. Therein, however, an important qualification must be made. By structuring such industrial support in part through tax credits, the state is able to rhetorically promote the removal of government interference from the market, all the while providing a form of direct corporate support. A choice is thus made to allocate tax revenue back to private activity rather than public goods. And in so doing, this public activism simply chooses sides by means of foregone investment. The explicit focus of the ACA on key sectors of the economy determined to be integral to future growth, and the extension of this industrial prioritization to direct grant funding as well as indirect institutional research, is no different than traditionally perceived means of "picking winners" and domestic industrial promotion.

Akin to Suzanne Mettler's work (2012) on the "submerged" nature of American (Federal) government intervention and the subsequent obfuscation of the roles of government and the

⁶¹ Broome 2013.

market with respect to personal benefits, corporate support does not recede under the rubric of supply-side policies. Rather it becomes hidden in the ambiguity of language that frames jurisdictional competitiveness. William Harris of the SFAz explains this strategy: “You have to assume that there is no free market. Once you introduce discriminatory taxes you change the market. It’s no longer a level playing field. Some may like to think that government should have no role in the market but this just isn’t the case.”⁶² And as the aforementioned review of Arizona’s economic development and innovation policies shows, the supposed retrenchment of the state vis-à-vis tax cuts and “private-sector leadership” simply hides new strategic policies that orient both indirect and direct support for private industrial activity towards sectors defined as innovative, knowledge-oriented and most likely to support the creation of high-wage domestic jobs. Whether one defines this as “picking winners” or, as a senior municipal official who wished to remain anonymous described, as “understanding the new competitive dynamic”, becomes an issue of semantic definition rather than policy difference.

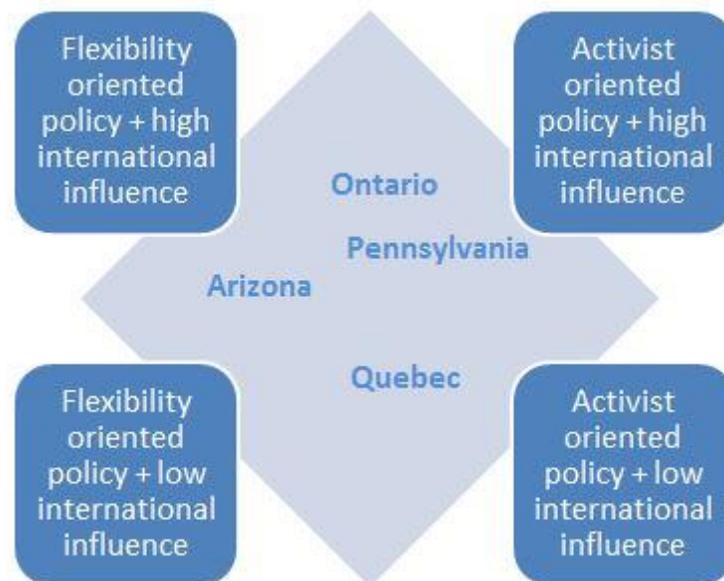
Conclusion

Interpreted within the body of literature reviewed at the outset of this dissertation, Arizona has indeed adopted the language of competition as the primary driving force of state policy. Therein a traditional focus on export-promotion and capital attraction as prioritized by Eisenger (1988) is complemented by a strong right-of-center, right-to-work regulatory and policy framework that puts downward pressure on in-state wages and taxes (Cerny 1997, 2004). This *flexibility-inspired* strategy, however, is complemented by what Jessop (1993, 2002) would see as an adaption of the Schumpeterian Workfare State and its pairing of flexibility and a focus on non-discriminatory research and innovation promotion. These elements coalesce towards an orthodox conception of the state as a provider of a business climate that promotes competition and competitiveness. This approach, however, operates alongside an activist definition of key priority economic sectors and the appropriation of public funds towards them. As shown above, Arizona has made a significant allocation of public funds towards private economic activity in chosen economic sectors, and amongst select firms operating within those sectors. While this reflects the importance of the state in these sectors as noted by Mazzucato (2013) and Block and Keller (2011), this research

⁶² Harris 2013.

has shown that the state is involved in a far more micro-level insofar as it supports individual firms from sub-national coffers.

Returning to the matrix developed at the outset of this section, Arizona's attempt to direct the development of new, high-value innovative technology sectors balances the flexibility-inspired strategy of the competition state. The latter has helped the state in its poaching efforts in neighboring states. Doing so, however, has focused on lower value economic activities. In more high-value ones, the state has relied on an activist role to develop them. Amongst these high-value or innovative sectors, while the focus on renewable energy is logical and builds on local comparative advantage, the targeting of the life sciences sector, and to a lesser degree the ICT sector, has required the directed development of brand new competitive strengths and anchor assets in these industries.



Returning to this dissertation's core research question, this case highlights that the state develops new innovation-oriented capacities through a series of directed or activist strategies. In Arizona's case these strategies include a focus on entrepreneurship rather than the competitive attraction of incumbent firms, a strong push for the commercialization of academic research, the development of third-party intermediaries to channel funding and operational control, and the

provision of direct grants to companies in targeted industries. And operating alongside these more intrusive roles is a strong focus on a deflationary wage and tax framework. These strategies have been adopted as a means of lifting Arizona off the bottom of U.S. state competitiveness rankings, in particular around educational and economic outcomes. In so doing these activist strategies are focused squarely on job creation and the development of employment opportunities for Arizonans. While this may not constitute welfare as traditionally conceived, the significant subsidization of these opportunities means the state is still at the heart of employment creation and industry development.

Finally, the role emerging economic actors play in the development of these state-level strategies is not insignificant. As reported by several interviewees and across much of the state's official communication, the rise of China, India and other emerging economies in industries including ICT, life sciences and renewable energy means Arizona cannot survive on flexibility and low-wages alone. Rather, those economies are perceived to combine high-value innovation with lower wages necessitating rapid upgrading for Arizona. And while regional competitors present a more immediately visible threat, the balance amongst these motivating factors is relatively equal.

Combined with a series of other motivating factors relating to public opinion, macro-economic events and the presence of domestic knowledge assets, the state's role in the economy is legitimized. It is legitimized, however, with a far more activist strategy in order to win against both domestic and international competitors. While there are certainly strong elements of the competition state present in Arizona's policy, it is far more activist than the contemporary narrative on the role of the state in the economy has allowed for. And while both Mazzucato and Eisenger's *Entrepreneurial State* highlight activist roles, neither builds a cohesive or holistic view of this activism as is provided here.

Rodrik's (2011b) argument ("globalization's paradox") that relates to the state's inability to mitigate the negative impacts of economic globalization is therefore problematized by sub-national state activism with respect to the development of industrial sectors and the allocation of public revenues towards the mitigation of exogenous competitive forces. Here the state acts forcefully to interact with the forces of global economic change. In so doing it acts to both direct public funds and to coordinate private and public sector collaboration towards areas of perceived

high potential. This collaboration, however, is largely public-dollar driven, with institutional research priorities funded by taxpayer contributions and framed by a strategic focus on technology transfer to private hands and rapid commercialization.

Policy space, notably for industrial privileging, is thus far from extinct and has instead taken on new forms through the development of third-party brokerage organizations, an explicit focus on university-industry commercialization and the use of tax policy as a means of discriminating between industries.

Thereafter, what Cerny once presented as the exit of the state from large, project driven strategic investment in basic industry (“les grands projets”) is, in the case of the state of Arizona, more accurately understood as the continuation of strategic state investment but focused on what is understood by the state as high-value, knowledge industry. Akin to Jessop’s vision of the Schumpeterian Workfare State, the contemporary sub-national state acts to promote technology transfer and innovative capacity to position the state as the driver for innovation driven structural competitiveness. Therein the composition of these more nascent industries, and the competitive dynamics surrounding high-technology and innovative sectors, favour small, nimble private enterprises over large ones. The State’s funding arrangements have now been reengineered to enable the growth of these firms, and the creation of technology through research commercialization efforts to jumpstart them. Moreover, buttressed by strong public support for public investments in technology and innovation, the State increasingly takes on a more active role as a direct investor in targeted enterprises, near-explicitly “picking winners”, albeit maneuvered around the language of employment creation and economic growth. The state thus increases its active participation in the market, not only in a facilitating or infrastructural role, but rather as an instrumental investor. In so doing, the state accepts that its preferences are a priori discriminating and that its role as market participant places it, and its public investments, in competition for capital with private actors. This role, while long constitutionally outlawed in Arizona, has been permitted thanks to a combination of legislative exceptions granted to its recent policy, as well as the confluence of industry and public support. In both cases, this support is premised on the promise of high-value, high-wage jobs and the essential role of government in the capture of the next Schumpeterian wave of economic prosperity.

Chapter 4: Ontario's Innovation Agenda

Unwilling to compete on the basis of labour costs, Ontario has sought to reposition its role in the global economy by taking a leadership position in the development of several new industrial sectors, notably renewable energy and the life sciences. In so doing, the Province has responded to both internal and external pressures through an activist economic policy that has targeted specific industrial sectors, enabled them with direct grants as well as indirect ones channeled through newly-developed third-party intermediaries, and has sought to buttress their long-term development through the nurturing of related entrepreneurial ecosystems.

Ontario's actions are far more complex than those described in the literature on the competition state. Rather, the province has largely eschewed the focus on flexibility and wage competition seen in the previous case study on Arizona, and instead has sought to upgrade its industrial base in the search for high-wage jobs to replace those lost in the province's manufacturing sector. And as the following will describe, the policies that have enabled this approach have been complex, including both explicit and stealth support for these new industries and others. The design of these policies has attracted both domestic and international controversy but in so doing highlights the activist role of the sub-national state and its primacy in the processes of economic transition that occur in mature economies. This role adopts elements of the Entrepreneurial State presented by both Mazzucato (2013) and Eisenger (1988), as well as the Schumpeterian Workfare State introduced by Jessop (1993, 2002). And while its strong leadership in the development of new sectors might auger a very modest allusion to the developmental state, instead it is more accurate to depict Ontario's approach as a non-exclusive one that takes aspects of each.

In order to develop this argument, we begin by analyzing the internal debates and ideological perspectives that have shaped Ontario's strategies and policies. Second, we then move to address the driving forces that have further shaped these policies, notably the perception of international competition. The third part of the chapter turns our attention to the targeting of specific industries, and the process by which these targets are identified and thereafter justified in the face of criticism. The fourth part of the chapter delves into how this industry targeting is operationalized, including case studies on the renewable energy and life science sectors, and how

their growth has been promoted. A final section reviews the Province's support of entrepreneurship as a means of building local economic resistance in the face of growing international competition. The chapter concludes with a discussion of Ontario's approach to economic intervention, and how this approach is situated in our matrix of motivations and operationalization of sub-national state intervention in the economy.

Motivations and ideological debates

In February 2009, then-Premier of Ontario Dalton McGuinty told an audience of business leaders gathered at the Ottawa Chamber of Commerce, "Let's be honest here -- other places in the world have figured out how to compete against us. And in some ways, they're pulling ahead. So we have a choice to make: settle for second place, or figure out a new way to win" (McGuinty 2009).

Figuring out how to 'win' in this changing global economy is certainly no easy task. Nor is defining what the role of government is therein. For just a few months after Premier McGuinty's speech in Ottawa, his then-Minister of Economic Development Michael Bryant created a whirlwind of controversy with his perspective on what winning in this new economy looked like. At a business luncheon hosted by the Toronto-based Canadian Club in May 2009, Bryant led off his speech entitled "Reverse Reaganism" by noting that his government intended to "invest company by company, industry by industry" to ensure the health of the economy (Bryant 2009). He noted that that "this is government picking winners and losers, government as entrepreneur." When interviewed for this dissertation, Bryant notes that his comments were premised on a rebuttal of Reagan's philosophy that "government is the problem", and the desire to bring forward a public debate on the role of government and on the realities of a global economy where "boy-scout" economic behaviour is rare.⁶³

Bryant adds,

I was happy to promote a debate about the role of the state and engage the public's desire for government leadership on the economy. I wanted to explain to the public that we were in a different era. Laissez-faire was no longer appropriate for the challenges we faced.

⁶³ Bryant, Michael. 2013. Personal interview with Michael Bryant, October 22, 2013, Toronto, Ontario.

And if the public was willing to have government lead in economic matters, this is what it would mean and look like (ibid).

In promoting this debate, Bryant argued that the role of government shifted based on the needs demanded at a specific point in time, not by static ideology. Thus while a supply-side approach was appropriate for Reagan's time, contemporary economic challenges require an industrial policy focus in order "to assist new, disruptive companies to leap ahead, and help those older companies facing consolidation battles survive" (Bryant 2009). He added, "We should not hem in our ability to react... we should build on our strengths, and invest in disruptors and emerging technologies. We take greater risks in order to potentially build new clusters, or build upon nascent ones" (ibid).

This assistance, Bryant notes, is to be shaped through both grants and investments, and represents a form of government intervention necessitated by market failure and the need to help Ontario "jump ahead." He presents the case for "government as the solution" to market failures whereby "the state has got to be strategic and if that's the case, then we need to act as an entrepreneur and invest directly in business" (Bryant 2009). Bryant admits when interviewed that this level of intervention, nevermind the honesty about it, was unorthodox. He adds, "this is supposed to be the thing that governments weren't supposed to do."⁶⁴

It was, however, a fact, one driven by intense competition, "an economic battle," with American states, the majority of whom were offering "hundreds of millions of dollars in public money as incentives" (Bryant 2009B). At the tail end of his May 2008 speech, Bryant answers an audience question (from a senior-level representative from General Electric) related to the Province's then-nascent Green Energy Act by noting that the government's approach to policy, funding and regulation is predicated on the "need to address the heavy competition we're in (Bryant 2009)."

Intervention is thus justified on the basis of changes in the global economy, and the pressures felt from growing competition in both old and new industries. Responding to these challenges has seen Ontario government policy vacillate between indirect policy geared towards facilitating the success of Ontario firms through the creation of a more competitive business environment and more direct policy approaches aimed at interaction within more micro-level

⁶⁴ Bryant 2013.

elements of firm and industry dynamics. In so doing, these approaches represent a variety of points on the theoretical spectrum introduced earlier in this dissertation. A more competitive business environment paired with a push for innovation and knowledge oriented sectors highlights a variant of the SWS à la Jessop (1993, 2002). A strong role in the transmission of publicly funded research into private hands presents more support to Mazzucato's thesis on the Entrepreneurial State. And while the differences between these two approaches reflect an internal tension about the role of government in the economy, the strong focus on the adoption of programs and policies geared towards the development of "innovative" knowledge-sectors, notably renewable energy technologies, information communications technologies (ICT) and the life sciences, reflects an understanding of government as one that plays an active role – albeit at different levels and in differentiated manner - in confronting the effects of transition and evolution in the global economy.

As Ontario's 2008 Budget document notes, "A strong economy is one that is continuously renewing itself in the face of external challenges and changing environments" (Ontario 2008:13). This Schumpeterian language begs a question, which is the target of this study, insofar as how the Government of Ontario has sought to structure this process of renewal, and therein, what role the Province itself plays in the processes of economic transition in this mature North American jurisdiction. Of particular interest in Ontario is the explicit targeting of industries identified as strategically tied to the Province's future prosperity. While this section has highlighted the ideological perspectives that drive intervention, the following section will look to the external factors further driving policy and strategy in the Province. The subsequent sections of this chapter will look more intensely at the strategies employed to catalyze new industrial sectors, notably the use of direct granting programs, third-party facilitating agencies, targeted entrepreneurial promotion, tax credits, and, as in the case of Ontario's green energy sector, controversial local content requirements.

In so doing, this chapter provides a unique answer to the primary research question – how does the sub-national state intervene? Industrial policy and an activist sub-national state will be shown to be very present in Ontario. While sometimes admitted, it is also sometimes hidden. And altogether this will contribute to the development of another model of how the sub-national state intervenes in a manner that is more interventionist than Cerny's original conception of the competition state, and while focusing on innovation as Jessop's Schumpeterian Workfare State

does, does not go nearly as far on matters of flexibility and supply-side dynamics as Jessop's model suggests.

Driving forces

The impetus for this period of government-industry interaction is multi-faceted though not necessarily unique to Ontario. Endogenous issues related to labour and industry cost structures interact with exogenous pressures related to growing international competition. As the 2006 Ontario Innovation Agenda states, "today Ontario faces challenges: increasing competition from lower-cost countries, a stronger dollar and lagging worker productivity" (Ontario 2006). An unwillingness or inability to face up to these challenges risks pushing Ontario down "from the first rank of economic prosperity" (ibid).

Like in the other case study jurisdictions seen in this dissertation, amongst the most pressing of outcomes resulting from the confluence of these challenges has been a significant decline in the traditional area of employment strength in the Province, the manufacturing sector. Manufacturing employment in Ontario has decreased from over 900,000 in 2003, to 654,000 in 2012 (Mowat 2012:7). Policy efforts, and political pronouncements, have subsequently been geared towards the development of alternative avenues for employment, notably through the development of industrial sectors viewed as high potential.

John Wilkinson, Minister of Research and Innovation between 2006-2007, notes that at the heart of Ontario's contemporary economic development strategy is a need to understand the Province's role in the global economy.⁶⁵ This understanding, however, is linked to the perception that a period of economic transition in the global economy would mean significant challenges for Ontario:

We understood that we needed to run up the escalator. Doing nothing would mean a slow but steady erosion of our standing of living as the manufacturing base that our economy was long based on was being carved out. Globalization requires us to work with these processes, and determine where we can be a world leader within it. And ultimately it meant marshalling our efforts towards progress (ibid).

⁶⁵ Wilkinson, John. 2013. Personal interview with John Wilkinson, Waterloo, Ontario, May 7.

In 2008, as a response to the then-fully apparent recession across North America, the Ontario government proposed the “Ideas for the Future Act,” a tax credit initiative for innovative companies in the government’s prioritized sectors consisting of advanced health technology, bio-economy, telecommunications, computer or digital technologies production (Ontario 2008B).

In describing the rationale for the Act, Minister Yasir Naqvi noted the driving role of international economic pressure:

We all realize that we live in an extremely globalized economy, where the competition now is not within our own borders; the competition is not within companies in Canada. The competition is global. The competition is with companies from India, China, Brazil and South Africa... (ibid).

Naqvi’s focus on emerging economies, however, garners little support across the interviews conducted for this dissertation. Rather, perceptions of Ontario’s place in the global economy, and its interaction with the evolving processes of economic globalization, focus largely on the Province’s relationship with its largest trading partner and largest competitor, the United States. Moreover, a common theme surfaces across interviews conducted for this dissertation regarding the Province’s inability to compete in low-cost, low-wage sectors of the economy. Policy reform towards more flexible and lower cost labour markets, as is proposed by Jessop as key to the Schumpeterian Workfare State and more generally by Cerny as key to the competition state, is pushed aside in favour of a focus on high-wage, high-value innovation. Competition from like, mature industrial economies is thus viewed as the primary driver of policy efforts aiming to improve the competitiveness of domestic firms. Bill Mantel, currently the Assistant Deputy Minister of the Ministry of Research and Innovation, notes, “we’re in a battle amongst stagnant, mature industrial economies for access to the growing markets of dynamic emerging markets.”⁶⁶ Michael Bryant agrees, noting that during his time as Minister of

⁶⁶ Mantel, Bill. 2013. Personal interview with Bill Mantel, Assistant Deputy Minister, Ministry of Research and Innovation, Government of Ontario, May 23.

MEDI, “emerging markets were of little concern to us. Rather the focus was on similar high-wage economies whose areas of specialization were very near to ours.”⁶⁷

Mantel goes on to note, however, that while Ontario does indeed compete in some high-value markets with Chinese competitors, the focus is increasingly on working with, and selling to, Chinese companies. Rather than viewing emerging markets as a competitive threat, Mantel posits that a pattern of complex interdependence is underway, especially in the innovative fields where Ontario seeks to renew its economic base.⁶⁸

This competitive dynamic is further problematized by questions related to the governance of the global economy, and the enforcement and/or lack of rules related to the subsidization of private industry. George Ross, who served as Deputy Minister of Research and Innovation between 2006 and 2009, notes that a level-playing field amongst states in this regard, and notably between emerging economies and mature industrial ones, is broadly perceived as lacking. This further drives the focus of Ontario’s competitive reaction away from a focus on low-wage, emerging economies and further towards like-governed mature industrial ones.⁶⁹ Former senior bureaucrat Fernando Traficante, who was the first Director of the Next Generation of Jobs Fund program, expands on this view:

Pressure from emerging economies was a contextual piece rather than a driver for our programs. Across our policy discussions, there was explicit acknowledgement and debate about the impact of the entry of low-cost economies in our competitive space. However a general consensus was shared that we could not, and should not, compete on low-cost. A company that wanted the cheapest labour would not choose Ontario. So we needed to find an answer to the question of how else we could compete.⁷⁰

The answer to this question of competitiveness was innovation, and by extension, a perspective that competition was most acutely felt from high-cost, as opposed to low-cost, jurisdictions. As Traficante explains, the preoccupation with like-jurisdiction competition first translated into a more activist role for the government in the late 1990s. Then, under the leadership of Premier

⁶⁷ Bryant 2013.

⁶⁸ Mantel 2013.

⁶⁹ Ross, George. 2013. Personal interview with George Ross, Deputy Minister, Ministry of Northern Development and Mines, Government of Ontario, May 21.

⁷⁰ Traficante, Fernando. 2013. Personal interview with Fernando Traficante, Principal, Prism, Economics, Toronto, May 13.

Mike Harris (who took power with what was commonly viewed as a right-of-centre economic and social policy platform) the loss of several significant automotive investments to competing North American jurisdictions, saw political officials begin to understand that a toolbox centred around tax cuts and tax credits was insufficient as compared to neighbouring jurisdictions offering direct grants and subsidies.

Thereafter, and surviving both ideologically “right” and “centre-left” governments, the focus on exogenous economic pressure is clear. Across the aisles of the legislature, bi-partisan support for the notion of promoting innovation and employment growth in new industries is common, albeit with disagreement on the process. As a member of the New Democratic Party, Mr. Michael Prue, noted in his support of the purpose of the Ideas for the Future Act,

We know that jobs are being lost at a horrendous rate in the manufacturing sector in this province. We know as well that some of our key indexes, such as auto sales, have suffered hugely as factory after factory shuts down, lays off workers, or downsizes operations from three shifts to two shifts to one shift, or takes time off. This Legislature has an obligation to the people of this province to do something in these times of economic uncertainty and do it well (Ontario 2008B).

Eventually restructured as the Ontario Tax Exemption for Commercialization (OTEC), the Act was launched in 2009 amidst broad consensus around Ontario’s challenges vis-à-vis an evolving global economy, and the subsequent need for government to play an active role in shaping how both government and domestic firms react and/or are able to react.

This aspect of how the state reacts to processes of global economic transition is further noted by then-Minister of Economic Development and Trade Sandra Pupatello. In comments related to the creation of the Next Generation of Jobs Fund, she acknowledges the magnifying glass placed on the effects of recession in the United States and the concomitant challenges of a strong Canadian dollar and high energy prices. However, she notes that international competition is increasingly more significant relative to Ontario’s fortunes:

There is increased global competition for trade and investment. Previously we might have been the only players in the field, chasing business to come to Ontario; now there are many more options for global companies (Pupatello 2008).

In announcing the Next Generation of Jobs Fund as the “cornerstone of the government’s economic development strategy” in Budget 2008, and in particular the green technology focus contained therein, then-Premier Dalton McGuinty noted the exogenous impetus for the program, and its roots in international economic competition (Ontario 2008C). In particular, he notes, “We’re stepping up because Ontario is not going to let others steal our future out from under us -- we will produce the next wave of clean technologies that create jobs and clean up the environment” (ibid).

More recently, while responding to critiques of the Provinces’ business support programs, Ontario’s then-Minister of Economic Development and Innovation Brad Duguid argued publicly that direct corporate support for private enterprise in Ontario was necessary given the Province’s direct competitors (high-cost jurisdiction in Europe and the United States) actively use them. He noted that as a result of “fierce global competition, without such support, Ontario businesses would be completely unarmed, in particular, nascent startup businesses” (Duguid 2012). Unlike the uproar which followed Bryant’s 2009 speech on government intervention, Duguid’s remarks garnered little to no response.

Others, such as George Ross, who served as Ontario’s Deputy Minister of Research and Innovation between 2006 and 2009, offer a more nuanced view of the driving forces of a shifting role for government. Ross notes that the philosophy of the McGuinty government was driven by both exogenous factors such as the emergence of the BRICs and the risks associated with being tied tightly to the US economy, as well as endogenous ones related to the government’s commitment to a low-carbon energy supply and what Ross terms a “disappearing supply of venture capital.”⁷¹

Notwithstanding slight variations in the prioritization of these causal factors, across party lines, and throughout the period from 1990 to 2012, perceptions related to international competition can be seen to drive a willingness to present a more active role for the Provincial government in the shaping of competitive dynamics in the domestic economy. What differs between the early stages of the period under study and the latter is an understanding of economic transition that has seen government support move away from generalized, industrial support,

⁷¹ Ross 2013.

notably as it relates to industries struggling with the effects of increased competition such as the automotive industry, towards funding “innovative” sectors identified as future-oriented and knowledge-based. And as the Ontario Ministry of Research and Innovation’s (MRI) first Strategic Plan (developed in 2006) notes, “both current leaders and those poised to become the next leaders of the global economy are not just investing in innovation, but have also developed well-integrated strategies to guide those investments” (Ontario 2006B). Inter-state competition is at the heart of an activist government, one that seeks not only to help domestic enterprise succeed, but also to play a more active guiding role in the development of new industries and new enterprises.

Sector targeting and commercialization

The language of industrial targeting takes center stage in Ontario’s policy efforts after the election of Dalton McGuinty in 2003. Here a distinct shift occurs from traditional targets, notably the automotive sector and manufacturing, towards industrial sectors identified as innovative, forward-looking and knowledge-based. Former Minister of Research and Innovation John Wilkinson describes this shift as one predicated on a belief that you have “to go where the puck is going to be.”⁷² Traficante adds that “the competition we wanted to engage in (globally) was for innovation and innovation-related investment that would lead to new product development and new production processes, both which were understood to lead to potential economic growth. We wanted to support programs that would lead to sustainable and long-term economic and employment growth.”⁷³

At the heart of Ontario’s push to facilitate a more innovative economy, one understood as more competitive and thus more likely to create sustainable employment, is the Ontario Innovation Agenda. Launched in May 2006 by then Premier Dalton McGuinty, the Agenda serves as a broad framework for the Province’s strategic investments in public research and private sector activity. Upon its release, the Province noted that the Agenda “provides a roadmap to ensure (it) has a winning economy in the 21st century” (Ontario 2006). This language of competition and victory is subsequently strategized via an explicit goal of spurring innovation and facilitating the launch of new commercial-focused technologies. In comments made to the Standing Committee on Estimates at the launch of the Innovation Agenda, then-Minister of

⁷² Wilkinson 2013. What would a Canadian case study be without an allusion to hockey?

⁷³ Traficante 2013.

Research and Innovation John Wilkinson noted that the Innovation Agenda represented an attempt to respond to global economic challenges and to “lead the world in new, global industries” (Wilkinson 2008).

Accompanied by a spending purse of CAD3.2 billion, the Agenda notes that “an economy the size of Ontario’s cannot compete globally in every area” (Ontario 2006). Instead, “public investments in research and innovation need to be focused to achieve maximum value... and to support Ontario’s areas of greatest academic strengths and greatest economic potential” (ibid). Spending is subsequently highly focused on a series of industries defined by the government as strategic and/or innovative, and where Ontario has a “demonstrated competitive advantage in industry, research, or both.” These sectors are identified as the bio-economy (including the life sciences), green technologies, advanced health technologies, and digital media and information communications technologies (ibid).

The process by which these industries are selected as strategic over and above all others begins in 2005 with the creation of the Ministry of Research and Innovation (MRI) and the subsequent establishment of the Ontario Research Innovation Council (ORIC). The latter was led by Premier McGuinty, a personal decision that represented an explicit sign of the importance placed on innovation by the government in power.⁷⁴ Both bodies sought to address the challenges as perceived by the government related to a “NAFTA-centric view of the world, a rising dollar, rising costs of electricity, and rising global competition” (ibid). As former Minister John Wilkinson describes when interviewed, “the alternative to this dependence, and the answer to these challenges, was to ask how to have innovation drive our economy. And while saying so is easy, we saw the challenge as being ‘if you’re going to do so, how do you do it?’” (ibid). A technocratic mindset can subsequently be interpreted as driving this conception of state interaction with the market.

Doing so, according to Wilkinson, included the creation of MRI with two primary purposes in mind. The first was to provide an explicit and targeted focus on commercialization and innovation for government programs and investments. The second was to act as a means of overcoming rigid, institutional views on innovation, industry and research. “A reliance on the

⁷⁴ Wilkinson 2013.

Province's manufacturing base and its ability to compete thanks to a cheap dollar and cheap electricity needed to change" (ibid).

Next, ORIC was created in order to ascertain what Ontario, in both industry and academia, was truly competitive in. Former Minister John Wilkinson describes the impetus for the council as stemming from a "desire to build on top of ongoing economic growth, and on top of real strengths, in order to compete in an increasingly competitive global marketplace" (ibid). In November 2006, MRI released a strategic plan based primarily on the outputs of ORIC consultation and planning. In particular, the eight recommendations developed by ORIC related to the Province's innovation strategy are therein noted to "provide the foundation" for the Province's ongoing efforts in building a competitive knowledge economy (Ontario 2006B). These recommendations include an orthodox focus on skill formation, access to capital and "an embrace of science and technology." More significant, however, is the explicit recommendation to target research and development investments on particular areas (albeit without the identification of those industries or sectors), and the need to more tightly align investments in research and development with "commercial competence" (ibid). This approach blends Jessop's Schumpeterian Workfare State (1993, 2002) and its focus on enabling infrastructure, including skill development, with the research orientation of Mazzucato's work on the Entrepreneurial State (2013).

Together, these recommendations highlight a then-nascent effort towards research commercialization in targeted areas as a foundational element of the Province's push for global competitiveness. Framed in the language of "enhancing the value of government investments," the 2006 MRI Strategic Plan notes that research funding is to be judged "on such factors as relevance to industry, potential for commercialization, and alignment with identified priorities" (Ontario2006B). Thereafter the differentiation between public research and private outcomes is clouded by this funding prioritization on commercialization and a research focus on targeted industries. The government alludes to this clouding effect, noting that this approach "will help to build critical mass and create the close partnerships between researchers and industry that ensure new ideas yield better and more rapid rewards" (ibid).

In so doing, the Provincial government is able to re-orient both upstream and downstream factors in the innovation process towards its targeted industries, yet in a fashion that avoids

perceptions that government is actively intervening in private operations. Then-Deputy Minister of MRI George Ross notes that this coordination represents a necessary “alignment across all elements of society towards a singular goal. Therein, academia needs to be in line with the Province’s economic development goals.”⁷⁵ Moreover, this shift in government research priorities is predicated on a belief that Ontario lags other jurisdictions in the coordination of academic and industrial outcomes. The shift presented is thus a means of catching up with a “world-wide trend towards sustained long-term partnership between academia and the private sector” (Ontario 2006B).

Across Ontario’s broader strategy, and in particular the targeting of specific sectors identified as having significant growth prospects, the question of what the role of government is in directing industrial and economic activity begs analysis. Public documents related to the Innovation Agenda note that the role of Government is to “act as a catalyst for innovation and commercialization – and committing the necessary resources to do this effectively” (Ontario 2009). Further, such resources are to be directed towards “research and industries where Ontario has a global competitive advantage” (ibid). While acting as a catalyst for innovation through the allocation of public dollars to basic research and the widely-viewed fundamentals of growth (education, healthcare, infrastructure) are broadly accepted components of the role of contemporary government (Porter 1990), the allocation of public dollars to industry is evidently contested. Ontario’s strategic targeting of sectors for investment and attention thus requires analysis insofar as it relates to the concept of “picking winners” and inefficient distortions of the market through state-sponsored industrial policy.

Here, the definition of targeting and its relation to “picking winners” is shown to be quite ambiguously understood. For example, then Deputy Minister of MRI Alistair Glass is noted to have framed industry targeting as follows, “Our job is to look ahead, strategically in a global context, and decide where the smart place is to put your money. This isn’t about picking winners and losers, it’s about being tops in the world in specific fields.” This perspective is far more directive than the entrepreneurial state envisioned by Eisinger (1988). The latter’s conception of the state is one that enables entrepreneurs through Jessop’s regulatory and flexibility-oriented approach. In Ontario, the search for dominance in specific industries reflects Aikinger’s strategic

⁷⁵ Ross 2013.

industrial policy approach, one that sees the state developing both incentives for private activity, and the fiscal base for that activity.

Minister Wilkinson addresses this debate by noting that government investments in research are a question of solving societal challenges, rather than picking winners. He notes,

“If society is willing to invest in research, it is only fair and proper that society is allowed to frame their investment towards specific challenges and the need for solutions. And it was our view that it is absolutely correct for government, on behalf of its citizens, to ask researchers to solve these problems.”⁷⁶

Wilkinson subsequently frames the selection of industries as key to the Province’s future along this challenge-orientation. Investments in healthcare and the life sciences were to build on proven research strengths in health informatics and genomics, and a general societal need based on an aging population. Investments in clean technology were driven by simultaneous plans to adopt an ambitious green energy strategy to wean the Province away from coal-fired power, as well as to address issues related to water quality that emerged in the wake of the water-related deaths in Walkerton, Ontario in 2000. And investments in ICT and digital media were premised on the view that Ontario’s demographic diversity endowed it with a translation capability that was unmatched (*ibid*).

Public documents related to the launch of Ontario’s Innovation Agenda provide a similar framing process. Therein, the ability to “compete globally” and “dominate high-growth global markets” is married to social issues related to “tackling climate change... conquering disease... and advancing the digital universe” (Ontario 2008D). In so doing, the specifics of an activist government policy, one that might otherwise be viewed as contravening orthodox economic policy related to the role of the state, is made publicly unobjectionable given the Agenda’s congruency with social issues. Wilkinson addresses the question of whether such policies are a form of “picking winners” by noting that while such sectoral targeting is indeed a form of picking winners, “by focusing that choice where you have sectoral advantages, and by funding those advantages through research and investment support, and finally, by focusing that support on the search for answers that are complementary to societal challenges, the question isn’t

⁷⁶ Wilkinson 2013.

whether one should do it or not, but rather how to make sure the firms supported survive.”⁷⁷ The provision of a social good, whether delivered via public or private means, thus trumps any ideological or theoretical opposition to the process involved.

The government’s perspective on its role is made more ambiguous by its simultaneous self-definition as catalyst, partner and value-harvester alongside market forces. Wilkinson, in committee testimony, offers the following perspective on the government’s role:

Our government understands business and we have no intentions of interfering with the market. And we understand science. We know that basic and applied science must never be influenced by political science. We are committed to peer-reviewed research excellence. But instead of just assuming that somehow business and research will interact on their own, we believe that government must act as a catalyst. To do that, government must do a better job of extracting value from research excellence. But now we have to go even further. We need to partner with innovative companies to make sure research excellence and great ideas are translated into thriving businesses and new jobs (Wilkinson 2008).

While this definition explicitly notes the separation of government and the market, the subsequent focus on partnering with industry towards the translation or commercialization of research and ideas provides a participatory role for the government in the market that is distinct from the theoretical perspectives offered by Eisinger, Jessop, Porter and others who posit a more subdued type of intervention. And to be sure, Wilkinson’s still-ambiguous definition of the role of government in the economy pales to the view offered on public record by former Minister of Economic Development Michael Bryant. As noted in the introduction, Bryant created a controversy in May 2009 by noting that his government intended to “invest company by company, industry by industry” in a process of “picking winners and losers” (Bryant 2009).⁷⁸

Bryant’s blunt assessment of his government’s strategy segues to the heart of the debate over the role of the state, and to the question of whether the government is to lead economic development or follow the private sector’s lead. In remarks made to the Standing

⁷⁷ Wilkinson 2013.

⁷⁸ It bears mentioning that Bryant’s comments may be related to their timing in the midst of a major economic crisis whose presence was only partially understood in Minister Wilkinson’s tenure.

Committee on Finance Estimates, Bryant notes “In some cases, government does lead the economy. That would be less by way of subsidy and more by way of policy. I’d say that the Green Energy Act, with its fixed feed-in tariff policy, is in fact driving a part of the economy by creating an incentive to bring people in(to) the province” (Bryant 2009C). Here the distinction between subsidy and policy is purposefully vague; if a policy circumvents the prices that the market will bear with public funds, how does this differ from a subsidy that allocates public funds directly to market participants? The process may be different, and in this case easier to justify as being borne of private-sector activity, however the outcome in terms of directed industrial development is very much the same.

Public response to Bryant’s admission was overwhelmingly negative. “I have no faith in the Ontario government’s ability to conduct this kind of industrial policy. It hasn’t worked in the past, and the world has not gotten any simpler or easier to predict since then” said William Robson, CEO of the C.D. Howe Institute, a right-leaning policy think tank. Doug Porter, the deputy chief economist of the Bank of Montreal noted, “I freely admit that we are living in unusual circumstances, but that doesn’t mean we should throw out decades and decades of what we’ve learned in one fell swoop” (Cowan and Greenberg 2009). In fact, all three leading Canadian daily newspapers (the National Post, the Globe and Mail, and the Toronto Star) published articles in the days that followed Bryant’s speech decrying the government’s strategy as “a losing entity,” “dangerous,” and “the anti-thesis of investment” (Coyle 2009, Decloet 2009, Foster, 2009).

Political opposition to the policy was equally vocal. Said Ted Chudleigh, then opposition MPP (Member of Provincial Parliament) for the Progressive Conservative Party, “There are a few problems with the minister’s theory. First, it’s theoretical. He cannot point to a shining city on the hill, because there isn’t one. Secondly, businesses will spend more time on applications and lobbying and less time on innovations and production. Thirdly, it begins a vicious cycle: More and more companies will expect handouts. Fourthly, it forces non-subsidized companies to pay their competitors with their tax dollars” (Chudleigh 2009). This rhetoric notwithstanding, it is interesting to note that debate in the Legislature and in Committee relate not to the funding of industry writ large, but rather the distribution of that funding to both old, manufacturing industries and to rural rather than urban settings (Ontario 2009B).

In response to the aforementioned criticism, Premier Dalton McGuinty attempted to clarify that “free markets are alive and well” (Jenkins 2009). He added, however, “It’s just that they have a new partner and it’s the government.” This partnership sees government take an active role by identifying opportunities for growth and placing public dollars behind them. McGuinty explains: “If you take a look around the world, the strongest economies have governments playing an active role. Now, there’s a smart way to assume that role and a dumb way to assume that role. I think the smart way is to find where are your sectoral opportunities and find ways to nurture growth in those strong sectors.” The Premier further noted that “I’m a little more leery of picking specific businesses. I’m much more open to finding businesses in specific sectors.” He then listed a series of industries worthy of government intervention: green energy technology, digital communications, biopharma and life sciences and the auto industry (ibid). Bryant later responded to the Premier’s remarks by noting that “Yeah, government should be leery of making these kind of investments. But we still do it” (Allemang 2009). In fact, over CAD2 billion in annual business subsidies were then available to corporations from these sectors, and others, under the Province’s economic development programmes, notably the Next Generation of Jobs Fund.

This political posturing, however, does not negate the previously noted bipartisan acknowledgement of the need to address changes in the nature of competition in the global economy. As former Ministry of Economic Development and Innovation senior staff Fernando Traficante notes, “the only surprise related to Minister Bryant’s speech was the candor that was used. The reality is that we had been “sinning” for awhile, and under different governments.”⁷⁹ Here he notes that previous administrations were more loathe to provide direct grants to private sector organizations, instead preferring a mix of tax credits and loan guarantees to particular sectors. However in so doing, while the perception of intervention or government activism is lessened owing to the language of ‘tax reform and tax breaks’, the outcome, Traficante argues, is the same insofar as such tools infer benefits to some private outfits and not others with public, taxpayer dollars (ibid). Moreover, in a global context, no matter the tool, the goal is explicitly focused on providing domestic enterprise with an improved foundation for its competitiveness against those from other jurisdictions.

⁷⁹ Traficante 2013.

As Deputy Minister Ross explains, “The debate within government about the role of public dollars in the economy never goes away; whether it acts as a facilitator for private decisions or as a more direct participant. This is an ongoing dynamic in government and is influenced by who’s in government, and the weight and influence of specific economists and stakeholders in and around it.”⁸⁰ He subsequently distances the Province from the explicitly interventionist approach championed by Bryant, towards a more nuanced view of government “coming alongside or behind the market.” In so doing, he argues the role of government is not to pick winners but rather to incentivize action. When asked to expand on why government should not be more intimately involved in the allocation of funds, Ross notes that “bureaucratic selection processes of this kind are done without a clear line of sight on the economy. Decisions are always clouded by political implications. The only form of discipline we have is to ensure that we go in with or beside or behind private investment.” He too, however, acknowledges the ideological ambiguity with which such discipline can be applied in government. In particular, he admits that “a certain level of intervention is necessary but needs to be reined in by a high degree of program sophistication and transparency” (ibid).

Throughout the interviews performed for this dissertation, the prevalence and permanence of industrial support programs are both acknowledged and defended as necessary components of a competitive strategy in a global economy marked by uneven global rules. Under previous administrations perceived as right of centre, the debate about picking winners is framed against a backdrop of ideological purity which believes that government has no role in picking winners or targeting. The result, according to Traficante, is a form of policy-schizophrenia whereby denials of fact are utilized to preserve ideological purity.⁸¹ This lack of coherence is displayed in Committee debates between Minister Bryant and members of the Opposition in the wake of Bryant’s infamous “Reverse Reaganism” speech. There, after having chided the government for its intervention in the market, opposition MPs then questioned why particular companies were unable to access government funds, noting that their survival should have been subsidized. Bryant responds as follows:

⁸⁰ Ross 2013.

⁸¹ Traficante 2013.

If I understand you, I think you're saying that you're opposed to the provision of (direct) financial assistance but once you're in the business of providing it, then you ought to be providing assistance to (specific company omitted) (Bryant 2009C).

Ideological purity as it relates to the role of government in the economy is thus a fleeting and perhaps well-intentioned but pragmatically difficult belief to uphold. The transition from a Progressive Conservative to a Liberal government in Ontario in 2003, according to Traficante, saw demand for such obfuscation drop as the incoming government came to power with a clear critique of the previous administration's failures related to economic development and investment attraction.⁸² Ross describes this shift as a philosophical or ideological transition from a belief that 'small government' and low-taxation were the most effective tools to grow an economy, albeit he notes with repeated interventions, to a more sophisticated and targeted approach that started from a viewpoint of Ontario in the context of a global economy.⁸³ A more targeted, direct and significant approach was thus understood as necessary – one that was not impeded by ideological debates related to the role of government.

Operationalizing Targeting

As Ontario's 2008 Budget indicates, contemporary targeting seeks to identify and exploit "industries that will provide the high-paying jobs of tomorrow" (Ontario 2008). Therein government seeks to act as a "catalyst for innovation and commercialization" through the allocation of public resources to specific sectors of the economy identified as having either high potential for growth and employment creation, or a proven competitive advantage against other jurisdictions. As former Minister John Wilkinson notes, this aspect of targeting, one that seeks to "look ahead and decide where we can compete," involves "determining what we can lead the world in. Not be good at but be the best, or at worst, top three in."⁸⁴ The focus on specific industries, and on the increased congruency between academia and private industry, is structured in the hopes of gaining the ability to set the price on new product and process innovations (ibid).

⁸² Traficante 2013.

⁸³ Ross 2013.

⁸⁴ Wilkinson 2013.

Key to this strategy is the CAD3.2 billion Ontario Innovation Agenda launched in April 2008. The Agenda provides a broad framework for the Government of Ontario's efforts to spur innovation and new commercializable technologies through both indirect funding of research and development, as well as the direct subsidization of business investment in the province. For example, in its 2010-2011 budget, the province of Ontario provided direct business support of over CAD1.3 billion to Ontario businesses. Estimates of 2011-2012 spending indicate that this figure approaches CAD2 billion. This spending is highly focused on strategic industries and job creation, in particular the "Next Generation of Job Funds" and its focus on advanced manufacturing, biotech and pharmaceuticals, renewable energy, digital media and information communications technology, financial services (Ontario 2009C). In addition to the Next Generation of Jobs Fund, Ontario provides a series of targeted funding envelopes including the CAD500 million Automotive Industry Manufacturing Strategy for the development of new technologies and innovations in the automotive industry, CAD150 million Innovation Demonstration Fund (IDF) for clean technology companies, the CAD160 million Biopharmaceutical Investment Program for the life sciences sector, and a CAD160 million "Ideas-to-Market" strategy for emerging technology companies aimed at "born in Ontario" entrepreneurs. Moreover, recent moves by the Province to rationalize its business support spending are not premised on a desire to reduce direct transfers to enterprises, but rather to reduce the administrative cost of delivering such programs. As the Province's 2012 Budget document notes, "the creation of the Jobs and Prosperity Fund as a means of reducing duplication and administrative cost of business support programs. This move will produce administrative savings of at least 25 per cent and overall savings of CAD250 million in 2014-15" (Ontario 2012).

The CAD1.15 billion (over 8 years) Next Generation of Jobs Fund (NGJF) is central to the Province's innovation and economic goals. Government documents describe the initiative as a "strategy that can help innovative companies take the lead in worldwide markets which offer long-term growth potential" (Ontario 2009C). As part of the funding criteria for the NGJF, projects must breach a CAD25 million threshold and/or create a minimum of 100 "good" jobs. As noted by the European Union's review of international business support programs, the NGJF was a novel program designed to "compete with other jurisdictions that provide business

subsidies and to achieve provincial objectives related to creation and support for innovative companies” (EC 2009).

Other Ontario incentive programs include research and development tax incentives that are promoted as enabling upward of 60 percent reduction in the after-tax costs of research and development. The 32 recipients of IDF funding have exclusively been companies whose activities are highly focused on green initiatives, be it product or process innovations with environmental benefits, alternative energy development, clean-water innovation or other environmentally-focused activities. Funding support for the 32 recipients has ranged from the mid-six figures to the ceiling of CAD4million with an average grant amount of over CAD2 million. The export potential of such innovations, and the government’s explicit funding support, lend credence to the perception that the Government of Ontario is picking winners akin to an interventionist industrial and strategic policy.

To be sure, the Province continues to use supply-side tax incentives as a means of attracting investment and employment in nascent industries. However, the aforementioned funding strategies for these sectors places a distinct prioritization on direct support, akin to industrial policy and explicit state intervention. As figure 2 highlights, grants under the NGJF can be applied to nearly all operational activities associated with new products and projects.

Figure 2 – Ontario Next Generation of Jobs Fund eligible costs

Ontario		Jobs & Investment Program – Project Costs Summary Table	
Eligible Costs		Ineligible Costs	
Equipment and Machinery		Ongoing Costs of Production or Operations, including Labour	
Construction/Leasehold Improvements		General Working Capital Requirements	
Labour (one time, start-up related costs)		Land or Buildings (except purpose-specific buildings or retrofit construction)	
Materials (prior to saleable product)		Transaction Costs	
Overhead		Business Case Preparation	
Research, Development, and Training		Vehicles and Off-Site Equipment	
Other Costs: that are directly attributable to the Project		Costs Not Incurred in Ontario	

Source: Ontario 2009D

In response to questions from members of the opposition regarding the existence of direct business supports, then-Finance Minister Dwight Duncan explains the NGJF as a contemporary means of “collaborating” with industry, a process that Ontario’s primary competitors utilize. He notes:

Our government has been partnering with the business community over the course of the last five years. That's what the Next Generation of Jobs Fund is all about... Governments around the world today are interfacing with business, are investing in business, are providing assistance to the auto sector --Japan, China, Germany, the United States, Canada, Sweden; a variety of countries. We (also), in fact, offer a variety of funds that are designed to assist with the preservation of jobs and to help create new jobs, particularly those new jobs that will be prevalent in the 21st century (Duncan 2009).

Fernando Traficante, then-Director of Funding at the Ministry of Economic Development, adds that the NGJF “is not just simply to support what we’d call day-to-day activities of the companies, but it’s a development of new products, new technologies, innovations, which will make a change with respect to the company and create capacity in the

province” (Traficante 2009). His testimony reflects that of then-Minister Michael Bryant. He notes that other tools at the government’s disposal, notably broad tax reforms, are an inefficient means of promoting growth. In particular, he states “the advantage of doing it this way (via direct grants) is that we are able to make efforts to put it towards those companies and sectors that have proven themselves in some fashion to be innovative. So it means that it is a better investment and a better chance of the taxpayer dollars being leveraged for greater success” (ibid). Disregarding for a moment the question of process and of how those investments in sectors and companies are made, the language used by Bryant makes it clear that the government saw itself as an active participant in the market, a role acknowledged as potentially distortive. This potential cost, however, is seen as acceptable given the potential for more focused returns.

This discussion of the tools available to catalyze and support business development in targeted sectors holds significant relevance to the theoretical review conducted earlier in this dissertation. Ontario’s approach highlights a spectrum of policy tools that includes tax credits (a form of regulatory flexibility as noted by Cerny and Jessop), research commercialization and research support in the middle (ala Mazzucato) including the use of third-party facilitating agencies, direct grants and investments to select firms, and the use of discriminatory content requirements. While Arizona focused its policy approach equally between components, Ontario shows a far greater focus on employing the more activist or interventionist tools at their disposal.

On the topic of returns on investment, while this dissertation explicitly does not seek to ascertain the benefits of the funding programs studied, it is instructive to note the impacts on employment and investment believed to have resulted from the Province’s suite of innovation programs. Since the inception of the Next Generation of Jobs Fund in 2008, the government notes that it has committed CAD714 million in support to 33 projects. In so doing, the program has “secured” (defined as either job creation or retention) 8,368 high-skilled jobs. The Government’s Advanced Manufacturing Investment Strategy, launched in 2005, has made loan commitments exceeding CAD160 million, securing 5,100 jobs. And the more recently launched (June 2010) Strategic Jobs and Investment Fund has provided CAD83 million in support (CAD52.4 million in grants and CAD31 million in loans) to secure 2,200 highly skilled jobs.⁸⁵ This multi-year CAD375 million fund is the successor to the NGJF. It consists of conditional

⁸⁵ Data in this section collected from Government of Ontario, Ministry of Economic Development Results-Based Plans 2008-2009, 2009-2010, 2010-2011, 2011-2012.

grants and repayable loans, is similarly focused on strategic industries and aims to “attract strategic investments in innovative projects that will help transition Ontario’s economy and build global competitiveness and long-term prosperity” (Hoskins 2014).

What is evident across these business support programs is the focus on new, generally high-value, high-technology industries as the core of government’s attempts to create new areas of global competitive advantage. Accompanying this focus is a belief amongst both political and bureaucratic stakeholders that such sectors are the key to future economic and employment growth.

Targeted Industries

Ontario’s Innovation Agenda, and the direct and indirect funding programs that have been developed to operationalize its goals, have focused on several industries defined internally as innovative and high-value. In particular, the green or renewable energy technologies, information communications technologies, and the life sciences or bioscience sector have been targeted for public investment. Fernando Traficante, former director of the Next Generation of Jobs Funds, notes when interviewed that the selection of these specific sectors was the product of a lengthy process of negotiation between Ministry and political staff. This process was shaped, he argues, by ongoing debate about the definition of “innovation” and the belief amongst most industry stakeholders that they are “innovative.”⁸⁶

Then-Minister of Research and Innovation John Wilkinson explains that the selection of targeted industries was based on two factors. First was a desire to transition Ontario’s economy away from its traditional, manufacturing base which was hampered by a high dollar and high energy costs, towards industries whose knowledge-intensity would allow Ontario a relative competitive advantage. Second was a desire to focus the Province’s investments towards a select group of industries it believed were not just globally competitive, but rather “best, or top three” in the world.⁸⁷

The resultant choice of industries reflects these beliefs, and an underlying desire to transform the Province’s manufacturing base away from traditional sectors to a role alongside these nascent sectors understood as critical to the Province’s future. The following section

⁸⁶ Traficante 2013.

⁸⁷ Wilkinson 2013.

presents two case studies on industries identified by the Province as critical to its future and reviews the policies and programs that have been implemented to push the sectors forward.

Case Study: Green Technology & Renewable Energy

Across the floor of the legislature, the evolving competitive pressures of an increasingly dynamic global economy are understood as requiring a more active state role. As has been shown, however, this increased role is targeted towards specific industries understood as innovative and high-value. Key amongst them is the green technology and renewable energy industry. As Peter Tabuns, an opposition party member, notes in remarks made to Committee on the Province's clean energy investments:

It is very apparent that in the United States, China and the European Union they understand that just as the space race defined a lot of technological policy... in the 1950s, 1960s, and 1970s, the clean energy race, the race both for the industries of the 21st century and for energy security, is going to be critical to the well-being of government and nations in the decade to come, and we can't afford in Ontario, in Canada, to be non-players, to be out of those races, to be losers, laggards in that race. China is becoming a leader in renewable energy; we are a bit player. (Tabuns 2009)

His comments are instructive for two reasons. First is the positioning of the Province as a direct competitor to national level states, an understanding that speaks to the role of mid-level governance structures in the global political economy. The support provided by the Province towards this industry has come independent of federal level funding, and indicates a strong degree of policy independence. Second is the notion of a race for industries of the 21st century, and the positioning of renewable energy technology as central to it.

Then-Premier Dalton McGuinty echoes this language of foresight-driven industrial competition by noting that "We're stepping up (investment in clean technologies) because Ontario is not going to let others steal our future out from under us -- we will produce the next wave of clean technologies that create jobs and clean up the environment" (Ontario 2008C). Communications from the government throughout the initial phases of Ontario's green energy

and clean technology push include a repeated reference to the creation of “more than 50,000 new jobs.”

Third-party analysis of the nascent sector provides support for the government’s perspective on the industry. A study completed by an Ottawa-based consulting firm noted that “Ontario's clean technology companies face intensifying foreign competition, as Ontario, itself, competes with other jurisdictions to attract investment in clean technology businesses” (Hamilton 2009). The author goes on to note that the industry’s success requires “something to prime the pump,” in specific reference to an activist role for the Ontario government, akin to measures seen in competitor U.S. states.

This activist role in Ontario’s clean tech or renewable energy sector is demonstrated through two pieces of policy. First is the Next Generation of Jobs Fund and its explicit focus on clean and renewable technologies. Through both it and the Innovation Demonstration Fund, Ontario has channeled millions to private companies in the sector. In addition, and perhaps more impactful, is the Province’s Green Energy Act (GEA). While tied to both environmental and economic factors, representatives from across the Government note the Act’s role in creating a new industry in the Province. Then Minister of Economic Development Michael Bryant explains to Committee on May 13, 2009 that “within the Green Energy Act, the goal is to create a cluster from end to end, from emerging technology commercialization through to the manufacturing of it” (Bryan 2009D). Therein, employment is inseparable from any environmental benefits. Then-Deputy Premier and Minister of Energy and Infrastructure George Smitherman explains it as follows:

"Encouraging the development and adoption of clean technologies right here in our own province is the right thing to do for our environment – and our economy. Soon, I will be introducing a new Green Energy Act designed to support home-grown innovation, create thousands of green sector jobs and make Ontario a world leader in renewable energy, energy efficiency and conservation" (Smitherman 2009).

Subsequent defense of the Act, and its heavy investment in the sector, by then-Premier Dalton McGuinty similarly focused on this confluence of economic and social purposes, noting that

“some place is going to secure thousands of jobs by researching and developing new solutions (to climate issues), and we want that place to be Ontario” (McGuinty 2007).

Despite these altruistic goals, not all stakeholders are satisfied. Some, notably domestic political opposition members, have criticized the Province’s strategy on the basis of its market distorting effects and a rhetorical critique of what they have termed “outdated 1990s industrial policy” (Hudak 2012). Others, such as the Ontario Environment Industry Association (ONEIA) notes that the “opportunity cost of engaging with the Next Generation of Jobs Fund program has meant that the SMEs targeted through these programs have been unable to access them due to the complexity of the application process, and the size of the thresholds for investment and job creation (too large).”⁸⁸

Alex Gill, Executive Director at ONEIA, continues on to note that “the policy was developed with little stakeholder input, in part because of the speed with which this file was developed; a speed that was framed as necessary given the rhetoric being used around China’s advance in this sector” (ibid). This critique aside, Gill goes on to note that the government’s strategy of channeling funds directly to corporations rather than via academic research speaks to a broader perception that “universities have underperformed on the translation of ideas and research into real products. In contrast, the washout rate for research funding in companies is far lower – they already have people and pipelines in place, and capital and markets ready to make that research commercializable.” And while Gill is critical of the government’s targeting efforts insofar as they relate to company-specific funding, he argues that government could and should play a role in driving demand by acting as a first customer and thus a legitimizing force for small local companies.

The GEA, and the accompanying legislative framework for a Feed-in Tariff (FIT) program respond to this latter point. By offering guaranteed pricing structures and other incentives to developers of renewable energy projects in Ontario, the program aims to increase the share of renewable energy in the province’s electricity mix by insulating green energy producers from risks, and facilitating investments that would otherwise be costly yet are seen as necessary by the government to catalyze this new industry.

⁸⁸ Gill, Alex. 2013. Personal interview with Alex Gill, Executive Director, Ontario Environment Industry Association, May 23.

This type of industry participation, if not leadership, however, has brought the Province into a direct line of tension with competitor nation states. For within the GEA and the accompanying FIT program lie a set of domestic content provisions that aim to stimulate the development of new technologies and processes in Ontario. These domestic provision levels start at 25% for wind projects, with projected future increases to 50%, 40-60% provisions for micro solar photovoltaic (PV) projects, and 50-60% provisions for larger solar PV projects (Ontario 2009E).

Unsurprisingly, Ontario's renewable energy feed-in tariff programme has attracted significant attention from other countries who accuse the Province's policy of unfairly discriminating against foreign renewable energy products through its domestic content clause. WTO disputes launched by Japan and the European Union in September 2010 and August 2011 respectively (WTO DS412 Japan-Canada-Renewable Energy and WTO DS426 EU-Canada-Feed-in Tariffs) both sought to compel the province to lessen the discriminatory walls erected by the strategy. European Union documents highlight an understanding by the EU that the domestic content provisions set for wind and solar are the outcome of direct political instruction to the Ontario Power Authority from then Minister of Energy George Smitherman (EC 2009).

In late 2012, a WTO panel ruled in favour of Japan and the EU on the illegality of the preferential treatment afforded to domestic producers under the GEA. Action to address this ruling, however, was slow owing to the fact that as the Province – as opposed to its senior level federal partner - is not a member of the WTO, it is not subject to direct repercussions from other member states. Instead, rulings are passed via the Canadian federal government which must subsequently negotiate with the Province to obtain changes in the provincial policy. Moreover, it may also speak to the strategic nature of the Act, and the understanding that while illegal under WTO law, the GEA provided the Province with a, in this case, four year window with which to prime a nascent industry. As then-Premier McGuinty noted in a September 24th 2009 speech, "I want every American governor to say, 'Why did we not think of that and why did we not put that in place?'" (Hamilton 2009B). The creation of a window for industrial policy in spite of global economic law might just be one of the reasons for this jealousy.⁸⁹ In a 2014 Globe and Mail

⁸⁹ Similarly, the NGJF has drawn the ire of the British ICT industry. The 2009 announcement by the McGuinty government that video-game maker Ubisoft would set up offices in Toronto, thus creating 800 jobs over 10 years, with the help of tax credits and direct investment of over CAD263 million was denounced as an "unfair trade

article regarding the growth of Ontario's solar industry, KPMG Vice President for global infrastructure, Georges Arbache, argues that the rapid evolution of the Province's solar industry is a product of the government's attempts to protect it. He notes that the Green Energy Act and its local content provisions "succeeded in creating strong local firms with expertise in manufacturing and a reputation for high quality." He continues on to say that the GEA "and the FIT program is what created the market... I don't know that we would have been able to achieve what has been achieved without it" (Blackwell 2014).

Ontario's strategic investment in green technologies is a central tenet of the province's Innovation Agenda, and its explicit focus on the development of new industrial clusters. To be sure, the impetus for this government-as-catalyst approach to competitiveness is one borne with both economic and social/environmental considerations. However, in so far as the government has taken on a direct role as an investor in private research and development in this sector, and insofar as it is driven by a perspective framed by a competition with neighbouring jurisdictions and emerging markets alike, the targeting employed by the government is akin to a contemporary form of industrial policy. This presents Ontario's approach to the economy in neo-mercantilist fashion, heavily influenced by a perspective of inter-state competition that pits states against one another for investment and employment creation. Therein, the state acts to shape market dynamics, and the fortunes of both the broader industry and specific companies within it.

Case Study: Life Sciences and the Bio-economy

In May 2009, then Ontario Premier Dalton McGuinty was awarded the Biotechnology Industry Organization's (BIO) second annual International Leadership Award for "his strong commitment to the development and growth of the biotechnology industry in Ontario, Canada" (BIO 2009). BIO noted that under McGuinty's leadership, the Province had developed several funding programs for research and innovation related to the life sciences and biotechnology field, including the CAD3.2 billion dollar Innovation Agenda and the Biopharmaceutical Investment Program included in the Next Generation of Jobs Fund. These investments, BIO noted, ensured Ontario's progress towards its place as a global biotechnology hub. Such optimism would surely

practice." Stakeholders demanded, so far with little success, that the UK government introduce similar preferential treatment to prevent a "brain drain" of talent and investment to Canada. See "Ubisoft gains from trial and error approach," Financial Times, September 2, 2009. <http://www.ft.com/cms/s/0/2e6e6d7c-97e8-11de-8d3d-00144feabdc0.html>

sit well with the Ontario government which shared this view, and justified its allocation of public dollars towards the industry on the basis of the employment which was believed to follow it. As McGuinty noted at the time of the award, "Our government will continue to fund (researchers) efforts so Ontario is the home of the next generation of breakthroughs, the next generation of businesses and the next generation of jobs" (ibid).

In so doing, the Province builds on two decades of public funding directed towards the biotechnology, and more broadly, life sciences industry. This investment began in the 1990s as part of the then-governing New Democratic Party's (NDP) commitment to the Industrial Policy Framework, and an explicit targeting exercise contained within it. The biotechnology sector was amongst these targeted sectors and, via the Ontario Biotechnology Council, received funding to develop a strategy to help "move the sector towards higher-value activity and greater international competitiveness" (BCO 2006). This attempt to strengthen the sector comes at a time of "profound restructuring" and transition in the Ontario economy. As Wolfe and Gertler (1999) write, the introduction of the Canada-U.S. Free Trade Agreement in 1989, followed by the North American Free Trade Agreement in 1993, saw a concerted push by provinces across Canada towards more knowledge intensive sectors.

After a brief period of spending cuts that saw sector specific funds decreased, in 1997 the newly elected Conservative government established the CAD500 million Ontario Research and Development Challenge Fund as a means of "keeping Ontario at the leading edge of science and technology and help the province create long-term jobs" (Ontario 1997). Then Minister of Finance Ernie Eves noted that "We are investing in R&D to create jobs for the future" (ibid). This funding notwithstanding, the focus of the then-government was heavily placed on tax reform and the use of tax incentives as a means of increasing economic growth. The Biotechnology Council of Ontario (BCO) notes that this period of government saw a reinforcement of the "foundations" of research and development for the development of the industry (BCO2006).

The 2003 election of the Liberal Party led by Premier Dalton McGuinty saw a distinct shift in procedural strategy as a passive approach focused on tax credits gave way to a far more active approach focused on direct grants. This shift represented, according to senior bureaucrat Fernando Traficante, as much of a philosophical shift about the role of government as it did a

pragmatic shift about growing competitive pressures.⁹⁰ Lorne Meikle, former President of the Ontario Biotechnology Initiative⁹¹, notes that the change in governments in 2003 saw a different approach towards the industry take hold – one that favoured more direct interaction.⁹² Meikle cautions, however, that the previous government was the one that had started MaRS and “put the wheels in motion” on significant sector attention.

Meikle adds:

“The shift in the role of government in the (life sciences) sector was premised on two issues. First, there was a change in the internal industry dynamics: while the 1990s saw a very good venture capital market for early stage bio companies, this disappeared in Ontario in the early 2000s. Government then had a role to play in filling that financing gap. Second, while government in Ontario traditionally had no appetite to do more than fund research, the arrival of the Liberal government in 2003 saw a more direct relationship between the government and industry around commercialization.”

Key to this focus on commercialization was the Next Generation of Jobs Fund and the Biopharmaceutical Investment Program contained within it. The program saw CAD150 million made available to attract new biopharmaceutical investments into the Province, or to enhance existing ones. Then Minister of Economic Development and Trade Sandra Pupatello noted that the investment was “focused on increasing the amount of health research and advanced manufacturing activity happening in Ontario” (Ontario 2008E). This broad goal, and the competitive pressures from both new and old economies, is expanded upon in Ontario’s Life Sciences Commercialization Strategy:

“with Ontario’s share of the global bio-medical market currently at just 2 per cent, we have the potential to do much better. With stakes this high, there is plenty of competition. From well-established jurisdictions like Boston and Southern Carolina to rapidly emerging bio-clusters in the development world, many other jurisdictions worldwide are investing aggressively in life sciences” (Ontario 2010:6).

⁹⁰ Traficante 2013.

⁹¹ The Biotechnology Initiative was the predecessor to the current day Life Sciences Ontario, the lead industry association for life sciences and biotechnology companies in Ontario.

⁹² Meikle, Lorne. 2013. Personal interview with Lorne Meikle, June 19.

Meikle adds to this perception of competition by noting that “competition in the sector was understood both domestically and internationally. We competed heavily with Quebec, who was long willing to participate directly in private market activity, and across the border with the traditional industry clusters in Boston and San Diego. Internationally, China, India and South Korea were all growing competitors in the (life-sciences) sector.”⁹³

These competitive pressures also highlight the demands of domestic firms, and how the ability to weigh offers from other jurisdictions allowed local firms to catalyze public investments in the sector. Graeme McRae, President & CEO of Bioniche Life Sciences Inc. notes that “Canadian biotechnology companies often sell their technologies at early stages. Investments such as this one by the McGuinty Government should assist companies in attracting the necessary venture capital to take their technologies right through to commercialization in Ontario, which will keep the jobs in Ontario” (Ontario 2008E). Public funding, be it direct grants or other, are thus framed as essential to Ontario’s ability to host a competitive and sustainable industry vis-à-vis alternative hosts across North America, and increasing competition from both developed and developing markets.

The BCO expands on this notion of alternative hosts by stating in a 2006 report that “if Ontario is to compete successfully with other provinces and countries ... then the Province’s life sciences sector will need to operate within a regulatory, legislative and policy framework that is competitive and conducive to increased R&D investment and its commercial exploitation. Ontario needs to more aggressively foster an “innovator-friendly” environment by enhancing the attractiveness of local market conditions, i.e. by enhancing investment and tax incentives, and by reducing regulatory barriers to commercialization” (BCO 2006).

The Province’s commercialization strategy for the sector responds to these demands with three primary thrusts (Ontario 2010):

1. The promotion of “greater collaboration” between government, academia and industry.
2. Positioning Ontario as the “go-to” place for foreign direct investment in advanced health technologies and pharmaceutical innovations.

⁹³ Meikle 2013.

3. Growing the “homegrown biotech industry... to the point where it rivals those of leading centres in the US and abroad.”

These priorities can be translated to read as:

1. The alignment of public research and private enterprise to improve what was regarded as a weak or underperforming commercialization rate for public investment in the sector (Nature 2008).
2. The use of public finances for the attraction of foreign investment, and the subsidization of operations and investment.
3. A focus on startups and domestic small and medium enterprise whose flight risks are lower than those of multinational corporations.⁹⁴

Across these priorities the role of public investment in private outcomes is significant and clear. The coordination of academia and industry facilitates the transfer of public research to private enterprise for commercialization purpose. While indirect, state funds thus subsidize private research and development. The use of public funds for FDI attraction is standard across jurisdictions but again clarifies the role of the state in shaping domestic industry dynamics. Finally, a focus on “homegrown” startups in the sector allows this former strategic thrust – FDI attraction – to be made less central to long-term growth strategies. This last element extends the spectrum of policy tools as understood in the accompanying body of theory. While the above roles highlight Mazzucato’s (2013) focus on research and Eisenger’s (1988) focus on FDI promotion, this latter focus on the development of domestic firms, early stage and mature, is tied in part to Jessop’s SWS and Cerny’s competition state but builds a far more robust understanding of how the state looks beyond enabling infrastructure to play a direct role in the development and survival of these firms. Ontario’s multi-faceted approach highlights that existing theoretical

⁹⁴ The BIP project was discontinued in March 2010. The remaining project funds were channeled to programs targeting “home grown” firms (Rosiello and Mastroeni 2010:56).

frameworks fail to capture the complexity and diversity of strategic approaches used to promote and guide contemporary economic activism at the sub-national level.

Entrepreneurial promotion

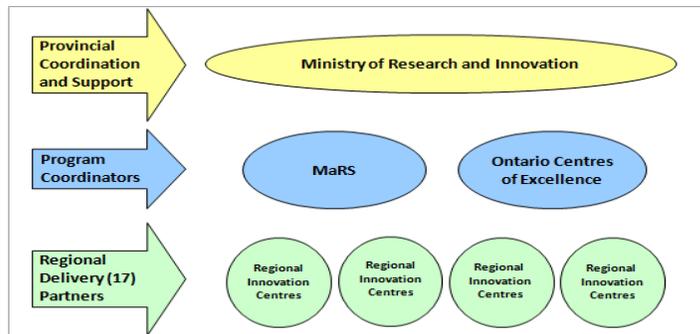
Building on the aforementioned focus on “homegrown” economic development, the development of a pipeline of new, startup companies in targeted sectors is a key element in the Province’s long-term industry strategy. While entrepreneurial promotion is a common policy strategy, as espoused by Cerny and Jessop and enabled via business climate and infrastructure improvements, the sectoral targeting within Ontario’s approach, and its congruence with the governments’ focus on five specific sectors, lends themselves to the conclusion that the Government of Ontario is actively pursuing a targeted industrial promotion strategy through these startup-oriented efforts.

In so doing, however, the government has actively channeled funding through third-party organizations, notably the Toronto-based MaRS, and similarly public-funded centres of excellence and regional innovation centres (RIC) set up across the Province. These efforts highlight a desire to develop a grow your own strategy designed to accelerate innovative entrepreneurship and firm growth. Doing so is enabled by provincial funding, although it is delivered by agents that include the aforementioned third-parties.

MaRS was established in 2005 by the Provincial Government, with Federal support, to “support innovation and help Canada’s leading science and technology entrepreneurs build successful global companies” (MaRS 2013). Through the provision of business advice, access to market research and networking with sources of capital, MaRS is the primary delivery agent, and provincial coordinator, for the Province’s “home grown” innovation strategy. Like the broader Innovation Agenda, MaRS’ focus is on the same set of targeted, high-growth sectors: clean tech, ICT, life sciences and health care and advanced materials. Provincial grants represent approximately 80% of MaRS annual program budget. In tandem with MaRS, the Province has established 17 regional innovation centres which serve as regional focal points for a similar set of business services, training and funding. Finally, an overlapping network of “centres of excellence” focus on developing industry-academic collaboration in the guise of accelerating the commercialization process. Across all three elements of Ontario’s innovation network, funding is fully public, and operational targets are based on the delivery of Ontario’s Innovation Agenda

(see figure 3). In addition, the focus of each component within the Network is on “innovation-based entrepreneurs/firms to develop high-value, leading-edge products and services for sale in export markets; start and grow globally competitive firms; and create new, high-paying jobs” (Ontario 2013).

Figure 3 – Ontario’s Research and Innovation Network Structure ⁹⁵



Funding available through this network includes the MaRS-administered Investment Accelerator Fund, allocated on behalf of the Province which provides up to CAD500,000 in seed funding for qualified companies in Ontario. The industry prioritization for this granting program is focused on advanced materials and manufacturing, information technology, clean tech and life sciences – congruent with the government’s stated priorities. Since the program’s inception, over CAD26 million has been invested in 57 companies who fall in these sectors. The structure of the IAF, flowing as it does through third-party, non-government organizations, thus allows for the minimization of a perceived government role in the growth of this entrepreneurial space.

In 2013, Bill Mantel, Assistant Deputy Minister for Research, Commercialization and Entrepreneurship at the Ministry of Research and Innovation, noted that the development of regional innovation centres provide a means of upgrading the relationship between academia and industry.⁹⁶ In so doing they act to increase the rate of tech transfer and commercialization that is, at its heart, publicly funded. Mantel adds that research funding channeled through the COEs is focused on areas and sectors “relevant to the economy” and to the prioritized industry sectors. These third-party, non-government RICs are, according to Mantel, the primary vehicle for

⁹⁵ Source: Ontario 2013.

⁹⁶ Mantel 2013.

homegrown innovation and competitiveness. He describes the strategy as a “smarter, and more effective means of turning innovation and research into growth.” He acknowledges, however, that “every once in a while you get into a competitive race and, then, you have to play the game. It’s an evil game but we have to play it. However, we only play it when it’s important to the Province’s future” (ibid).

While the funding provided through such centres is far smaller in aggregate size than the aforementioned Next Generation of Jobs funding (which averages over CAD20 million per grant), it flows to “made in Ontario” startups and nascent enterprises. Moreover, while this focus on helping grow enterprises and employment in the Province has immediate benefits (both political and economic), the secondary impact of growing this pool of firms may be an eventual lessening of the need to compete for trans-national investment location. In comments made at Legislative Committee in 2009, then-Minister of Economic Development Michael Bryant noted the handcuffs placed on government by corporations shopping for a jurisdiction to host their investment. “The risk is that if we don’t partner with them, they go elsewhere and take those jobs with them” (Bryant 2009C). The language of “partnership” alludes to the business of subsidies and government investment that sees jurisdictions compete against each other for corporate investment.

Former Minister of Research and Innovation John Wilkinson voices a similar message related to the benefits of home grown corporations, and to the potential long-run effects of hosting the first stages of ideation and invention:

In the global race for R&D, we know that when a company invents something, if we (the government) are there at the inception of that invention as a partner, we then have leverage by being a partner to ensure, as best we can, that the commercialization of that new molecule or that new breakthrough in genetic engineering is something that can be commercialized and turned into high-quality, high-end manufacturing jobs right here in the province of Ontario (Wilkinson 2008).

To be sure, the gravitational hold of place is true for both large and small companies vying for subsidies or investment from competing jurisdictions. However, a perspective emerges from across the interviews for this dissertation that privileges incumbent places when they facilitate

and fund the transition of homegrown ideas into domestic firms. Here too, extra-jurisdictional competition plays a significant role in the design and funding of start-up assistance. Documents obtained from MRI note that “In North America alone, more than 20 US States have started new programs to support entrepreneurs and start-ups similar to the ONE and SBECs. More than ever there is a need to challenge the status quo and seek out ways to further improve” (Ontario 2013).

George Ross notes that the use of such third-party facilitators does come at a cost. While direct granting activity provides politicians with ready-made photo-opportunities and explicit (albeit ill-defined) metrics regarding job creation, less direct channels via third party centres of excellence may provide better long term results but with less upfront fanfare. Navigating and balancing the demands of elected officials alongside the prioritization of the most effective means of transitioning the economy are thus a necessary but insufficient means of promoting this second pillar of transition and innovation.⁹⁷ Pragmatic economic and political realities force an optimum strategy to share space with more direct funding programs.

Across interviews conducted for this dissertation, a clear preference and prioritization of this “grow your own” strategy emerges. The renaming of the Ontario Network of Excellence to the “Network of Entrepreneurs” in early 2013 reflects this preference. While ostensibly done because “entrepreneurs drive projects to the market,”⁹⁸ the effect of public policy that prioritizes the subsidization of homegrown development has significant impacts on the interplay between domestic and international actors. Notably, a privileging of a pipeline of domestic firms may, once a certain level of output is achieved, shift the balance of power that governs the relationship between multinational capital and jurisdictions competing for their investments. While interviews have so far been inconclusive on this matter, it demands further attention given the potentially significant impact it may have on the role of the state vis-à-vis international capital. A second important impact of this strategic shift by the state, insofar as it funds local startups instead of large anchors, is the ability to channel an increasing amount of corporate subsidization through quasi-permissible definitions of research funding as defined by the WTO. In so doing, this highlights a major flaw in the architecture of global trade given the inherently discriminatory

⁹⁷ Ross 2013.

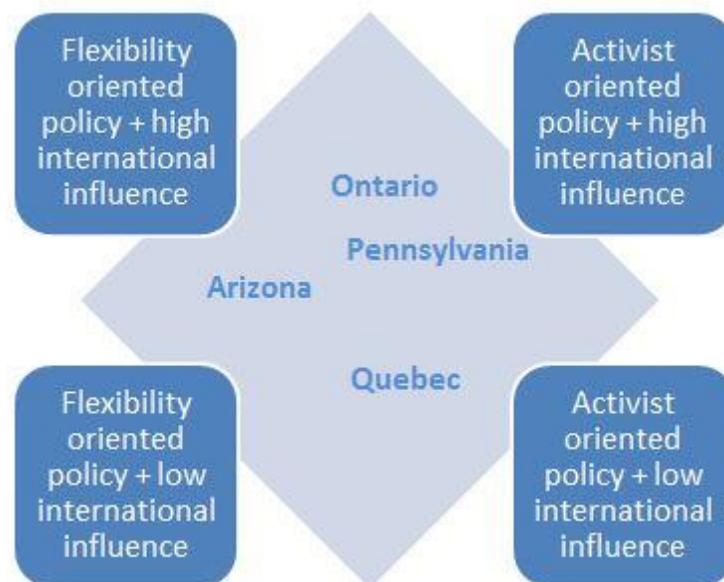
⁹⁸ Mantel 2013.

nature of a “homegrown” funding orientation, and the barriers to entry which less developed countries are likely unable to overcome.

Conclusion

This second empirical chapter provides a unique analysis of the industrial and innovation strategies employed at the sub-national level, and the manner in which global economic change is interpreted and acted upon by government officials. The analysis of Ontario’s strategies related to the development of new sectors, and the Province’s activism with respect to that development, highlights an example of the persistence of state intervention in the economy, albeit in a differentiated manner than traditional, big project industrial policy.

Ontario has done so as a result of both exogenous and endogenous drivers, with the former playing a significant role in shaping the views of policy makers in the Province. Notably, Ontario has refused to compete on the basis of labour and wage related flexibility. Instead it has sought to carve out industrial niches in high-value innovative sectors including renewable energy and the life sciences. Support is directed heavily towards these industries defined as innovative and future-oriented. This support is channeled directly from government and sometimes indirectly through third-party non-government organizations. Both routes of funding see an increasing focus on the creation of homegrown firms and entrepreneurship in the targeted sectors



As shown in matrix above, Ontario's strategies highlight a very activist and high-value approach to intervention. This in contrast to the more flexibility-oriented conception of the state's thrust as proposed in work on the competition state and as seen in Arizona. Moreover, while both international and domestic factors shape the province's approach to industrial policy, the impact of exogenous competitive pressures is viewed as more significant. All together, these forces have catalyzed the Province's interventionist approach to the economy, and to the processes of economic transition. Ontario's policies also highlight the state's ability to learn from its environment and find gaps amongst the rules and structures imposed on it by other orders of governance to build policy space that enables transition. Ontario's use of an albeit short window to provide discriminatory advantages to domestic renewable energy firms is a prime example.

Ontario's approach is thus far more interventionist than orthodox conceptions of the role of the competition state allow. Moreover, while Ontario's strategies with respect to industries that are perceived as highly innovative touches on Jessop's conception of the Schumpeterian Workfare state, it does not include the latter's focus on labour flexibility. And while the province's channeling of funding to third-party intermediaries presents a strategy akin to what Mazzucato (2013) finds on the national level in the United States, its direct granting to companies in targeted industries for operational and research expenses and its development of policies to provide protected competitive space for them shows a far more intertwined public role in the operational activities of private firms. Ontario highlights that the role of the sub-national state is not just to interact on the establishment of the business environment or infrastructure. Rather it plays an ongoing role in the development and activity of targeted markets and targeted firms.

It does so because of its sense of what Cerny calls "raison du monde" or its understanding of its external environment. As the global economy has evolved, Ontario must evolve not only its local economy but also the role of the state in that local economy. Raison d'état has indeed been replaced by raison du monde, albeit within the ongoing confines of a strong state role in both interpreting those trends and leading the transitions and responses that result from them. And while the force with which this state intervention is implemented increases after the full impact of the post-2007 global economic crisis is felt, the first moves towards the establishment of new sectors predates any such economic turbulence.

Chapter 5: Pennsylvania's state-driven transformation

The re-birth of Pittsburgh as a hub for so-called “creative work” as documented by Richard Florida (2002) is often used to detail the process of economic transition in mature economies. This story, however, captures but a limited aspect of the true transformation underway both in Pittsburgh and the state it resides in, as well as the forces and actors that helped usher the broader economic transition along. This case study aims to unearth the deeper story of economic transition in the state of Pennsylvania, and in particular, aims to concentrate on the role of the state government in this transition to a knowledge-based economy.

Moreover, if the previous two empirical chapters of this dissertation have presented relatively nascent examples of the sub-national state's activist role in the development of new industrial sectors, the next two chapters will present examples of more long-run state activism in the economy. Pennsylvania, for example, has seen several decades of state activism towards the development of new industrial sectors. In both its recent and more historical interventions, the state's role has responded to changes in the global economy and their local ramifications. In reviewing this history, this chapter presents a more long-run view of the sub-national role in economic transition and the development of new industrial sectors. It argues that the sub-national state plays a leadership role in the development of specific, targeted sectors of the economy. Moreover, Pennsylvania's longer-term policy orientation towards intervention, beginning as it did in the 1980s, provides a unique look at how these reactions evolve amidst different political and ideological structures. It does so primarily through the development of third-party intermediaries that, while ostensibly independent, respond directly to state-level policies and priorities. All together this chapter presents a further example of a sub-national state's attempts to privilege high-value innovation over labour-related flexibility as a means of navigating economic transition. In so doing, it adds further context to our understanding of the role the sub-national state plays in the economy and how it does so.

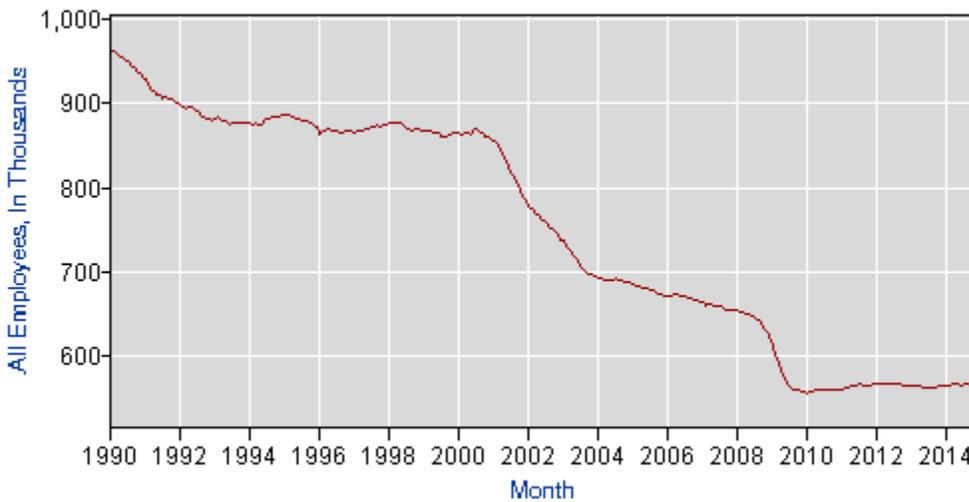
The chapter develops this argument by first analyzing the historical processes of state intervention and state response to exogenous economic pressures. It begins this analysis in the 1970s with a look at the impact of the rise of Japan's steel industry on Pennsylvania's domestic sector. Second, we then move to reviewing the third party organizations that have been

established as a means of responding to these global trends, in particular the Ben Franklin Technology Partnership (BFTP). The third part of the chapter looks to the present and the processes and policies utilized by the Pennsylvania government to facilitate ongoing transition and industrial development in a pair of targeted sectors. These policies include a significant focus on the role of the state as an investor, either directly or indirectly, in firms that operate in the state's prioritized innovation sectors. A fourth section provides two case studies of targeted sectors and the policies used to develop them. The chapter concludes with a discussion of how Pennsylvania's policies and strategies inform our understanding of the activist sub-national state, and the drivers for this activism.

Driving Forces

English writer Samuel Johnson's famous quote, "nothing so concentrates the mind as an imminent hanging" is often used to describe the economic situation facing the political leadership of the state of Pennsylvania in the 1980s (Thornburgh 2003: 126). The economic crisis facing the state was severe. Statewide unemployment neared 20 percent, and in major centres such as Pittsburgh, upwards of 35 percent of the workforce was without work. The collapse of the steel industry in the face of cheaper Asian competition left the state facing an economic and social abyss. Facilitating a rapid transition away from the state's reliance on its manufacturing industry, the heart of the Pennsylvania's economy since the Industrial Revolution, was non-negotiable. Since the 1970s the sector had seen ongoing declines in employment, and between 1979 and 1985, 21.5 percent of manufacturing employment in the state disappeared (Osborne 1988: 45). As shown in Figure 4, this trend has continued forward to the present, albeit at a decreased rate of disappearance.

Figure : Manufacturing employment in Pennsylvania (1990-2015)



Source: United States Department of Labor (2015).

The 1980s marked the climax of these troubles. Competition from Japan in traditional areas of economic and employment strength, notably the steel industry, eroded the state's competitiveness and was a proximate cause in the dramatic increase in state-wide unemployment. As unemployment soared it was clear that the state's industrial players were extremely vulnerable to foreign competition and that adjustment through either trade policy or domestic competitiveness was necessary (Osborne 1988: 77). Bendis, Seline and Byler (2008:74) note that Pennsylvania's leaders "recognized that foreign competitors' faster industrial design processes and greater flexibility in adapting to new market opportunities would be ongoing causes for concern and needed to be addressed systematically."

Phillip Singerman, the former president and chief executive of the Ben Franklin Technology Center of Southern Pennsylvania, explains this transition as follows:

(Pennsylvania) went through an economic crisis in the late '70s and early '80s with, basically, the disappearance of the steel industry in Southwestern Pennsylvania. So there was an urgency to address that, and in the early 1980s they, in a sense, stumbled upon technological innovation through transfer technology from the universities. They stumbled upon those as a source of economic development, looking upon what had

happened in Silicon Valley and Research Triangle Park. So they were driven to make very significant investments in their technology development activities -- research parks, business incubators, (and) seed venture funds (Singerman 2003).

Mattei (2011:3) describes the period as wrenching, both in terms of the emotional toll economic turmoil engendered, as well as structural insofar as the chosen treatment broke longstanding political-economic structures,

With the bottom falling out, a Democratically-controlled Pennsylvania legislature went to battle with fiscally conservative Republican Governor Dick Thornburgh over what to do about this dire state of affairs. Historically, large corporations and a heavily unionized workforce had dominated in Pennsylvania, reflecting its industrial might. Not surprisingly, its de facto approach to economic development was along the same lines—backroom deal making and “smoke-stack chasing.”

The results of this smokestack chasing, however, were far from stellar. For example, in 1976 under the leadership of Governor Milton Shapp, Pennsylvania taxpayers contributed upwards of USD70 million in subsidized loans and grants to attract a Volkswagen manufacturing plant. A decade later, only half the projected direct employment materialized, and just one-tenth of estimated spinoff jobs (Holton 1987).

As John Sider, Statewide coordinator of the Ben Franklin Technology Partnership (BFTP), the state’s leading commercialization support program, explains,

“the understanding at the time was that Pennsylvania wasn’t the master of its own destiny. We were heavily reliant on our ability to recruit firms from the outside. We needed to find a way to shift that structural reliance and re-invent our economy.”⁹⁹

Catalyzing this reinvention became the legacy of then-Governor Richard Thornburgh, whose efforts to promote the state’s industrial transition began in 1982. Then, facing the aforementioned unprecedented unemployment levels and a dramatic and rapid disappearance of

⁹⁹ Sider, John. 2013. Personal interview with John Sider, Statewide Coordinator, Ben Franklin Technology Partnership, Harrisburg, Pennsylvania, October 15.

state revenues, Governor Thornburgh sponsored the creation of the Ben Franklin Technology Partners (BFTP) as a means of catalyzing a new period of economic growth and employment in the state. This reinvention was envisioned as one centered on the transition of a mature industrial economy into a “globally competitive knowledge economy” (BFTP 2013).

Developed in collaboration between government, industry and academia, the BFTP was designed to foster the commercialization of high-tech enterprises and catalyze a more entrepreneurial economy and thus employment in non-manufacturing industries (Osborne 1988: 43). An August 1982 article in the Pittsburgh Press best captures the hopes of the BFTP, “If Governor Dick Thornburgh is successful in his latest venture, Pennsylvania may become as renowned for robots, biochemicals, computers, energy-saving devices and telecommunications products as it now is for steel and coal” (Uhl 1982).

The creation of the BFTP in 1982 thus marked a distinct departure from the status-quo of economic development in the state of Pennsylvania. For while the state had a long history of soft economic activism, notably the use of tax subsidies to attract out-of-state business and investment like Volkswagen, it had largely avoided preferential industry selection and/or investment. The BFTP, however, was designed to focus on endogenous growth in a targeted set of industries, a grow-your-own approach to economic development, and thus provided a stark contrast to traditional incentives and subsidies (Safford 2004). This approach thus allowed the state, to some degree, a means of exiting the competitive subsidization of industry that saw the balance of power between government and corporate interests accrue nearly exclusively with the former. This shift in approaches will be further expanded upon in the next part of this case study.

Deutsch (1999) summarizes the BFTP’s inception by noting that “while it was clear that steel was on the way out, Governor Thornburgh defied conventional wisdom by refusing to woo other types of heavy industry with the promise of tax breaks and land, concentrating instead on small companies with growth potential.” Defying this conventional wisdom saw significant opposition develop to Thornburgh’s proposed BFTP. The Pennsylvania Manufacturers Association opposed the policy document (Choices for Pennsylvanians) from which it drew inspiration because of its focus on new, sunrise industries and its aversion to “smokestack chasing,” (Osborne 1988: 62). The project also drew the ire of some in academia for its desire to

“change academia” and focus on commercialization and company formation rather than basic research (ibid 58).

On the political front, the specific language used in the original project description – and legislative notes – is integral to understanding the tensions present at the time between the reality of what the program sought to do, and the political rhetoric of the time. By promising to make publicly-funded academic research more efficiently linked to private outcomes, and thus also avoiding any mention of the provision of support directly to private enterprise, the project’s sponsors were able to gain the necessary bipartisan support to launch the BFTP. This was especially important given it came at the height of then-President Ronald Reagan’s push for smaller government (Plosila 1982). Thornburgh, a Republican, was publicly supportive of Reagan’s ideological turn away from government intervention. However, his support of the BFTP acknowledged that “government can be a catalytic agent that provides the tip-over component” for commercial success (Osborne 1988: 80). Moreover, as Thornburgh states in David Osborne’s work on *Laboratories of Democracy*, Pennsylvania “could not afford to wait for the next recovery or to evoke nostrums of free-market theory” (ibid Osborne:2). This acknowledgement comprised what Osborne terms “part two of the Reagan revolution” as led by Thornburgh. He notes that Thornburgh “wanted to come up with part two of the Reagan revolution: a positive agenda that focused on the creative use of government, particularly at the state level” (ibid).

This second part of the ‘Reagan revolution’ was also necessary as the Federal government quickly receded from its traditional role at the centre of American economic and scientific development (Benowitz 1995). When interviewed in 1995 while chairing a task force on the relationship between states and the U.S. Federal government on research and development planning, Thornburgh noted “There’s a strong sentiment in Congress to cut federal expenditures, including (for) science and technology.” An emergent state role in funding science and technology, and facilitating commercialization, was subsequently viewed as driven by the gradual withdrawal of the Federal government from this area of economic governance.

In more recent literature, notably Block (2012) and Mazzucato (2013), the focus is placed on the substantial contemporary role for U.S. federal level economic planning and economic development initiatives. However, the analysis of Pennsylvania’s state-driven economic transition will highlight that sub-national economic activism is as, if not more, important with

respect to long-run economic transition and industrial development. To be sure, there are important points of confluence amongst priorities and funding paths; however, the sub-national state has increasingly become the focal point and director for economic activism. Walt Plosila, who served as deputy secretary of Pennsylvania's Department of Commerce between 1983 and 1986 and was one of the key architects in the development of the BFTP, notes that "states have the ability to work with small and medium-sized firms to develop (economic) benefits" that the Federal government simply can't match (ibid Benowitz). This proximity, further enabled by decreases in funding throughout the 1980s, allowed space for the development of a more active and more interventionist state government in Pennsylvania.

Despite the project's popularity with both Republican and Democratic leaders, and despite a track record of successes, objections have remained present for three decades. In 2011, right of centre advocacy groups pressured Governor Tom Corbett to make significant cuts to the state's economic development programs, notably the BFTP. The Commonwealth Foundation, a self-described "free-market thinktank" sought to end funding for the BFTP on grounds that it "should stop these giveaways to favored companies, and instead lower taxes for all Pennsylvania businesses so they will be more likely to hire people," (DiStefano 2011). Interviews for this project with the Pennsylvania Chamber of Commerce lend themselves to this critique, notably their demands for non-discrimination as opposed to the BFTP's industry selectivity.¹⁰⁰

This opposition notwithstanding, Pennsylvania's experiences in economic transition provide a fascinating example of the activist sub-national state. Faced with the evolving reality of global economic competition, notably the rise of Japanese efficiency in steel-making, the Pennsylvania government chose to contravene the then-orthodox tenets of American economic policy by actively shaping the direction of industry, and the paths of specific private companies therein. In so doing, the state has only minimally sought to pursue the flexibility and regulatory path described by Cerny (1997, 2004) and Jessop (1993, 2002), and instead has focused far more intently on the development of the type of public-private research relationships that Mazzucato (2013) and Block and Keller (2011) highlight. Yet these works leave a significant gap insofar as the direct role the state plays in funding and investing in the operational activities of specific companies in specific sectors. This case study, in addition to the three others, endeavors to shed

¹⁰⁰ Barr, Gene. 2013. Personal interview with Gene Barr, President and CEO of the *Pennsylvania Chamber of Business and Industry*, Harrisburg, Pennsylvania, October 15.

light on a wider contemporary spectrum of sub-national state activities in the economy.

Driving Transition: The Ben Franklin Technology Partnership

In response to the exogenously-driven economic transition being forced upon Pennsylvania, Governor Thornburgh launched the Ben Franklin Technology Partnership as a means of driving the transition from manufacturing to advanced technology. Governor Thornburgh notes that at the time of the program's creation, "our unemployment rate hovered around 15 percent. We were in desperate straits and we had to try something different" (Todd 2012). The BFTP was launched with USD1 million in annual funding to be allocated as grants for joint academic-industry collaborations that promised to better commercialize academic research and thus translate into "new and future oriented jobs" (ibid).

Fast forward three decades and this vision has in part been satisfied and in part continues to evolve. The BFTP, notably, remains the center-piece of an activist-state agenda, one that continues to place economic transformation at the heart of contemporary public policy efforts. This transformation has sought, and continues to seek, to transform a traditional centre of American manufacturing into a thriving knowledge economy focused on the high technology and life sciences sectors. It does so through a series of publicly-funded programs that build on existing areas of expertise, as well as attempts to stimulate novel ones.

Since its initial start in 1983, the BFTP's funding has grown from just USD1 million to a peak of USD28 million in 2006/2007, and as of 2014 receives USD14 million in annual funding (Corbett 2014). The organization operates on a regional framework that sees BFTP funding allocated evenly amongst four regional organizations. The group's list of targeted industries can be distilled into four groups: advanced manufacturing, health technology, green technology, and information communications technology.

Together the four BFTP regional organizations have three primary roles:

1. Financial investments in technology/innovation-oriented companies to "help cover costs associated with product and process development and commercialization,";
2. The provision of organizational and technical assistance, and

3. The development of regional infrastructure which is defined to include both physical infrastructure (research parks and business incubators) as well as capital infrastructure (venture capital and angel investor funds) (BFTP 2013B).

When established by then-Governor Thornburgh, the BFTP sought to stimulate economic activity and employment creation in ‘innovative’ sectors, notably the life sciences and biotechnology. The choice of sectors was premised on the analysis and inventory of research specialization in the state’s two major research universities conducted by the state-commissioned MILRITE Council. An acronym for “Making Industry and Labour Right in Today’s Economy,” the MILRITE Council’s research sought to “promulgate plans and implement procedures that would cause structural changes and updating of economic development tools of the State government” (MILRITE 1980).

Over time, however, the BFTP and thus the economic development tools at the disposal of the state have evolved. Notably, the BFTP has become far less dependent on academic-industry relationships and now provides direct grants to private entities, as well as providing for the infusion of public funds into companies in targeted industries through both public-private venture capital mechanisms and direct targeted investments. Dennis Yablonsky, former Pennsylvania Department of Community and Economic Development Secretary (DCED), notes "through the Ben Franklin Technology Partners, we are making targeted investments in a wide range of emerging high-tech companies that will bring new products to the competitive global marketplace" (Lloyd 2007). The state-as-investor in private enterprise has thus become an explicit part of Pennsylvania’s economic dynamic, despite continued rhetoric pointing to a limited government role.

This evolving role comes amidst a continuity of the competitive challenges faced by the state. While international competition remains a driving force as it was in the earlier phase of industry challenge vis-à-vis Japan, ongoing efforts are geared less towards rising competition from emerging markets, and more towards that of neighbouring states and provinces suffering from similar structural and cyclical economic challenges. George Overmyer, chief executive officer of the Fourth Economy, a Pennsylvania-based economic policy think tank, notes that Pennsylvania’s external competition for investment and retention comes from Georgia, North Carolina and Texas (Overmyer 2011). Mel Billingsley, president of the Life Sciences

Greenhouse, is similarly focused on regional and US competition. Competitive pressure from abroad, notably from India, is developing quickly but he notes that on quality and safety, Pennsylvania and other American jurisdictions have a significant lead.¹⁰¹

Hoffer (2010:4) disagrees with the minimization of the international aspect of Pennsylvania's competitive position, noting that "globalization is the dominant issue in high-tech job out migration." In particular, he finds that "international job flight from Pennsylvania dwarfs domestic job shifting—by a factor of 30 for the years 2001 through 2006, "and adds that "interstate movement of jobs accounts for just a fraction of one percent of the state's high technology jobs."

Ultimately, both domestic and international competitive pressures contribute to the state's industrial activism. Earlier versions of this activism were driven more clearly by international forces, notably the impact of Asian competition on the state's steel industry. More nascent competitive forces are both international and from and/or regional competitors. Across both types of motivating forces, what is clear is that Pennsylvania's state leaders have sought to actively promote firm development in targeted industries in an effort to develop more stable labour markets and more robust job creation. The following section delves into the strategies and policies enacted by policy-makers to address these challenges.

Towards endogenous growth

At the core of Pennsylvania's economic development efforts, and of the state's intervention, is a focus on the development of domestic firms in targeted sectors. For example, the BFTP is part of a network of agencies that operationalize a "grow-your-own" strategy that allocates over USD200 million per year into domestic enterprise (KRC 2010:17). This funding is part of a larger purse of over USD1 billion spent annually on economic development efforts in Pennsylvania, primarily through the Department of Community and Economic Development (DCED). Traditional subsidies – used to attract out-of-state facilities and to retain existing jobs – account for a quarter of this total, while regional development programs (largely infrastructure) account for 44 percent (ibid 4). This type of domestic-oriented spending has grown increasingly popular as the state budget has shrunk. Stephen Brawley, President of the BFTP of Central Northeastern Pennsylvania (BFTP CNP), notes when interviewed that "cuts to the state budget

¹⁰¹ Billingsley, Mel. 2013. Personal interview with Mel Billingsley, President of the Life Sciences Greenhouse, Harrisburg, PA, October 16.

have meant less discretionary funds to attract relocating firms. We've subsequently had to focus increasingly on trying to grow a strong base of domestic companies that will grow and stay."¹⁰²

This focus on endogenous growth is married to the creation of broader public goods. Like in Ontario, Pennsylvania's approach to industrial transition includes a rhetorical connection between "societal challenges" and the industries needed to address them. The BFTP notes in public documents that it "helps turn the challenges facing the Commonwealth...better health care, alternative energy, improved telecommunication, leaner manufacturing process—into opportunities that fuel our economy" (BFTP 2013). Thereafter, the group's list of targeted industries is unsurprisingly focused on four groups: advanced manufacturing, health technology, green technology, and ICT. Justifying state activism thus relies in part on the subjugation of economic ideology to the needs of society.

Support for the state's "grow-your-own" approach includes commentary by the Keystone Research Centre (KRC), a non-profit, non-partisan public policy think tank. They note that "instead of handing out checks to lure new businesses to the state... Pennsylvania should strengthen its efforts to grow its own companies" (KRC 2010:17). The KRC references a 2009 study by the Economy League of Greater Philadelphia that found that over the 2002-2006 period, the BFTP provided a five-to-one return on the state's investment. Moreover, as Hoffer (2010) finds as part of a report on Pennsylvania's high-tech advancement policies commissioned by Good Jobs First, a non-profit advocacy group located in Washington, DC, concludes, net job growth of in-state companies is 28 times larger than the net movement of jobs across state lines (Hoffer 2010:28).

The rationale for such investments, according to the KRC, addresses a private market failure. Notably, "the private sector under-invests in innovation because companies cannot capture all of the benefits of their innovation. Some of these benefits spill over to other (often nearby) businesses. This market failure creates a strong rationale for the public sector to invest" (KRC 2010:8). The KRC acknowledges, however, that "politicians and economic development entities are reluctant to abandon traditional subsidies, equating this to "unilateral disarmament" in the competition for jobs." Herzenberg (2010) further argues that "Grow-Your-Own programs

¹⁰² Brawley, Stephen. 2013. Personal interview with Stephen Brawley, President of the BFTP of Central Northeastern Pennsylvania, Harrisburg, Pennsylvania, October 16.

are not about “picking winners” but about creating a business eco-system and set of support systems hospitable to innovative companies.”

To an extent this is true as the state’s broad bucket of economic development funding includes substantial amounts for “eco-system” support or enabling infrastructure in Cerny or Jessop’s language notably for job training and infrastructure creation. However, over 57 percent of Pennsylvania’s annual spending on economic development is done via grants to private companies, thus indicating a high degree of selection, and thus discriminatory treatment of some over others. Moreover, even Herzenberg notes that industry targeting is necessary, if not essential, and notes three industries in particular – biomedical, plastics and the renewable energy – as key drivers of the state’s competitiveness (ibid).

The focus on endogenous enterprise creation and growth – as opposed to traditional subsidization and relocation efforts – highlights the shift of industrial policy efforts from visible, above-ground funding mechanisms to stealth, somewhat below-the-radar ones channeled primarily through research and commercialization grants. The survival of the BFTP through both Republican and Democratic leadership of Pennsylvania is premised on this stealth activism.

It must be noted that this dissertation does not intend nor attempt to scrutinize the economic benefit of the state of Pennsylvania’s investments. However, analysis conducted for the BFTP by the Pennsylvania Economy League (PEL) notes that since 1989, through its investments in over 3,500 private organizations, over 51,000 jobs have been created that “otherwise would not have existed.” The PEL’s analysis notes an additional 89,000 jobs have been created “as a result of increased purchasing and investment by (BFTP) clients,” thus providing a total of 140,000 new jobs attributable to BFTP’s investments. The report further finds that since 1989, BFTP has boosted the state’s economy by more than USD23.5 billion (PEL 2010).

This dissertation does not seek to scrutinize these claims further than noting that, to be framed within the debate on industrial policy and government support of private enterprise, they must be understood versus a counterfactual that sees the State’s investment pushed elsewhere in the economy. In the absence of reliable data to build this counterfactual, the above numbers stand solely as one analysis of the program’s nominal impact. They do, however, present an

interesting rebuttal to the orthodox arguments against industrial policy and state support. For across the period studied, employment gains were significant in the industries targeted, despite broader macro-economic challenges in the state.

Doubling down on innovation

While the general thrust of the BFTP has remained intact since 1983, in 2001 the Ben Franklin Technology Development Authority (BFTDA) was created through Act 38 by then-Governor Tom Ridge as a means of improving the governance of state funds flowing to the BFTPs. In addition, the BFTDA extended funding to a series of complementary innovation related programs. Since 2001, the BFTDA has dispensed over USD601 million in grants and investments in 190 projects through five program streams (BFTDA 2012):

- University Research Commercialization;
- Keystone Innovation Zones;
- Technology Development Grant Program;
- Ben Franklin Technology Partners; and
- Venture Investment Program.

Ridge, a Republican, noted upon signing ACT 38 that the expanded suite of state-funded programs was meant to provide innovative financing for small- and medium-sized technology firms, stimulate expansion of e-commerce, and coordinate university-based research in high technology fields (PTC 2001). Ridge noted that the creation of the BFTDA would help ensure “Pennsylvania companies and entrepreneurs have all the tools they need to build globally competitive technology companies right here in Pennsylvania” (BFTDA 2012). This legislation aimed to “encourage and coordinate programs and investments which the competitiveness of Commonwealth (of Pennsylvania) companies in the global economy” (PGA 2001). Together these two statements highlight the tension that existed between domestic research and, hoped for, commercialization. As noted by several interviewees, the lack of a domestic venture and angel capital sources saw a significant share of domestic ideas and young firms move to other parts of the country where capital was more readily available. As Ryan Glen at DCED notes when interviewed, the state has long been perceived as a “fly-over” state with respect to innovative

sectors.¹⁰³ The subsequent lack of private-market activity in high-tech sectors is thus positioned as grounds for a more active state role in channeling investment to riskier, potentially high-reward firms and sectors.

The creation of the BFTDA as an overarching organization reinforces the role of government far beyond facilitating a flexible tax and regulatory environment. Instead, through legislative act, the state of Pennsylvania further integrates state decision makers into the coordination of funding related to high-technology fields. Therein both grants and direct investments channel public dollars into “companies, economic development agencies, educational institutions, government agencies or other entities as necessary to carry out the authority’s activities” (PGA 2001). This list of recipients highlights that the BFTDA has both supply- and demand-side responsibilities, including broad research and development funding through universities and non-government organizations as well as targeted investments in identified growth companies.

While initial BFTP funding focused on either academic-industry partnerships or direct grants, BFTP programs have transformed from dispersing grants to a direct investment model that gives BFTP a 3 percent stake in the company being funded. Stephen Brawley from the BFTP-Central Northeastern Pennsylvania notes that while the original focus on industry-academia partnerships was meant to improve the rates of university-research commercialization, the process “did not deliver as expected owing to the different incentives and interests amongst partners.”¹⁰⁴

The BFTPs new investment model provides the state with an ongoing stake in any long-run gains experienced by the funded company, thus providing a more direct means of substantiating the funding provided at the outset. This investment has shifted the focus from technology transfer to direct investment in research, and by extension, operations (as private funds not spent on R&D can now be allocated to other operational needs). More substantively, Brawley notes that by playing a more active role as an investor in the development of firms and sectors, “the BFTP is the mechanism for the state to put money where there is a private market failure” (ibid). The BFTP Innovation Fund has invested over USD60 million in more than 350 companies since 1999. These companies have generated more than USD1.3 billion in follow-on funding and

¹⁰³ Glen, Ryan. 2013. Personal interview with Ryan Glen, Venture Capital Advisor for the Pennsylvania Department of Community & Economic Development (DCED), Harrisburg, Pennsylvania, October 17.

¹⁰⁴ Brawley 2013.

represent some of the region's fastest growing firms (BFTP 2013). This type of direct investment positions the state as far more active than previous conceptions of the state as described by Mazzucato (2013) and others.

To be sure, not all of the BFTDA's funding is directed towards so-called "future-oriented" high-technology fields. In 2004 the Keystone Innovation Zone (KIZ) stream was developed as a response to slowing job growth in traditional sectors and to foster innovation and create entrepreneurial opportunities therein. The KIZ program incents the creation of clusters through the disbursement of USD25 million in annual tax grants for participating private and non-profit organizations. In particular, the KIZ program was designed "to use Pennsylvania's institutions of higher education as economic drivers while providing a formal structure through which collaborative partnerships could be formed between the IHE, entrepreneurs and economic development organizations in regions across the Commonwealth" (PGA 2004). As of 2012, 29 KIZs exist across the state, and are tied to the creation of 3,085 jobs, the retention of 7,210 jobs and the formation of more than 434 new firms in Pennsylvania.

A third component of Pennsylvania's innovation strategy is the Pennsylvania Life Sciences Greenhouse Initiative. Created in 2001 by then Governor Tom Ridge, the initiative was funded by a one-time investment of USD100 million from the Tobacco Settlement and actively invests in early-stage life science companies and offers relocation and expansion incentives through three regional Life Sciences Greenhouses (PLSG 2013). And while these regional organizations are structured as independent entities beyond government, their composition as a partnership between academic, private and public institutions maintains significant state-level government involvement and nearly exclusive public funding. The Life Sciences Greenhouses are the subject of a case study in the following section.

All together these sub-national policy initiatives comprise Pennsylvania's attempt at catalyzing what Governor Tom Corbett terms a "new industrial revolution" that would see the state develop a thriving knowledge economy alongside traditional manufacturing and resource sectors (Corbett 2012). Moreover, when weaved together, the policies stand as an acknowledgement of the active and interventionist role of government in economic development and in facilitating economic transition. In so doing, the BFTDA and the BFTP seek to address a perceived market failure in the availability and provision of capital, notably patient long-term

capital, to riskier, more innovative enterprises and in the commercialization of publicly-funded research. Mitigating this private-market failure in the provision of capital is thus at the heart of an active state role in the economy that is congruent with earlier conceptions of the entrepreneurial state as presented by Mazzucato (2013) and others.

The state and private-market failure

The state-as-investor role implemented by the BFTP targets a perceived private market failure in the allocation of capital to firms perceived as having higher risk owing to their age and/or industry sector. Sheri Collins, Executive Director of the Technology Investment Office at DCED as well as Executive Director of Ben Franklin Technology Development Authority, notes that the BFTP plays an integral role in “developing higher-risk sectors and the capital markets necessary to enable them” through the provision of capital where private markets are unwilling to do so.¹⁰⁵ Her colleague, Ryan Glen, the DCED’s Venture Capital Investment Advisor, pushes this further noting that “we’re playing the role of market-maker by addressing inefficiencies in risk capital allocation.”¹⁰⁶ He adds, “Pennsylvania has traditionally been a fly-over state vis-à-vis more well known IT/high-tech jurisdictions. We need to compensate for that and the BFTP is our means of doing so.”

A report developed for the BFTP highlights the organization’s mitigating role vis-à-vis this perceived private sector funding gap:

Many companies in the BFTP portfolio were at the earliest stages of development when they first sought assistance—when fundraising is most critical and most difficult to obtain. BFTP has often been the first institutional investor for firms, providing seed capital for initial product development and commercialization efforts (PEL 2013:3).

A subsequent BFTP document further notes that it is at this early stage where “such companies are most vulnerable and when outside intervention is likely to be most essential” (BFTP 2013). Here again activism by the sub-national state is justified on account of a perceived market

¹⁰⁵ Collins, Sheri. 2013. Personal interview with Sheri Collins, Executive Director of the Technology Investment Office, Pennsylvania Department of Community & Economic Development (DCED), Harrisburg, Pennsylvania, October 17.

¹⁰⁶ Glen 2013.

failure. It is worthwhile noting the investment process for BFTP funds and the lead role play by the state. As per the BFTP,

BFTP investments are made through a process that includes both staff and peer review, and considerable due diligence of the proposals that are submitted. While there is regional variation in the process, in most cases, third-party experts identified by the respective regional organization also review proposals submitted by applicants and assess the technical, business and commercial merits of proposed projects. Where necessary, companies are asked to clarify or further elaborate on different aspects of their proposals and, if necessary, to resubmit. Investments are made based on the recommendations of BFTP staff with input from the reviewers, subject to the availability of funds and final regional board approval.

Moreover, unlike some jurisdictions where private-public partnerships via academic-industry cooperation is mandated for the flow through of funds, the majority of BFTP funds flow directly to entrepreneurs and both early-stage and established private companies (BFTP 2009). As legislative documents related to the creation of the Innovate in PA tax credit note, full control over spending will be held by the Department of Community and Economic Development (DCED) “in consultation with the (BFTDA) and each regional center” (Blake 2013B) The BFTP is clearly a state authority, and it’s clearly one that participates, if not leads, in building and shaping markets.

Thereafter, the process of delegating authority over investment selection to the BFTP should not obfuscate from the fact that this delegation provides a mean of picking winners from a distance. On this element of investment selection, Chadwick Paul Jr., president of the BFTP of Northeastern Pennsylvania, notes

Ben Franklin client companies are selected competitively based upon the expected creation and retention of Pennsylvania jobs, the potential to develop industry-leading positions, and building Pennsylvania’s identity as a high-technology leader. We also seek to diversify the regional economy by investing in companies from high-potential technology sectors. Currently, we focus on alternative and clean energy, information

technology, life sciences, nanotechnology and advanced materials, and optoelectronics/semiconductors/ photonics (Paul 2013).

Therein it is difficult to differentiate the priorities driving the BFTP's work, from that of the DCED or other state officials. Moreover, in testimony to the Senate Finance Committee related to his Innovate in PA Tax Credit initiative, Senator John Blake states this explicitly, noting that the BFTP is an "established state authority... with long-standing experience with deployment of investment capital" (Blake 2013B).

In theory, the BFTP does so semi-autonomously. John Sider, statewide coordinator for the BFTP, notes that while mandated programs like Governor Rendell's focus on renewable energy sometimes shift the BFTPs short-term focus, "The mandate is otherwise clear. We have an investment framework that we have to operate within and we do so with no political interference."¹⁰⁷ That framework, however, includes an explicit focus on targeted industrial sectors established through legislation by the state, and requires approval by the BFTDA which is led by the Executive Director of the DCED. Differentiating state from non-state actor in this dynamic is thus far from clear and leaves the distinct perception that the two are direct representatives of the state.

Leaving aside the ambiguous distinction between the DCED and the BFTP, what is clear is that both play a significant role in the development of Pennsylvania's targeted innovation-oriented industries. In so doing, the state plays two significant and novel roles in the economy. On one-hand it mitigates a private-market failure in the allocation of capital by allocating public dollars in their place, and second, it directs those public dollars towards select private enterprises in select sectors. These roles extend the spectrum of state activity previously framed by the competition state on one end and the entrepreneurial state on the other. The contemporary state as highlighted by Pennsylvania's example is equal parts regulator, entrepreneur and venture investor.

These roles come in addition to more traditional investment attraction and export promotion roles as noted by Eisenger (1988). Here too, Pennsylvania has sought to be aggressive and unique in its approach to international markets. Peter C. O'Neil, Executive Director for

¹⁰⁷ Sider 2013.

Trade Development at DCED, notes that “deindustrialization in the 1980s forced the state to decide on an outward-facing strategy. Either we run from globalization or we embrace it.”¹⁰⁸ The result is a network of 22 overseas officers who represent the state and seek to promote SME export growth. The DCED notes that the network is the largest of its kind at the sub-national level (OIBD 2013).

To be sure, the state’s role in the economy is couched in the language of sponsoring entrepreneurship and tackling large societal challenges. However, beyond this rhetoric, the flow of funds from public to private hands in targeted sectors highlights a form of government activism in the economy that is often thought absent in North America. Instead, the understanding that emerges from this research is a contemporary form of industrial policy that sees the state as the vanguard in leading the development and evolution of new industrial sectors through its role as investor and match-maker between public and private capital and ideas.

Here it is instructive to note how this role matches with prescribed standards on government activism in the economy under WTO law. As noted in Chapter 1 of this dissertation, the expiry of a multilateral agreement on R&D subsidies in 2002 has allowed significant space for the state to fund and/or subsidize domestic industry, notably in those fields where research spending is a significant share of total operational cost. The BFTP, it would seem, is designed to fit within this allowable space. A review of program spending and investment documents shows that all funding is premised on research and development no matter the actual operational usage. In fact, within program review documents, research and development allocations are shown to be used to cover costs for website development, process improvements and a wide variety of operational costs that take advantage of a very wide definition of “R&D expenditure.” While the term subsidy is evidently non-existent in program documentation, the reality of these funding flows is just that. Public revenues fund a third-party organization whose industry targets and investment frameworks are defined by the state, and whose investments and grants are allocated to broad operational spending. The result is the prioritization of some sectors over others, and within that subset, some companies over others in the name of employment and competitiveness.

¹⁰⁸ O’Neil, Peter C. 2013. Personal interview with Peter C. O’Neil, Executive Director for Trade Development at Pennsylvania Department of Community & Economic Development (DCED), Harrisburg, Pennsylvania, October 17.

In the following section we look more closely at the industries targeted within Pennsylvania's economic policies, and present a historical analysis of where these areas of focus emerged from and why.

Target practice

While the BFTP's investments framework prioritizes advanced manufacturing, health technology, green technology, and information-communications technology, much of the current economic attention in Pennsylvania is taken by the state's romance with natural gas.

Governor Tom Corbett, "an unabashed supporter of the gas industry," has noted that the industry will usher in a "new industrial revolution" by slashing the cost of energy for domestic firms. It is subsequently unsurprising that Corbett's support for the industry has included significant tax policy reforms aimed at directing investment to the state's untapped reservoirs of gas (Corbett 2012). The rationale for this support is linked to the public good. For example, House Majority Whip Stan Saylor (R- York County) sponsored a major package of inducements for a major natural gas development project in the state. When asked whether such funding amounts to a discriminatory subsidy, Saylor responds, "This package is not corporate welfare.... Natural gas helps us get off foreign oil. It's a money-saving process, and it cleans up the air. Is it going to solve climate change? No. But it cleans up the air pollution" (Cusick 2013). The link between a broad social good, in this case the environment, is thus used to cloud what is a very clear form of state sponsorship of sector-specific industrial development.

The same confusion exists in comments made by the Governor during the announcement of the 2013 budget. Then, Governor Corbett announced that "(t)he substance of this budget is built on four core principles: Fiscal discipline, limited government, free enterprise and reform" (Corbett 2013). Given the proposed spending on sector-specific inducements for investment and job creation, the appropriateness of the terms "fiscal discipline, limited government, free enterprise" is certainly debatable. As one Pennsylvania solar company noted in an online post, the Governor's rhetorical repudiation of market intervention and of "picking winners" is problematic given his support of incentives and subsidies for the state's natural gas industry. As a (unidentified) company representative notes, "I guess I am confused on a few things. I need to look up the definition of 'Picking Winners' and 'Hypocrisy'. I am confused on the meaning of both...either that or Corbett is" (EIS 2013).

These tensions and incongruences notwithstanding, the privileging of fiscal support towards the natural gas industry has enjoyed significant support, including from the PA Chamber of Commerce and industry advocacy groups. As Gene Barr, President of the Chamber of Commerce, notes when interviewed, “support of lower-energy costs means lowering the bar for economic activity for all companies, not select ones in certain sectors.”¹⁰⁹ Stephen Brawley, President of the BFTP of Central Northeastern Pennsylvania, passes along similar sentiment from the State’s more rural areas, where the economic benefits of the state’s gas resources are most closely felt, noting that privileging gas extraction over innovation and research has evident, regionally-based political benefits.¹¹⁰

This contemporary focus on natural gas, however, does not detract from the State’s focus on new areas of technological expertise. Helen Hammerschmidt, Director of Policy at the Department of Community and Economic Development (DCED), and who identifies her role as one that coordinates the Governor’s policy priorities within DCED, notes that the two are in no way incompatible.¹¹¹ Rather, she states that the two are complementary, whereby the ability to make domestic firms more competitive through lower energy costs will increase state revenues and thus meshes well with a direct investment strategy that seeks to prioritize a “grow-your-own” base of small firms.

This two-pronged strategy is showcased by the Governor’s support for the Innovate in PA Tax Credit that highlights a continuing focus on “innovation” oriented industries. Championed by Pennsylvania Senator John Blake (D) and his Republican counterpart John Gordner, the “Innovate in PA Tax Credit” aims to provide USD75-85 million in immediate funding for “innovative industry” through the sale of deferred tax credits (Blake 2013C). In so doing, it seeks to mitigate the state’s fiscal cuts to the BFTP. For despite its success, BFTP has been unable to escape the effects of the state’s challenging fiscal situation. While the BFTP budget reached a high of USD28 million in 2008, this funding has been cut to just over USD14 million per year for fiscal years 2011, ’12 and ’13.

¹⁰⁹ Barr 2013.

¹¹⁰ Brawley 2013.

¹¹¹ Hammerschmidt, Helen. 2013. Personal interview with Helen Hammerschmidt, Director of Policy at the Department of Community and Economic Development (DCED), Harrisburg, Pennsylvania, October 17.

Innovate in PA

As fiscal pressures have cut into BFTP's state allocation, advocacy efforts from related stakeholders, as well as political leadership, have sought to redress these cuts and redouble investment efforts into targeted sectors. As the text of the *Innovate in PA* bill states, "It is the intent of this article to invest in innovation as a catalyst for economic growth... (that) will advance the competitiveness of this Commonwealth's companies in the global economy" (PGA 2013). Governor Tom Corbett (R) notes that the bill provides a means of advancing a homegrown approach to economic development, one couched in "common sense" given the overwhelming share of new jobs that are tied to start-ups and small business (Corbett 2013).

The initiative, approved in July 2013 by the PA legislative assembly, will see USD100 million in future credits sold via auction to generate the immediate USD85 million in funding. The credits will be redeemable in 2017, and with no more than USD20 million redeemable annually over a five-year period. Fifty percent of funding from the auction will be allocated to the BFTP, forty-five percent to a PA Venture Capital Investment Program and the remaining five percent to the state's Life Science Greenhouses. Senator Blake notes that the program "will improve Pennsylvania's capacity to support the job creators of the future because it will assist promising start-up businesses while delivering job-creating investments through the state's proven and capable network of economic development agents..." (Blake 2013C).

The program was championed by two stakeholder organizations with stakes in PA's innovation ecosystem. According to interviewees, the BFTP and the Greater Pennsylvania Alliance for Capital and Technologies (PACT) were both instrumental in coalescing political will for the initiative through lobbying efforts. The BFTP's John Sider calls the program a "lifesaver" owing to its role in re-filling the agency's capital stock for investment and advocated broadly for the program.¹¹² His colleague, Stephen Brawley, president of the BFTP of Central Northeastern Pennsylvania, expands on this sentiment as follows:

At a time when we need every startup to grow and provide employment, the now four-year budget crisis has really hurt. Our funding has been halved which means our ability to invest in startups and young firm has been dramatically limited. The Innovate in PA

¹¹² Sider 2013.

initiative is a necessary means of recovering the ground we've lost because of those cuts.¹¹³

When interviewed, Dean Miller, President and CEO of PACT, acknowledges his group's role in lobby efforts aimed at political representatives on both Democratic and Republican sides of both the Senate and House of Representatives (Miller 2013). Doing so, however, was "easy" given broad bipartisan support for entrepreneurship. According to Miller, the bill's passage occurred in record time (15 months) owing to the state's "very forward-thinking approach to high-growth entrepreneurship and the understanding from all sides of the link to high-wage jobs." Brawley agrees noting that "Startups engender support from all sides. No one is against entrepreneurship" (Brawley 2013).

Where opposition does exist, interviewees note its presence is tied to a rural/urban divide in PA politics that such corporate support programs, owing to their concentration on employment in urban centres, only exacerbate. Miller argues, however, that the industry-specificity explicit in the bill is necessary given that high-tech industries "produce jobs in small businesses that have higher wages and much faster growth."¹¹⁴ This view is not shared by all stakeholders. Gene Barr, President of the Pennsylvania Chamber of Commerce, notes that the selective choice of certain industries over others that is explicit in the Innovate in PA tax credit, and therein of certain technologies over others, "makes us very uncomfortable."¹¹⁵ The Chamber advocates primarily for improvements in the states' tax and regulatory environment, issues that affect all industries rather than only those identified as "innovative" or "high-technology" oriented.

Surprisingly, opposition regarding the allocation of public revenues towards firm-specific investment are predominantly absent from public and political debate on the legislative bill. This absence is despite the fact that the bill allocates public funding to strategic investments in private enterprises. When queried as to the presence of an ideological debate in the state regarding the use of public funds for corporate support, notably a debate on the concept of picking winners, Senator Blake admits that the debate is present but asserts that the novel use of deferred tax credits as part of the Innovate in PA bill has provided a means of mitigating any controversy by

¹¹³ Brawley 2013.

¹¹⁴ Miller, Dean. 2013. Personal interview with Dean Miller, President and CEO of Greater Pennsylvania Alliance for Capital and Technologies (PACT), Harrisburg, Pennsylvania, October 3.

¹¹⁵ Barr 2013.

removing immediate financial cost. Blake adds, “There’s certainly some concern for its impact on the general fund, and for sure, some philosophical issues, but we have a proven model that shapes our expectation that the returns will outweigh the initial costs and investments. And good facts outweigh ideological frames.”¹¹⁶

The cost of the bill is proposed as neutral whereby the cost of the tax credits is presented as neutralized by assumed financial returns on immediate investments. As Dean Miller notes, “It pushes the credits out into the future, and once they do start taking them they are spread out over several years. By structuring it this way, the impact on revenue for the Commonwealth is diminished” (Landry 2012). In testimony to the Pennsylvania Senate Democratic Policy Committee, Chadwick Paul of the BFTP of Northeastern Pennsylvania notes that the BFTP will use the increased allocation to “strategically invest in deserving regional companies” (Paul 2013). He continues on, however, to argue that these investments will be done “without impacting the current state budget.” The evident delay in fiscal impact may serve an immediate political purpose but it does not hide that such funding is an explicit redirection of public funds towards private enterprise, and in this case targeted sectors.

Senator Blake acknowledges that while delaying the investment expense to 2017 relieves an immediate financial burden, should assumptions on short-term returns from immediate investments not go as planned, the assertion that general budgetary funds will not be utilized will be false. Blake is on record as having noted that “because the (tax credits) are deferred, they won’t hurt the general fund” (Nath 2013). This support notwithstanding, the initial language of the bill would have seen USD175 million allocated from future revenues. Miller notes that this amount was cut to USD100 million owing to a general fatigue with tax credits amongst the political class (Wink 2013).

Ultimately, while the use of deferred tax credits provides immediate cover to public spending, it represents an allocation of public funds from the Department of Community and Economic Development (DCED), and thus an industry and/or company specific investment. In so doing, the State is indeed picking winners, albeit in a manner that provides the state with an

¹¹⁶ Blake, John. 2013. Personal interview with Senator John Blake, Pennsylvania General Assembly, Harrisburg, Pennsylvania, October 16.

equity holding in those chosen, and thus a share, albeit eventually diluted, in any financial upside. While this certainly differentiates from traditional discriminatory programs, namely grant programs that see the state invest public funds with no potential gain, the focus on specific sectors and subsequently specific companies within such contemporary funding programs highlights that the state is indeed an active agent in the economy, namely as a selective investor.

A history of targeting

Pennsylvania's focus on industries perceived as innovation-oriented has significant precedent. Since the establishment of the BFTP in the early 1980s by-then Governor Thornburgh, the state has not hidden its focus on industries believed to have significant growth potential in terms of both revenues and job creation. As Thornburgh notes in a July 30, 1985 speech to the National Governors Association,

We in Pennsylvania have recognized that during this decade we must deal with the wrenching transition in our economic base from one reliant on traditional industries to one emphasizing the new high-growth industries of the future, such as those in the service and advanced technology fields (Thornburgh 1985).

This remark is one of many that Thornburgh issues in speeches over the period 1982 – 1986 that highlight the role of the state in facilitating this industrial transition. A repeated theme through these speeches is the necessity of transition, notably as it relates to the use of subsidies for economic development. Instead, as Thornburgh argues in a speech aptly entitled “The State's Role in an Era of Economic Transition,” given to the Annual Meeting of the Council of State Planning Agencies, “It is necessary to shift away from smokestack chasing model of economic development and towards increasing the birthrate of small business” (Thornburgh 1986)

Correspondence between Thornburgh and his chief economic advisor, Dr. Walter Plosila, indicates that the focus on advanced technology sectors was driven by both an element of forward-thinking, as well as a response to action in other U.S. States and critique at home. In a letter dated March 22, 1982, entitled “Promoting advanced technology,” Plosila presents Thornburgh with a report on the development of high-technology sectors in other states, notably California and North Carolina, and notes that the report will help the Governor “respond to criticism that Pennsylvania has been negligent in not promoting advanced technology as have

other states” (Plosila 1982). Thereafter, however, Plosila notes that the development of new sectors in leading state-level economies has not included a strong state role. Rather, Plosila notes the important presence of active venture capital and private investment activity. This development, he notes, builds on top of domestic research and development expertise. The lack of venture capital activity in Pennsylvania subsequently allows for a more active state-government role in the facilitation of this transition. Plosila adds in later work that success in these ventures is based on “striking a balance between private venture capital incentives and markets, and a desire to promote public economic development objectives” (Plosila 1987: 1)

However, a more active, if not strong, state role is not how Thornburgh attempts to position the creation of the BFTP. Rather, an analysis of the Governor’s speeches between 1984 and 1987 highlights a repeated downplaying of the state role. For example, in a May 29, 1985 speech given at the University of Pittsburgh entitled “Pennsylvania’s Economic Future – State Strategies for Development,” Thornburgh notes that the BFTP is “no industrial policy, no centrally planned blueprint” (Thornburgh 1985B). Moreover, as he remarks in the aforementioned Council of State Planning Agencies speech, “We seek no grandiose industrial policy to supplant the free market in choosing winners and losers in tomorrow’s economy. Rather, the state is a catalyst and partner for this activity.”

The archives of Governor Richard Thornburgh offer insight into the evolution of the State’s approach to business subsidies. For example, in a July 1, 1980 letter to members of his Economic Development Committee, he notes the difficult interstate competition to lure industry, and attaches an article noting that states “gain little, pay dearly” for such competition (Thornburgh 1980). Later, in a December 1981 press release on the topic of the 1981 Northeast Economic Summit, Thornburgh notes that a growing realization that economic revitalization must focus “on our self-help efforts” rather than cross-border relocations (Thornburgh 1981). By 1983, Thornburgh’s focus on the growth of small firms in advanced technology fields is clear. In an August 1983 press release that speaks to the establishment of the BFTP and the focus on endogenous, innovative growth, the Governor notes “it is clear that this effort must be intensified if we are to compete effectively in one of the most promising areas of new employment, re-employment and economic development on the national horizon today” (Thornburgh 1983).

This focus on small firm development, and on subsidization of endogenous growth rather than cross-border relocations, is supported by a 1984 report by the Institute for Public Administration at Pennsylvania State University. Entitled “Homegrown Entrepreneurship – Pennsylvania’s Small Business Incubators,” the report builds the case for funding local firms by noting the assumption that “companies which successfully incubate will stay in the general area in which they are born” (Allen, Ginsberg and Meiburger 1984). Thereafter, a review of the Governor’s speeches as well as a series of letters written by Thornburgh to the Presidents of Pennsylvania’s colleges and universities, highlights that the “birthrate of small business” and the “promise of technology” have become the State’s over-riding economic development priorities, displacing previous smokestack chasing activity in traditional economic sectors (Thornburgh 1986B).

This evolution over the early 1980s of the state’s approach to market intervention remains fluid . As Senator Blake notes, “the state of Pennsylvania has a long history of a ‘robust’ role for government.”¹¹⁷ He adds, however, that the state is “now focusing on endogenous growth, on growing entrepreneurs and start-ups, rather than throwing everything at inter-state competition for the same companies”. And at the heart of this grow-your-own strategy is a focus on a series of industries defined and/or perceived as innovative and of particularly significant potential for job creation. Targeted sectors across all streams include Advanced Manufacturing, Clean Technology and Green Energy, Information Technology and Life Sciences. The development of the latter two sectors, IT and life sciences, date from Thornburgh’s initial foray into state activism. The state’s investments in advanced manufacturing may represent a response to the aforementioned critique of the BFTP by traditional manufacturing interests, and thus allow a degree of funding to flow to more mature enterprises, notably previous manufacturing ones. Finally, the focus on clean technology is more nascent and represents a tactical shift that has its roots in the stagnation of the state’s IT sector. The 2008 Pennsylvania Alternative Energy Act provided a USD40 million allocation through the BFTP to “make energy-related investments in early-stage activities that include management support, commercialization of research, incubator support services and seed capital investment” (BFTDA 2012).

¹¹⁷ Blake 2013.

Kelly Wylam, Program Manager of the Innovation Partnership, a third-party organization that helps PA-based technology firms access federal research funds, notes that these industry priorities also inform the relationship between state and federal research programs.¹¹⁸ For example, the Innovation Partnership notes that it is “especially interested in small, promising businesses operating in these market sectors: clean energy, life sciences, nanotechnology (and) advanced manufacturing.” Wylam adds that while the organization will not deny assistance to other industries, there is a real prioritization of the aforementioned group of sectors given the concomitant state and federal attention to these industries.

Traditional industries, however, have not been completely abandoned. Lynn Ruby, Director of Grants at DCED, notes that the department oversees a suite of assistance programs for manufacturing firms outside of the BFTP. These programs continue, she notes, because “that’s what a significant part of our workforce knows best, and to be competitive with regional competition, we have to provide subsidies.”¹¹⁹ In line with this perception, in 2012 Governor Corbett established the Governor’s Manufacturing Advisory Council (GMAC) to advise on the current and future state of the industry “with a keen awareness that manufacturing has led the commonwealth’s growth since the days of the Industrial Revolution” (GMAC 2012). Included amongst the Council’s recommendations is a focus on the provision of working capital to the industry, notably to fall in line with regional competitors. And even within the BFTP, the program’s focus on regional diversity allows regions where traditional manufacturers are still dominant to channel funding appropriately towards them.

Thereafter it is not surprising that the concept of industry targeting is not accepted by all stakeholders interviewed for this dissertation. Notably, Stephen Brawley, president and CEO of the BFTP Central Northeastern Pennsylvania, remarks that the investment process is less focused on industry as it is on innovation. He notes, “We’re less interested in limiting our pool of dollars towards one industry than we are to companies that show they can innovate. Recipients need to

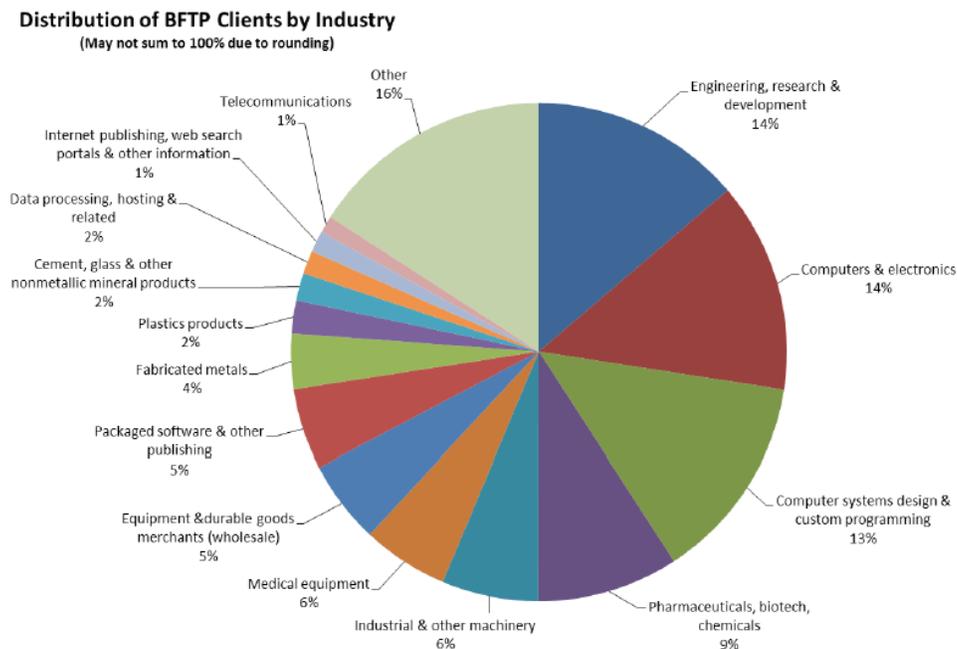
¹¹⁸ Wylam, Kelly. 2013. Personal interview with Kelly Wylam, Program Manager of the Innovation Partnership, Harrisburg, Pennsylvania, October 15.

¹¹⁹ Ruby, Lynn. 2013. Personal interview with Lynn Ruby, Director of Grants at Pennsylvania Department of Community & Economic Development (DCED), Harrisburg, Pennsylvania, October 17.

demonstrate that they have an innovation that can form a barrier to entry in a particular market, and that their model has some form of sustainable competitive edge.”¹²⁰

Brawley’s comment notwithstanding, it is clear that some sectors have received a far greater share of capital and attention from the state’s funding programs. Figure 5, below, highlights the distribution of current BFTP clients by industry. Note that the data provided does not allow for a clean delineation of each sector within the BFTP’s four-industry target framework. However when aggregated by a broader definition of industry, it is a clear that a prioritization of the life sciences and IT industries is present.

Figure 5 – Distribution of current BFTP clients by industry



Source: BFTP 2013

What follows is a brief look at two industries that have received significant state-support through the BFTP program, as well as through other novel funding mechanisms. First, the life sciences and biotechnology industry is reviewed through the lens of state investments and

¹²⁰ Brawley 2013.

policies geared towards firm creation and employment generation. This more-objectively defined success is then juxtaposed against the more uneven path of state investment and regulatory policy vis-à-vis the renewable energy sector. While the immediate or medium-term outcomes differ across both, each highlights how the state has adopted a new set of policy levers in order to shape and direct the evolution of these private sector industries.

Case Study: The Life Sciences and Biotechnology

Six years after Ontario Premier Dalton McGuinty received the Biotechnology Industry Organization (BIO) Award for his commitment to the ongoing development of the biotechnology and life-science industries, in 2013 Pennsylvania Governor Tom Corbett received the BIO Governor of the Year Award in recognition of his “leadership and commitment to strengthening the biotechnology and public health sectors within Pennsylvania” (BIO 2013).

In receiving the award, Corbett noted that

By supporting initiatives that stimulate growth within the industry – from helping entrepreneurs quickly transform ideas into commercial products to supporting the establishment and expansion of biotech companies – we are ensuring the biotech economy will continue to grow and flourish in Pennsylvania. We are proud to continue to serve as a national leader of how to unlock the best of what the life sciences industry has to offer (ibid).

Corbett’s work includes the formation of the Pennsylvania Leadership Advisory Council which is tasked with developing a 10 year roadmap for the industry in Pennsylvania. He notes, “We want to give industry a sense of stability and an understanding of the commitment we’re giving to the industry over a longer period of time” (ibid). Key to this stability is the aforementioned Innovate in PA Tax Credit and the increased funding it will flow to the state’s three Life Sciences Greenhouses.

These moves come over a decade after the state’s first publicly-funded push to promote the life-sciences industry. Then, the Pennsylvania Life Sciences Greenhouse Initiative was championed by then-Governor Tom Ridge as a means of catalyzing the development of the sector, and related employment in the state. Created through Act 77 of 2001 as part of a larger plan to ensure continued growth in Pennsylvania’s life sciences, the initiative was funded by a

one-time investment of USD100 million from the Tobacco Settlement and actively invests in early-stage life science companies and offers relocation and expansion incentives. In public comments made at the time of the investment, then-Governor Ridge noted that the prioritization of the biotechnology industry through this initiative was done in the hopes of “priming the pump” of innovation and employment (Knox 2001).

Ridge allocated near USD100 million in 2001 towards the nascent industry, including USD30 million for incubator-type commercialization support, and USD60 million towards venture capital funds to invest in state health-related companies. Three regional organizations were established to dispense funds with USD32.8 million earmarked for Central Pennsylvania, USD33.2 million for Philadelphia, and USD33 million for Pittsburgh. And while these regional organizations are structured as independent entities beyond government, their composition as a partnership between academic, private and public institutions maintains significant state-level government involvement. According to Mel Billingsley, current president and CEO of the Pennsylvania Life Sciences Greenhouse, funding for the LSGs, including ongoing operational funding, is nearly exclusively public (Billingsley 2013B). As Knox (2001) writes, the public investment highlights an explicit element of targeting amongst the states “business, political and academic leaders,” noting that together they “are now pinning their dreams on what looks to be the Industry of the New Millennium: life sciences.”

Billingsley explains this targeting of the life sciences as part of a broader policy focus on improving the commercialization of publicly funded research:

State leaders always understood that we had a strong base in pharmaceutical and biotechnology research at our universities. But despite this research base, the level of economic output accruing to the state from this research was disappointing. And what research was being licensed or commercialized, much of it was being taken out of state. What we had was a knowledge drain built on our inability to translate research into meaningful economic activity.¹²¹

Built on the anchoring presence of the state’s university research facilities, as well as several large “anchor” pharmaceutical tenants, the Life Sciences Greenhouses are, according to Billingsley, meant to address this performance gap by channeling investment to startup ventures

¹²¹ Billingsley 2013.

and small firms and ensuring that capital and expertise is not an impediment to state-based economic development, wealth and job creation. The program was developed, and primed with public funding, as a means of catalyzing the development of the state's life-sciences sector in the absence of private capital. The LSGs attempt to do so by providing early-stage seed investment, in amounts ranging from USD500,000 to USD1.5 million, and thus acting as a "legitimizing force" to attract follow-on private capital.

When interviewed, Billingsley is coy as to the overall impact of the LSG. The LSGs promotional materials note that since 2001 they has invested USD64.5 million of public funds into 257 companies. In so doing, these public dollars have attracted over USD2.7 billion in private capital. In terms of employment, those investments are argued as having created more than 3,400 jobs at an average salary of over USD90,000, nearly twice the state average. Billingsley, however, notes that the post-2007 economic crisis dealt a severe blow to the LSG portfolio, causing a write-off of over one-third of the group's investments. No detail is available as to the impact of this period on the aforementioned job creation figures.

Interestingly, the LSG does not hide that their investments flow from public dollars. Rather, in promotional materials the LSG notes that it has "efficiently transformed state dollars into a thriving generation of companies that are making a difference." It continues, "companies and products born here in Pennsylvania are being developed to treat the world's most debilitating diseases." Again we see a narrative developed linking the channeling of public funds towards private enterprise to significant, societal challenges. This potentially controversial use of taxpayer dollars is thus muted by associating it with a value-driven goal. Moreover, like the BFTP, the LSG, while positioned as a non-state actor, is so tightly tied to the policies and funding of the state, that it is far more akin to an extension of the DCED.

The state's promotion of the life sciences and biotechnology industry thus provides a valuable example as to how the state has used the development of third-party, innovation-organizations to channel state edict and state funds towards the development of specific industries. In so doing, this case highlights the ongoing state activism present in Pennsylvania, and further adds to the argument that the sub-national state is key to the promotion of industrial transition necessitated by global economic change. And, as is seen in both Arizona and Ontario, this case highlights that the sub-national state's role extends far beyond tax and regulatory

incentives as noted by Cerny and Jessop. Moreover, while Pennsylvania's approach has been focused in part on the commercialization of publicly-funded research, matching Mazzucato's (2013) thesis on this topic, it goes much further insofar as the state directly injects funds and acquires equity stakes in firms operating in targeted industries.

Case study: A Rocky Path in Alternative Energy

While the life sciences and biotechnology fields have attracted significant bi-partisan support, attempts to catalyze a renewable energy sector have not met with the same welcome. Dean Miller from PACT describes these efforts diplomatically as having met "significant challenges."¹²² This outcome occurs despite the fact that over the course of a decade Pennsylvania has positioned itself as a domestic leader in clean energy employment, including significant gains in wind and solar power generation and employment. As Jan Jarrett, president and chief executive officer of Penn Future, a state-based environmental advocacy group notes, "In the past 12 years, Pennsylvania has gone from having virtually no clean energy jobs to employing more than 106,000 Pennsylvanians in the clean energy industry, despite the national recession" (Hopey 2011).

This growth, however, has hit a significant roadblock with the transition in administrations from Governor Ed Rendell to Tom Corbett in 2011. Corbett, a strong proponent of the natural gas industry, has acted decisively to de-emphasize renewable energy sources that had been promoted heavily under the previous Rendell-led administration. Since his term began he has significantly reduced state investment in the sector, most significantly by winding down investments made under the Pennsylvania Energy Development Authority (PEDA).

Governor Rendell revived PEDA after years of inactivity to help incentivize innovation and economic development in Pennsylvania's energy industry. According to government documents, "PEDA's mission is to promote the development and use of Pennsylvania's clean, indigenous energy resources and to stimulate economic development and job creation in Pennsylvania's growing energy sector, all in an environmentally beneficial manner" (PEDA 2005). From 2005 until the end of Rendell's tenure, PEDA distributed nearly USD70 million to 140 clean energy projects (Detrow 2011). Eligible grant and loan recipients through PEDA include nonprofit organizations, universities, for-profit corporations and municipalities. A review

¹²² Miller 2013.

of the program's disbursements from 2005 to 2010 highlight a near even distribution of grants between private firms and public, non-profit entities.

Rendell's re-invigoration of PEDA was but one of the ways the then-Governor spent significant political and real capital on the development of Pennsylvania's alternative energy sector. Doing so, according to public comments made by Rendell, was tied to both economic and environmental outcomes, and was facilitated through both public investment and regulatory policy amendments. In an interview conducted during his transition out of office, Rendell noted the success his policies and investments in the sector had. He notes, "we invested over a billion and a quarter dollars to incentivize renewable and alternative energy. We have the third highest number of clean energy jobs in the country produced over the last eight years" (Zager 2011).

On the regulatory front, in November 2004 Rendell introduced Pennsylvania's Advanced Energy Portfolio Standard (AEPS) that mandated that 18 percent of the state's energy supply must come from alternative, clean sources by 2020. In promoting the new energy standard, Rendell noted that the move would "create thousands of manufacturing and construction jobs," and "attract billions in private investment to Pennsylvania" (PennFuture 2004). In conjunction with this regulatory shift, Rendell allocated significant sums of public dollars towards the sector through landmark legislation such as the 2008 Alternative Energy Investment Act. The act provided for the creation of a USD650 million energy fund, funded through the sale of bonds. Of this total, two-thirds, or USD428.4 million was allocated towards the development of alternative energy resources. John Sider, now the statewide coordinator of the Ben Franklin Technology Partnership, was then the Deputy Secretary of the DCED. At the time he noted the equally important economic and environmental outcomes of Rendell's actions. "The work of Governor Rendell and the legislature has made Pennsylvania a destination state for businesses that create jobs and lead to a cleaner environment" (DCED 2009).

Included amongst this state investment was a one-time USD40 million allocation to the BFTP for the development of a specific "Alternative Energy Development Program" (AEDP). These funds were intended to make energy-related investments in early-stage activities that include management support, commercialization of research, incubator support services and seed capital investment of clean energy startups and entrepreneurial ideas. An analysis of program review documents shows that the AEDP contributed to the creation of 18 new companies over

the 2008-2012 period. These firms were responsible for over 420 new jobs. In addition to the funding of new startups, the AEDP also distributed 176 grants and direct investments into existing Pennsylvania-based companies. These investments ranged from the tens of thousands of dollars to a ceiling of USD500,000 per company.

As of 2013, the AEDP program has been suspended. The BFTP still lists the Alternative and Clean Energy sectors amongst their key industry targets, and as of 2012, public funds continued flowing to sector-based firms. However, as noted, industry stakeholders note significant skepticism regarding the sustainability of public funding.

Notwithstanding the contemporary political dynamic that sees precedence given to the natural gas industry over other forms of alternative energy, the period of 2004-2012 highlights a clear state-activism with respect to the development of the alternative energy sector. Therein, the impetus for significant public-investment is balanced between employment and environmental concerns, as well as the over-arching call for the development of innovative new companies in a burgeoning field. And while the subsequent administration of Governor Tom Corbett reduced direct subsidization and investment of the sector, it has done so not so as to end such practice, but rather as detailed previously, to redirect such funding to the natural gas industry.

Evidently this case highlights the downsides of industrial targeting insofar as sustained, bi-partisan political will is necessary to keep one-time public investments from being stranded in historical vacuums of economic policy. However, such shifts are all-too-possible given the overarching political dynamic that dictates state-driven policy. What is of interest here is the clear use of supposedly non-state organizations, in this case the BFTP, to develop an industrial sector that existed in only cursory terms prior to this intervention. All together then we continue to see an active state at work, directing the development of new sectors through the use of both regulatory and investment policies, all the while tying these policies to the rhetoric of societal good. In this case, the regulatory aspect takes on greater prominence insofar as it used as a carrot to incent the development of the sector. This approach is complemented, however, by a significant allocation of public funds in the form of grants and investments flowing through third-party, publicly-funded organizations.

Conclusion

The state of Pennsylvania offers a unique case study as it relates to the role of a sub-national government in facilitating, if not driving, economic transition caused by global economic change. Over a thirty-year period, political leaders from both Democratic and Republican sides have sought to transform the state's traditional manufacturing economy into one focused on high-technology fields such as the life sciences, information technology and, more recently, renewable and clean energy technologies.

Therein, two phases of transition can be distinguished. The first, catalyzed by a dramatic shift in employment levels and economic activity surrounding the state's historic steel industry, saw international competition from Japan force then-Governor Richard Thornburgh to create what was at the time a novel approach to the role of government in the economy. His creation, the Ben Franklin Technology Partnership, saw the state insert itself as a broker in both the transfer of technology between public and private hands but also as the primary funder for both startup and established firms seeking to develop technologies in the aforementioned targeted sectors. In so doing, the state, albeit through a delegated third-party agency, designs an industry-specific framework for the investment of state dollars into specific companies. This role, however, shifts its focus from large, established firms, the central focus of subsidies directed towards 'smokestack chasing', and instead positions itself as the catalyst for the development of small, entrepreneurial firms. This latter group of firms is believed more likely to stay upon the expiry of preferential treatment, and is more prevalent in the nascent industries targeted.

A second phase then emerges in the early 2000s at the confluence of economic and social priorities. Here the same third-party agencies are central to the translation of societal challenges, notably environmental and health-related issues, into economic policies that maintain the original thrust towards industry selectivity and firm-specific investments. International competition remains present as a driving force for this strategy, however, it is no longer the primary driver. Rather, stagnant labour and capital market and regional competition amongst high-wage, high-quality jurisdictions in North America has positioned the state to address what it believes is a private-market failure in the allocation of capital to riskier, high-potential industries.

Across these phases, the role for the state provides evident nuance to the rhetoric of small government and Reaganism promoted heavily across levels of government throughout the 1980s

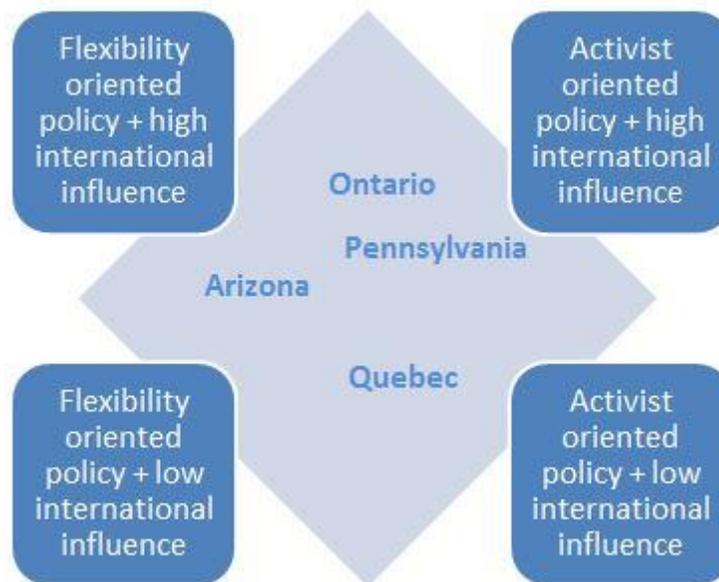
and forward. Rather than a disappearance of the state from the economy, we see a significant entrenchment of the state, albeit in a delegated fashion that clouds the role of the public payer. Thus through the creation of sui generis organizations that operate in an ill-defined quasi-government space, the state is able to play a primary role in the creation and development of new industries and the firms that operate therein. Moreover, by structuring the support provided to private firms as ‘research and development’ funding, the state is able to avoid legal limits established by the WTO on the provision of corporate subsidies.

Evidently, such support is not without controversy or criticism. Debates about the role of the state in the economy are still present, however, they have been largely muted and relegated to the sidelines in favour of bi-partisan support for research commercialization and entrepreneurship. Moreover, while the shift from large, relocation-related subsidy efforts to local, “grow-your-own” efforts have significantly altered the conventional definition of a subsidy, the end result is very much the same – public dollars towards specific companies, and in this case, in specific industries. The justification for this continued activism is made most clearly by Senator John Blake. When pressed on the state’s continued use of subsidies and like-discriminatory policy mechanisms, Blake notes simply, “it is not the time for unilateral disarmament of subsidies and state activism. Rather we need to help build on the foundations that are here. This is by necessity because of changes in our economy, and the impact of the global economy on ours.”¹²³

Blake’s comment, and the perspectives from policy makers highlighted in the sections above, showcase the adoption of a “raison du monde” approach to understanding Pennsylvania’s position in the global economy. To be sure, domestic competition in high-tech sectors may drive more immediate concern; however, the impetus for economic transition has historically been global in nature. For three decades, international economic forces have, and continue to, significantly impact the state’s domestic economic realm. The result has been an activist sub-national government role. Returning to our matrix of state intervention, this activism has been focused on the targeted development of industries perceived as innovative and high-tech. In turn, this targeted industrial promotion has focused less on the flexibility that Jessop and Cerny promoted. Tax schemes, for example, play but a minor role in the state’s strategic approach to

¹²³ Blake 2013.

building new industries. Moreover, the role of the sub-national state shown here is far more intense than the role of the state portrayed by Mazzucato (2013) and others on federal funding for research. Rather, in Pennsylvania's case the state makes specific investments in particular firms in targeted industries. While there is indeed a focus on the commercialization of publicly-funded research, this is accompanied by a significant spending purse allocated towards specific firms in specific, targeted sectors.



Returning to our matrix, Pennsylvania highlights a significant external orientation in the drivers of policy change related to industry and innovation. Moreover, it does so through a strong focus on upgrading and movement up the value-chain, as opposed to the more flexibility oriented changes seen further south in Arizona.

All together then, Pennsylvania highlights the evolved role of the state in the economy at the sub-national level. This role has three primary components,

1. It is delegated through third-party organizations that while supposedly distinct, are broadly directed by state-level policies and frameworks;

2. It provides for investments and grants in specific industries targeted because of their perceived potential for employment and economic growth; and
3. It directs public dollars directly to private firms in these select industries.

Moreover, these roles are orchestrated so as to ensure that the support provided does so without explicitly contravening existing international law on corporate support.

We subsequently see the sub-national state as a significant actor in the development of private markets and the activity, both investment and operational, therein. The sub-national state level is thus seen as the protagonist in the interplay between state and market forces. And while the sub-national state originally adopted this role as a result of the interplay of international and domestic economic forces, this activist role is now increasingly premised on the confluence of domestic economic and societal issues. The activist sub-national state role in the economy is legitimized by these driving forces, and further aided by placing the operational role for this activism one-step beyond the state in third-party organizations. The sub-national state role in the economy is thus a semi-stealth one, wrapped up as it is in a web of social and economic ties that leave the public broadly unaware of its role but also broadly supportive.

Chapter 6: Quebec Inc.

While each of the jurisdictions studied for this dissertation has intervened actively in the economy, none has done so as explicitly as has the Province of Quebec. Alongside policy documents on innovation, workforce development, and economic development is a specific piece on “la politique industrielle” or industrial policy. And as the Province’s history of economic activism attests, such explicit privileging and targeting is commonplace. As Roy George writes, while the majority of Canadian provinces steered well clear of any type of systemic intervention in the market towards the development of strategic industries, Quebec “has generally subscribed to the belief that the proper development and operation of the economy demands planning and direction by the state” (George 1983:11). This explicit take on what, across the other case studies included in this dissertation, has been seen as a largely taboo topic reflects an internal political economy that drives and supports such policy. Moreover, as will be explained herein, this intervention is part and parcel of a decades-long political effort to raise the stature of the Province’s Francophone roots in the economy.

At the root of this role is a period of change within the political economy of Quebec known as the Quiet Revolution that marked the 1960s. Then, as a means of addressing a perceived economic laggardness, the shackles of social conservatism and a laissez-faire approach to the economy that saw American and Anglophone capital as the primary driver of economic activity were undone. In their place came an activist political state, charged with redirecting the province’s economic fortunes with an eye towards privileging domestic, francophone owned firms. As this activist state evolves, the socio-cultural element that drove this first wave of intervention has been gradually joined by a more pragmatic economic strategy that sees publicly-driven and industry-specific development programs that seek to counter economic stagnation and high unemployment. This socio-cultural element is distinctive in this case vis-à-vis the others profiled in this dissertation. Akin to efforts in East Asia and France, Quebec’s activist state soon takes on the moniker of Quebec Inc. to match similar models such as equivalent Japan Inc. (Fraser 1987).

While the other case studies for this dissertation highlight political divides on the issue of intervention, opposition to explicit industrial policy is largely muted in Quebec. As Peter Graefe

writes, the activist Provincial government of Quebec over time shifts to become one focused on “a sustained attempt to build a high value-added, progressive competitive economy as a response to the challenges of being a small society in a liberalized international economy... (and) although confronted with the strong neo-liberal attraction of the North American economy, Quebec has pursued distinct development policies...” (Graefe 2000:6). And as interviews for this dissertation attest, political change across time has done little to change this course of interventionism and activist economic policy.

This section first examines the historical roots of these distinct economic development strategies. The first phase examined begins in the 1960s. The second phase of more contemporary state support and economic activism begins in the 1980s and 1990s. The dissertation then moves on to examine this more contemporary period of support, in particular as it lands in two targeted industries, pharmaceutical and digital media. In both cases, these sectors and individual firms therein are targeted for support as by the Province as part of an explicit competitiveness and employment agenda. In so doing, this work supports the assertions of George (1983) and Graefe (2000) that no province or territory has a more reputed industrial policy program than Quebec, but builds a contemporary analysis of novel new industrial development programs to their historical works. This argument also broadens the lens provided by contemporary scholars such as Mazzucato (2013) and Block and Keller (2011) and their respective work on federal-level activism. As will be argued, Quebec provides a rich example of how the sub-national state, working to become an independent state of its own, plays an activist role in the development of new industrial sectors and the firms therein. We begin with a historical look at where this intervention originated.

Early Drivers of Change: The Quiet Revolution and the Birth of an Interventionist State

If the 1950s and 60s represented the Gilded Age of post-war capitalism, many in Quebec failed to see its benefits. Rather, the period was marked by deep insecurity about the Province’s place in Canada, notably a self-perceived economic backwardness that held the Province’s economic capacity back. As Durocher and Linteau (1971:41) write, the Province’s perceived economic inferiority was part and parcel of an economy that was largely driven by Anglo-Canadian and

American capital and a subsequently perceived lack of balance between the province's Francophone and Anglophone participants in the economy.

Moving forward from this period, as Arbour writes, saw the Quiet Revolution symbolize a period of political and economic renewal that had as "one of its consequences a wholesale rethinking and transformation of our system of education, health services and economics" (1993:160). Belanger and Fournier add that the Quiet Revolution redrew the map of state involvement in the economy, placing it at the centre of a vast machinery of public agencies that served to plan and direct industry (1987:9). In so doing, the strategies and agencies developed during the following decade served to lay, in the words of Fraser, "the groundwork for the capitalist revolution that would erupt two decades later" (Fraser 1987:74).

This transformation included a significant focus on reforming the Province's economic structures, and adapting the place of the state in the economy. As Claude Belanger writes,

"Quebec went from being the least taxed and the least indebted of the Canadian provinces to have the highest taxes and debt. A large and professional state bureaucracy was rapidly set up, many government departments and agencies were created... No full understanding of the Quiet Revolution can be arrived at unless the strong current of statism of the time is grasped. Whatever the problems were in the 1960's, as great and varied as they might have been, the solution always involved the stirring of state intervention to achieve proper results. For the state to be effective, planning had to take place" (Belanger 2000).

At the heart of this economic activism was the establishment, in 1965, of the Caisse de Placements et Depot, hereafter referred to as La Caisse. As Arbour (1993:22) notes, "in the minds of its founders, it (La Caisse) was to perform much more than the simple efficient management of the funds on deposit, being also a conscious mechanism for transforming the industrial structures of Quebec on a long term basis." Created in 1965 through Bill 51 and the Liberal government of then-premier Jean Lesage, La Caisse was designed as a means of ensuring "maximum financial return and to contribute by its actions to the dynamism of Quebec's economy." Arbour continues on to note that "the Caisse would turn itself into a conquering government agency, taking over responsibilities previously belonging to (Quebec's Industrial

Development Corporation) which did not have the capital to fundamentally modify the industrial structure of Quebec” (ibid 32).

La Caisse served to channel the savings of Quebecers into jobs for Quebecers (ibid 16). Doing so, according to Fraser (1987:80) focused on channeling the “huge pool of capital drawn from a continuous stream of pension-fund contributions, (to) immediately become a powerful tool of nationalist economic policy.” Moreover, through direct ownership of domestic firms, it also served to ward off the long standing control of the Montreal Anglophone elite as well as advances of foreign firms seeking to acquire Quebec-based companies (Belanger and Fournier 129; Fraser 1987: 95). All together, the development of an activist state in the 1960s marked the implementation of an industrial policy strategy that sought to end the ‘erosion of province’s economic weight and reinforce the influence of domestic business’ (Belanger and Fournier 1987:122).

This strategy is further developed in the early 1970s, notably through a policy document entitled Horizons 80 released in 1970. Therein it is noted that the explicit goal of the Quebec government is to actively guide “the development and reinforcement of a small number of private enterprises or multinationals that are capable of beating foreign competition” (Belanger 1998:126).

In so doing, La Caisse and the politically-driven Ministries operating alongside it, helped catalyze the development of several domestic multi-national firms, Bombardier, SNC Lavalin and Saputo, amongst them. As Bernard Landry, former finance minister and the chief architect of many of the interventionist policies introduced in the 1970s under a PQ government, noted in a 1994 speech at UQAM, the big economic successes in Quebec were accomplished as a result of the “active support” of state policy (in Belanger 1998: 17). Fraser takes a different perspective on these successes. He notes instead that these leading firms that rose to prominence in the 1970s and early 1980s were not state vehicles, but rather a powerful capitalist class of entrepreneurs who become the drivers of a shift in Quebec’s political economy from one focused on the welfare state to one driven by an orthodox capitalist state (1987:138).

Fraser’s perspective notwithstanding, the intimacy of state and private relationships during this period is striking. Notably, the ever-present role of the state in the provision of

financing and the development of regulations geared in part to keep foreign firms at bay and in part to facilitate expanded global reach for these firms becomes the central tenet of a developmental state.

Therein the definition of Quebec Inc. is clarified. As Belanger writes, the term denotes “an alliance between public powers and private enterprise seeking to control the levers of economic policy and promote a socio-economically driven growth policy” (Belanger 1998:177). Popularized by Jacques Parizeau in the 1980s, the term refers to the close relationship, decried as incestuous by some, between the Quebec government and domestic firms (Kelly-Gagnon 2009). These firms, now powerhouses both within Quebec and across the country (if not the world) such as Bombardier, SNC-Lavalin, Saputo and Quebecor, were part and parcel of the evolution of Quebec’s economic policy post-quiet revolution. Notably important here was the introduction of the Quebec Stock Savings Plan that provided significant incentives for the location and development of corporate activity in Quebec. This was part of the PQ’s market-led development strategy that underpinned the state’s interaction with industry (Courchene 1986:7). Therein, the state does not seek to replace the private sector. Rather it seeks to use the private sector as a means of hastening a series of economic changes viewed as both economically and socially necessary. Quebec Inc. can subsequently be viewed as a social, economic and political project, one geared towards the advancement of Quebec as both a distinct and sustainable nation and economic project.

This dichotomy towards public and private leadership, however, is largely false. For what emerges from the Quiet Revolution is an activist state that supplements firm-specific activity through capital allocations and regulatory reforms. In so doing, the state as economic actor does far more than facilitate the proper functioning of markets; rather it helps craft, protect and develop both markets and firms. Public and private success is subsequently increasingly undistinguishable. And as the following sections highlight, as time passes, this role does not disappear with the ascension of neo-liberal economic policy across North America in the 1980s. Rather Quebec’s case highlights how this support and intervention in private markets takes on different shapes in order to meet the ever-changing realities of competitiveness in the global economy.

The Activist state matures

If the Quiet Revolution was the marker for the development of an activist provincial government in Quebec, subsequent changes in leadership did little to change the activism of the state. In 1989, Pierre Fortier, then Associate Finance Minister, addressed the Canadian Club of Montreal (February 13, 1989) with a speech in which he noted, “We have to start promoting the development of industrial, commercial and financial conglomerates which, by pooling of their resources, will provide Quebec with the means to act both here and abroad” (in Courchene 1990). As in the wake of the Quiet Revolution, the state does not waver in its desire to promote domestic enterprise with a global span. Yet as the following will show, what begins to distinguish itself is an industry specific form of targeting that looks to develop key sectors of the economy through both direct and indirect assistance.

This shift in process happens concomitantly with a shift in the provincial-federal relationship. As Thomas Kierans notes, “Ottawa now appears willing to take a back seat on a lot of (economic) issues and to let the provinces assess what these issues mean for them and how they want to address them.... This puts the provinces in a very important position vis-à-vis constitutional development and social and economic policy” (Kierans 1990:27). This flexibility in policy development is leveraged by the government of Quebec to focus state efforts on the development of a competitive domestic pharmaceutical industry. Later the target is the development of the Province’s information and communications technologies (ICT) sector.

As the following section will explain, these efforts take both direct and indirect means. Direct insofar as grants and subsidies are used to channel capital to selected firms, and indirect insofar as government regulation is utilized to create a business environment that privileges domestic firms. Across these two targeted sectors, as well as others as will be referenced, the Province of Quebec highlights how the state plays a strong, leadership role in the development of new industrial sectors. In so doing, the state works both ahead of the private sector as well as alongside it, in the name of societal and political autonomy gains.

Case Study: Pharmaceutical Industry

In the 1980s, the decline of manufacturing across the province saw significant attention paid to new industries. In particular, the economic crisis that engulfed that province (tied in no small part to ongoing talks of secession from Canada) was felt hardest in Montreal. In 1985, a working

group chaired by the Dean of the Faculty of Management at McGill University, Laurent Picard, formally the Ministerial Committee on Development of the Montreal Region but informally known as the “Picard Report,” sought new pathways to rescue the city and the region economically. A key recommendation of the report was to focus on novel industries, notably telecommunications, aerospace, biopharmaceuticals, information technologies and microelectronics (Hamel and Jouve 2008: 25).

While the presence of each sector was not new, “major shifts in provincial policies had to be deployed to lever these impressive assets to the full” (Griller and Denis 2008: 5). As Hamel and Jouve note, the working group’s recommendation mark a turning point in the city, and by extension the province’s, economic focus towards the knowledge economy (2008:25). Particular attention was paid towards the development of a competitive pharmaceutical industry. Through a series of fiscal and regulatory reforms, Quebec sought to promote the industry and related employment. As Griller and Denis (2008:1) note, “Québec built its pharmaceutical industry through a reaction to economic adversity. In the mid-1980s the economy of the Montréal region faltered. Politicians and business leaders mobilized their efforts to focus on three major knowledge-based sectors, pharmaceuticals, aerospace, and information and communications technologies (ICT). Over the next two decades these sectors helped revitalize both the economy of Montréal and that of Québec as a whole.” By the early 1990s successes were showing in the biotechnology sector, notably the province’s pharmaceutical sector, as a result of fast growth firms enabled by provincial government funding and preferential regulatory treatment (Hamel and Jouve 2008: 27). Moreover, despite strong incentive-laden competition from several provinces, particularly Ontario and British Columbia, by the mid-1990s Quebec was capturing over 40 percent of international investment in the Canadian pharmaceutical industry (Griller and Denis 2008:9). In addition, 46 percent of overall industry-related research and development was now performed in Quebec, including 66 percent of discovery research (ibid:22).

In addition to significant improvements to the province’s corporate tax regime and a generous system of tax credits for research and development, this success is attributed in no small part to the introduction, in 1987, of Bill C-22. The legislation provided substantial advantages for domestically produced pharmaceutical products. In particular, through what was known as the “Fifteen Year Rule,” the province provided preferential treatment of domestically

created pharmaceutical compounds by allowing them longer periods of privilege on provincial formularies. The Province's Ministry of Finance states in a 2005 document, that this preferential regulatory system has, along with generous tax credit and fiscal transfers, been key to the development of the industry in Quebec (Bahan et al 2005). It has done so at an estimated cost of CAD31 million per year. Simulations conducted by the Ministry show that the removal of this preferential treatment would cost the Quebec economy over CAD340 million in lost annual activity owing to both a reduction in investment and subsequent reductions in employment and spending (ibid: 13).

An important distinction should also be made between the market oriented, regulatory approach taken by Quebec as compared to the regulatory and flexibility inspired approach in Arizona. While both jurisdictions have used such levers to attract external investment, Arizona's approach focused on placing downward pressure on tax revenues and wages. In contrast, Quebec's regulatory focus has been on the promotion of domestic firms through the provision of discriminatory access to public procurement channels.

These regulatory changes were just part of a policy regime that has, across a variety of left and right leaning governments, sought to promote the industry. And while each has attempted to leverage the cluster of academic and private pharmaceutical expertise in the region for further growth, the policies enacted have explicitly sought to stimulate new industrial development. The focus therein has balanced market oriented supply-side measures including a competitive tax regime with interventionist approaches including direct funding and the development of domestic corporations.

Currently, Quebec's R&D tax credit program is by far the most generous in the country, allowing for a 60% rebate for research expenditures for small businesses and 34% for large companies. In contrast, Ontario allows for only 44% and 23% respectively. An even more significant advantage for domestic companies is the aforementioned "15 years rule" that allows branded product to be requested by patients and doctors for 15 years after patent, even if generic alternatives are present. However in late 2012 the Quebec government announced that it would end the "Fifteen Year Rule" as a means of channeling funding more explicitly towards research and smaller companies.

In explaining the decision to end the 15 year rule, Minister of Finances and the Economy Nicolas Marceau noted, “Over the years, Québec has introduced conditions favourable to the development of the biopharmaceutical sector. However, in recent years, the business model of the industry has undergone a sea change. Québec government support needs to be adapted to this new context, the objective being, as always, to promote research activities in Québec” (Québec 2012:15). In particular, Marceau notes that the prioritization towards domestically produced products has not been sufficient to attract and retain significant research and development centres in the Province. Marceau adds, “large pharmaceutical companies are changing their ways and outsourcing research, leading to the closure of several research centres and, consequently, a significant decrease in research spending in Québec, not to mention the loss of high-value-added jobs” (Marceau 2012). In its place, the government seeks to instead promote domestic activity through enhancement of tax credits for R&D, as well as more direct assistance towards SMEs in the sector, including the allocation of CAD125 million for industry-academia partnerships.

While local factors are key to the evolution of policy in the province, so too is the role of inter-provincial competition. Across interviews with stakeholders in the province’s innovation-oriented sectors, references to “what’s on offer in Ontario” are common. Moreover, policy introductions have followed competitive moves in other jurisdictions. For example, in November 2009 one year after Ontario announced the development of its CAD150 million BioPharmaceutical Investment Program and saw an increase of nearly CAD28.3million in pharma-related R&D (while Quebec’s R&D figure dropped by CAD29.2m), Québec announced the launch of its *Nouvelle stratégie biopharmaceutique* (translated as *New BioPharmaceutical Strategy* (Québec 2010). The strategy sees subsidies of between CAD122.77 million and CAD176.77 million made available over a three period to private sector pharmaceutical companies (see figure 6). In announcing the program, the Government noted that its “new biopharmaceutical strategy will reinforce the provinces advantages as a means of growing the competitiveness of its enterprises on a global scale” (Québec 2010).

Figure 6: Quebec’s New BioPharmaceutical Strategy (all figures CAD)

Support research and development	39,00 M\$
Support the development of local biotechnology companies	30,95 M\$

Support the development of large biopharmaceutical companies	50,00 M\$
Support skill development and ensure the availability of qualified labour	0,32 M\$
Support the development of a positive brand image of Quebec's pharmaceutical industry	2,50 M\$
Three year funding total	122,77 M\$

In addition to this pool of industry specific funding, the Province's Research and Innovation Strategy focuses on the development of several strategic technologies: genomics, biotechnology, optics and photonics, and nanotechnologies. Doing so leverages public investment of upwards of CAD2 billion. As part of this strategy, the Province has also established a suite of "developmental programs" reminiscent of the French Grand Projets of the 1980s.¹²⁴ With a budget of CAD180 million, a public sector steering committee will oversee the development of "major developmental projects" aimed at ecological aircraft, electric bus, forest biorefinery, and green communications technologies (Québec 2010B).

To be sure, Quebec's distinct constitutional structure allows it a certain degree of flexibility, for example as it relates to the signing of direct bilateral ties between the Province and other nation states.¹²⁵ And its Francophone status surrounded by Anglophone neighbours has facilitated the political and social acceptance of public intervention in markets (see, for example, Gagnon and Lachapelle 1996). However, its appropriateness as a case study in this dissertation is made clear by its aggressive intervention in markets, notably towards future-oriented areas of "strategic promise," and its heavy subsidization of key innovative industries. Moreover, the Province's focus on bilateral exchanges related to credentialization and labour mobility further highlight the increasingly central role of the middle level of State/Provincial governance in broad economic development.

¹²⁴ A popular advertisement slogan in the 1970s framed the country's big project orientation: "En France, on n'a pas de pétrole, mais on a des idées !" which translates as « In France we don't have oil, but we have ideas !" <http://matweblog.levillage.org/index.php/post/2011/01/12/162-vrai-projet>

¹²⁵ As is the case with the France-Quebec agreement on the mutual recognition of skilled workers competencies

Case Study: Digital Media

If the political economy of Quebec's economic development strategy in the 1980s was focussed primarily on the development of a then-nascent pharmaceutical industry, the 1990s and early 2000s saw information-communications technology take centre stage. In 1996 under the leadership of then-Premier Lucien Bouchard, the government of Quebec introduced the first of what would soon become a series of incentive programs designed to facilitate the attraction and retention of multimedia technology companies. The first of these programs was a tax credit that was valued at between 26.25% to 37.5% of the labour costs associated with game development (Investissement Québec 2015). While ostensibly focused on job creation, the plan was introduced in a speech by then-Finance Minister Bernard Landry as one that helped the government meet its commitment to protecting and nurturing provincial culture (Québec 1996).

As seen across the jurisdictions studied for this dissertation, intervention in the development of an industrial sector is introduced as being focused on a social, rather than strictly economic, gain. Much later, in 2013, Premier Pauline Marois is asked by a reporter as to the element of culture that underpins the government's investments in the sector, to which she responds: "They're certainly part of our culture, of Quebec culture ... (Gaming) is a new art that demands as much creativity as a painting, and is very stimulating not only for our youth but for anyone who's interested in new technology and multimedia. So it's part of our culture" (Czikk 2013). Thereafter, however, the focus of government reporting on the credit program is strictly framed in employment terms. While a small cluster of multimedia firms existed prior to the introduction of the aforementioned government programs, the sector's growth came primarily after (Della Rocca 2012). As of 2011, the government estimated that the programs had attracted 86 foreign firms to set up in Quebec and facilitated the creation of 8,236 jobs (Baker 2011).

The development of this cluster is the product of two decades of support. In its 1998 budget, the government noted the development of a suite of fiscal measures designed to capitalize on new information and communication technologies. Budget Speech 1998 introduced a broad tax credit program on related labour costs, allowing for a near 40% subsidizing of labour related to research and development in targeted sectors. These programs are framed by a perspective that focuses on the job and growth potential of particular sectors. As the Budget Speech notes:

The development of information and communication technologies has been accentuated over the past several years. These promising economic sectors offer significant potential for investment and employment growth. In order to advantageously position Quebec in these clusters, the government has put in place a series of measures that aim to favour investments made in firms, both local and foreign, in the economic sectors enjoying this emergence such as multimedia and the Internet (Québec 1997).

A dozen years later, the government of Quebec estimates that it has provided just shy of a half billion dollars to the industry since those first program incentives.

It should be noted, however, that the Province has not always acted alone in this effort. In 1998, as a means of attracting French video-game maker Ubisoft to Montreal, the government of Quebec requested, and received, assistance from the Federal government. As Tremblay, Chevrier and Rousseau write, the Federal government contributed CAD10,000 per employee for 500 jobs (2004:308). Moreover, the Province's attempts to stimulate activity in the sector have not been limited to tax measures. Rather, in 2010 the government expanded its activity by taking a direct ownership stake in Ubisoft valued at CAD40 million (Chung 2010). This equity stake reflects an additional tool utilized by the Province in its industrial development strategy. Channeled through government agencies such as Investissement Québec, the Province has taken stakes in several companies as a means of injecting capital and sharing potential profits. In 2014, the Minister of the Economy and Innovation Jacques Daoust announced a CAD5 million investment into a Montreal-based gaming company. In doing so he noted that the allocation of funds was "not an expense, it's an investment. I insist on that because it's a great deal. We're spending real money and they're going to create real jobs" (Shalom 2014). As of 2014, the organization has disbursed over CAD300 million to digital media and ICT related firms (Investissement Québec 2014). These investments highlight that the state has extended its strategy towards the development of the sector from tax incentives to direct investment. In so doing, the state moves from a broad approach available to all firms to a far more discriminatory one that privileges some over others. This matches the evolution in policy seen in other cases conducted for this dissertation and highlights a gap in the pre-existing body of literature on the state in the economy.

Upon taking power in 2003, the Liberal government led by Premier Jean Charest sought to address a significant fiscal deficit through a cancellation of several of the PQ government's

business subsidy programs. Then Finance-Minister Yves Seguin noted that the “excessive interventionism” of the previous government had saddled taxpayers with “unproductive interventions ... that will cost Quebecers CAD11 billion in years to come” (Québec 2004). In so doing, however, the new government’s approach can be seen as a shift in language rather than a distinct shift in means or process. Thus in that same budget speech, in a comment that smacks of irony, Seguin notes “our government has undertaken to do away with generalized, costly interventionism” (ibid). He continues, however, “Our intervention will be better targeted and more effective” (ibid). The issue to be tackled is thus not the active intervention of government in a private market, but rather the language and effectiveness of that intervention. While noting that this will focus on the transition of the government to the role of partner with the private sector rather than independent entrepreneur, Seguin then allows for the continuation of an entrepreneurial role by stating, “we will also intervene where our involvement is essential to the realization of projects that create wealth and jobs for Québec society” (ibid). A change in government and shift in rhetoric is by no means a repudiation of intervention or government activism.

As one right-leaning Canadian newspaper notes, “Lawmakers chose long ago to bet on video game development with the belief it would generate well-paying creative jobs and help compensate for the declining manufacturing and textile sectors. By some measures, the gamble has paid off” (Van Praet 2012). This perspective on the benefits of the governments activism vis-à-vis the ICT sector is shared by others. Tremblay, Chevrier and Rousseau (2004:180) note that state support was integral to the industry’s development, “these forms of public support (incentives) played a fundamental role in the development of the multimedia industry in Montreal.”

This view is reflected across interviews for this dissertation. Michel Leblanc, chief executive officer of the Board of Trade of Metropolitan Montreal, notes that “Montreal’s digital media cluster has clearly been aided by the intervention of the provincial government and the subsidies that have followed. There was a small number of companies and researchers that existed prior to the government’s prioritization of the sector but little to indicate that this type of

success was forthcoming.”¹²⁶ Nicole Martel, president of the Quebec Technology Association, adds that “the government’s use of tax credits and subsidies have played a very important role in promoting growth and innovation, especially in the digital media and gaming sectors. They have been key to the growth seen over the past decade.”¹²⁷

Serge Landry, president of Montreal-based games developed Mirulapa and board secretary for Alliance Numerique, a digital media industry association, concurs. He notes that the province’s digital media and gaming industries are all the product of a turning point in government policy that occurred in 1997 and 1998.¹²⁸ Then, as noted above, the provincial budget allocated significant incentives towards the development of the industry. Prior to their introduction, Landry notes that the industry was “practically non-existent.”

The success seen in this industry, however, isn’t guaranteed. Leblanc notes when interviewed that the government’s support of other sectors, notably the electronic commerce sector, has not produced the same results. Instead, significant sums of public dollars were invested with little to no impact. Leblanc argues, however, that this failure shouldn’t dissuade further intervention. “As the government ended the project once they saw how little impact it was generating, it’s fair to infer that government can intervene so long as it learns and adapts quickly.”¹²⁹

Leblanc argues that there are arguments in favor of a certain amount of intervention in the economy. In particular, he notes, “clusters provide an example of economic development where public assistance can take an immature activity and provide it with significant advantage. At this stage it’s legitimate for the government to get involved” (ibid). He cautions, however, that this works best when the support is aimed at real strengths based on existing economic activity rather than “theoretical investments based on the government taking on a visionary role” (ibid). The latter approach is fraught with significant risks, notably delegitimizing the

¹²⁶ Leblanc, Michel. 2014. Personal interview with Michel Leblanc, chief executive officer of the Board of Trade of Metropolitan Montreal, Montreal, Quebec, April 7.

¹²⁷ Martel, Nicole. 2014. Personal interview with Nicole Martel, president of the Quebec Technology Association, Montreal, Quebec, March 27.

¹²⁸ Landry, Serge. 2014. Personal interview with Serge Landry, board secretary for Alliance Numerique, Montreal, Quebec, May 6.

¹²⁹ Leblanc 2014.

government's role in the economy. Leblanc adds that the government's contemporary approach to corporate support is not sustainable. He argues that "they are attempting to support and subsidize specific sectors and specific firms therein but without sufficient attention to the general fiscal environment that drives the performance of all firms in the province" (ibid). This view is shared by other stakeholders. Nicole Martel, president of the QTA, notes that while the government has pursued a very targeted approach to funding and subsidization, the QTA would have preferred a broader approach to the eligibility of firms and/or sectors. Martel adds, "The government's role should be to catalyze industrial sparks. Support can be an excellent means of sending a message to firms that 'we believe so much in new technologies that we'll co-invest with you.' However, this needs to be balanced across the economy, not in specific targets."¹³⁰

Landry's critique is more nuanced. He notes that originally the package of support offered by the province was largely directed to large, multinational firms. The recruitment of firms such as Ubisoft with multi-million dollar packages is a key example. These firms, he argues, are better able to speak to and lobby government. Conversely, smaller, entrepreneurial firms have been less able to present a consolidated approach and have been sidelined from much of the province's largesse.¹³¹ Marie Lapalme, Vice President of the Association pour le développement de la recherche et de l'innovation du Québec (ADRIQ) agrees. She notes that "while money is being spent, it's not being spent on small firms. Rather, it's the larger companies with more resources that have in-house counsel that allows for better access to decision makers for visibility and influence."¹³²

Recent changes in policy to better target small firms are a welcome shift, says Landry. "The province's support and subsidies are now more democratized and allow small players and entrepreneurs better access."¹³³ This shift, he believes, is the product of two increasingly influential perspectives. The first, held by policy makers, is that large firms are far more mobile than small ones and the ensuing competition between states to attract large anchor firms is increasingly expensive. The second, held by large firms, is that without a collaborative ecosystem that sees both large and small benefit from government support, the pipeline of ideas,

¹³⁰ Martel 2014.

¹³¹ Landry 2014.

¹³² Lapalme, Marie. 2014. Personal interview with Marie Lapalme, Vice President of the Association pour le développement de la recherche et de l'innovation du Québec (ADRIQ), Montreal, Quebec, April 1.

¹³³ Landry 2014.

talent and general sector attention will dissipate. “Large firms have more constraints in seeing and finding new technological waves,” says Landry, “they realize that innovation more often comes from the basement of entrepreneurs.” This critique notwithstanding, Landry concludes by noting that “without the government’s support via subsidies we would not have seen the development of these industries. We just need to make sure we better target these funds towards the small firms that are likely to grow quickly.”

Quebec’s contemporary industrial policy

That Quebec Inc. has survived and developed for nearly four decades is evidence of the staying power of state activism. Despite shifts in political rhetoric, political reality and its roots in the economy and employment have allowed Quebec’s political leaders to continue a process of explicit intervention and activism. As recent Premier Pauline Marois noted in conversation regarding the benefits of the Province’s subsidization of the digital media industry, “I believe that to have, once again, well-paid, quality jobs in high-tech, we’re building a Quebec of the 21st century, a Quebec with a future” (Heinrich 2013). This future is a highly leveraged one. As Seydou Sisoko, director of the Ministry of Higher Education, Research and Science and Technology, notes, “around the world, and thanks to globalization, it is knowledge societies are required for local economies to flourish. And in turn this knowledge orientation must be supported by the state.”¹³⁴

The intervention that follows is subsequently positioned as a natural strategic reaction to evolution and change in the global economy, and Quebec’s place in it. And this intervention is not light-handed. Rather, as Sisoko admits, the state takes a leadership role in “catalyzing the development of priority sectors.” He adds, “we (the government) are the conductors. We direct and coordinate other stakeholders towards a common goal. We don’t have unlimited resources, not all the necessary parts of the answer, so our job is to bring everyone together.”

¹³⁴ Sisoko, Seydou. 2014. Personal interview with Seydou Sisoko, director, Ministry of Higher Education, Research and Science and Technology, Quebec City, Quebec, March 31.

Michel Leblanc of the Board of Trade of Metropolitan Montreal notes that the provincial government's contemporary policies leave it as one of the most, if not the most, interventionist government in North America.¹³⁵ Leblanc adds, "this is a government that across its industrial, fiscal and innovation policies, is attempting to prioritize and support some economic activity more than others. It's a government that has given itself the authority to assume that the market won't work in certain cases, and step into the void to make choices and investments as a result." He adds, however, that this interventionist approach transcends political change as both Liberal and Parti Quebecois policy have pursued an activist economic agenda.

Across interviews for this dissertation, stakeholders make clear that despite changes in political leadership, the subsidization and active direction of industrial development has remained consistent. Daniel Blanche, president and chief executive officer for the Computer Research Institute of Montreal (CRIM), states that the current strategies employed by the provincial government towards targeted industrial promotion are "95% identical to those of the previous Liberal party."¹³⁶ And Sissoko notes that while successive governments have sought to add nuance to the province's industrial and innovation policies, the primary thrust of this activism has not changed.¹³⁷

Marie Lapalme, vice president at ADRIQ, notes that this activist role in the economy is generally supported by industry and third-party groups such as hers. "We know that if government is going to intervene it will either do so by sprinkling funding around to all sectors or to target and prioritize select ones. We also know that the provincial government, both Liberal and PQ, have preferred to target so our role has been to push them to broaden this lens as much as possible."¹³⁸ She adds, "we shouldn't be putting ourselves into paths that can't be changed. Sector selection or targeting needs to be flexible. It needs to be able to move with technological evolution and not remain static." Blanche from CRIM echoes this need for flexibility. He notes that "you need to create a critical mass and for this government action is integral. But we can't

¹³⁵ Leblanc 2014.

¹³⁶ Blanche, Daniel. 2014. Personal interview with Daniel Blanche, president and chief executive officer for the Computer Research Institute of Montreal (CRIM), June 9.

¹³⁷ Sissoko 2014.

¹³⁸ Lapalme 2014.

keep subsidizing firms forever. Digital media has succeeded so needs to be weaned off of subsidies. Electronic commerce never flourished so we have to move on.”¹³⁹

Whether such flexibility exists is beyond the scope of this dissertation. What is clear, however, is that the province employs an explicit targeting strategy that discriminates between industrial sectors. In particular, successive governments have sought to privilege those sectors they believe are most important for the province’s present and future economic and employment base. As Sisoko notes, “better to focus on those sectors that are dominant in the economy or have the competencies to be so in the future. We have to decide which sectors are able to pull the economy forward.”¹⁴⁰ He adds, “this isn’t to say we don’t support other sectors of the economy, simply that we first prioritize help towards those we determine are strongest or most important.” Thereafter this targeting, and the support and subsidization that follows, is focused on high-technology sectors that the province believes will be sources of employment growth.

Whether this approach bears fruit is also outside of this political-economy analysis of the state’s role in the economy. However, it is worthwhile to note that the province’s record is viewed as mixed. As scholar Vincent Geloso writes in a report prepared by the HEC Montreal, “from 1975 to the present, Quebec began to stagnate once again relative to the rest of Canada, especially in terms of productivity. During this period, living standards were artificially stimulated by the effect of federal transfers and overestimated by changes in household structure in Quebec relative to the other provinces” (Geloso 2013). Marie Lapalme from ADRIQ agrees. She notes that “the government has invested a great deal in innovation but the results are not as vibrant as we would like. The results are simply not the most inspiring.”¹⁴¹ Despite a strong state role in the economy, it seems as if Quebec has not been able to escape many of the economic issues that rose to prominence at the height of the Quiet Revolution.

The province’s future, however, is one where the threat of departure by firms drives a process of competitive subsidization against other jurisdictions. Across interviews completed for this dissertation, inter-jurisdictional competitive risk drives a contemporary version of Quebec Inc. and its explicit approach to intervention in the economy. Blanche from CRIM notes that

¹³⁹ Blanche 2014.

¹⁴⁰ Sisoko 2014.

¹⁴¹ Lapalme 2014.

“government support may ultimately be necessary to keep innovative sectors in Quebec given that other jurisdictions are happy to step in and offer incentives.”¹⁴² Sisoko adds that this competitive element drives the province’s actions. “We have to look across the OECD at what the barometer is for state support. We have to measure ourselves against what is done elsewhere.”¹⁴³

The competitive subsidization of firms is just one aspect of the province’s ongoing economic, and innovation related, challenge. According to government documents, Quebec’s most recent strategies to intervene in the economy seek to address three problems – a lack of productivity, insufficient investment in technology and machinery, and a lack of export diversification (Quebec 2013).

Developing strategies to address these issues is most recently detailed in the 2013 industrial strategy spelled out in a government document entitled “Putting Jobs First: Investing in productivity is investing in Quebec” (hereafter referred to as *PJF Report*). In it, Minister for Industrial Policy (yes, they have a Minister for Industrial Policy!) and the Banque de développement économique du Québec, Elaine Zakaïb notes that “the time has come for us to make increased productivity a national economic priority by modernizing our businesses and greening our economy.... This is the only path to creating and maintaining quality jobs” (Quebec 2013B).

In so doing, much of this policy is targeted at the province’s manufacturing sector. In assessing the performance of the broad sector, the PJF Report notes that “productivity is still too low compared to our main competitors.” Addressing this perceived weakness subsequently relies on an estimated CAD2 billion purse over 2013-2017 that is geared towards three priorities:

1. Green and modernize existing businesses;
2. Facilitate the emergence of new flagship sectors;
3. Support innovation, from concept to market (Quebec 2013B).

This framework of support builds on an understanding of global competition whereby Quebec has failed to stay in-step with other economies. The PJF Report notes that,

¹⁴² Blanche 2014.

¹⁴³ Sisoko 2014.

“We have entered the third industrial revolution. Around the world, governments are trying to adapt their country’s economy to this emerging advent, which is fundamentally transforming the context in which our economy and our industry are evolving” (ibid:3).

Here the reference to other governments and competing jurisdictions lays the framework for the introduction of an explicitly activist strategy by the Government of Quebec. Rather than relying on the private sector for the recalibration of the economy, public forces are looked to for leadership. The PJF Report highlights this role, noting “the government believes it is essential to adopt an industrial policy that will allow Quebec to benefit, to the extent of its aspirations and capacities, from a new model of economic growth rooted in continuous innovation and sustainable development” (ibid:11). Public leadership is framed as key to the province’s economic competitiveness.

Moreover, while support is broadly directed towards the manufacturing sector, this document makes clear that targeting and intervention are an integral part of the role of government in the Quebec economy. The document highlights that four sectors in particular are worthy of strategic attention. These sectors are aerospace, ICT, life sciences, and renewable energy technologies. The government’s policy document goes on to note that given the importance of these sectors to the present and future prosperity of the province, the province cannot sit idly by as they risk “being victims of their too slow adaptation to the evolution of the global economy” (ibid:1). Within these sectors, the document states that targeting specific firms, or picking winners, is a necessary complement. “It remains the fact that it is necessary to favourize the growth of those with the most potential amongst them” (ibid:15). This explicit industrial policy is positioned by the government as one of a series of government strategies aimed at promoting the economy and directing the development of new industrial sectors. In particular, this policy lies alongside the *National Policy for Research and Innovation* and the *International Commerce Development Plan*. It is also accompanied by the creation of an economic development bank, which if it proceeds would become the only standalone provincial entity of its kind in Canada. The proposed bank would target financing towards firms and sectors identified as strategic for the province and requiring assistance to become more competitive.

All together, these strategies encompass the Province’s attempt not just to create an environment that is conducive to growth, but rather to target specific microeconomic levers to

address firm competitiveness. The policies promoted include CAD1 billion in direct subsidization and funding for the integration of new technologies in firms, including the introduction of a series of tax measures and grant programs aimed at lessening the cost of investment for SMEs into new technologies. In addition to this funding, an additional CAD1 billion is to be made available for the prioritization of specific firms in specific sectors, notably those identified as most promising, in the hopes of having them develop into the industrial nodes of future clusters. Daniel Blanche of CRIM notes a word caution insofar that these policy initiatives all represent a strategy focused on “technology push rather than a focus on what’s needed in the market vis-à-vis technology pull.” He adds as well that across these strategies, a great deal of fragmentation is present, significantly dampening the strategic thrust of the Provinces’ greater economic goal.¹⁴⁴

Across these policies, and as response to the competitive poaching efforts from other jurisdictions, the support directed towards existing firms, and towards the development of medium and large firms that are global leaders, is increasingly placed on the development of a more robust entrepreneurial sector. Like in the other jurisdictions studied in this dissertation, Quebec places a significant focus on a “grow your own” approach. Here the government allocates CAD50 million towards the development of Capital Emergence, a venture capital fund whose focus is on the funding of start-up businesses that have strong growth potential (Quebec 2013:49). Additional programmatic measures include direct funding for marketing and intellectual property management. Moreover, the documents note that the public and para-public sectors are to become testing grounds for innovative products and services with an explicit annual goal established for the development of this public-private linkage. Heavy public investment in collaborative academic-industry partnerships are key to this approach. Sisoko notes that the government provides upwards of 50 percent of the funding for collaborative research centres focused on the government’s priority sectors.¹⁴⁵

As noted, the province’s industrial policy is closely tied to its National Research and Innovation Policy whose goals of promoting growth and productivity are largely similar. Launched in October 2013, this policy has the explicit goal of responding to three socio-economic drivers: demographic change, sustainable development, and Québec identity. Marco

¹⁴⁴ Blanche 2014.

¹⁴⁵ Sisoko 2014.

Blouin, Director, Industrial research, Ministère de l'Économie, de l'Innovation et des Exportation, notes that these two policies are complementary parts of a holistic focus on economic development, and of the state's role in promoting and catalyzing that development.¹⁴⁶ As noted by Pierre Duchesne, Minister de L'Enseignement Superier, de la Recherche, de la Science et de la Technologie, the innovation strategy "sends a clear signal: the state is a key player when it comes to innovation, and our government is taking full responsibility as an agent for joint effort on a public scale" (Quebec 2013C:2). Sisoko refers to the role of the state as that of a "spark" or "catalyst" in the development of programs, public and private, aligned towards the state's goals.¹⁴⁷ Stakeholders interviewed for this dissertation, agree, highlighting the need for the state to provide incentives for innovation and technological adoption, primarily amongst SMEs.

This analysis has so far focused primarily on the role of the state as providing supply-side incentives for the development of technologies and new industrial sector. This role is complemented by a belief that the government must act in a strategic manner and as a lever for demand-side intervention. Here the primary lever is the purchasing power of government. Domestic innovations are to be promoted through the use of public markets, that is to say the prioritization of domestic over foreign suppliers. While Sisoko notes the risks this strategy adopts, insofar as it may spark retaliatory discrimination in export markets, he affirms the use of public procurement as a development strategy (ibid).

Sisoko references a 2010 transportation contract given to Montreal-based Bombardier as an example of the strategic risks preferential treatment for domestic firms engenders. The case begins in 2005 when the government of Quebec, then led by Liberal Party Premier Jean Charest, awarded a CAD1 billion contract to Bombardier without a full international tender process. The subsequent threat of a WTO challenge by French transportation firm Alstom saw the contract rescinded (CBC News 2006).

In 2007, The Economist christened the allegations of trade protectionism as "Train Wars" (The Economist 2007). In 2008, as a result of the threat of legal and retaliatory action, a final

¹⁴⁶ Blouin, Marco. (2014). Personal interview with Marco Blouin, Director - Industrial research, Ministère de l'Économie, de l'Innovation et des Exportation, Gouvernement du Quebec, March 31.

¹⁴⁷ Sisoko 2014.

solution saw Alstom and Bombardier agree to collaborate on a subsequent tender (Gibbens 2006). This too, however, drew the ire of other firms, and as recently as 2010 WTO action has been threatened by Chinese and Spanish firms. Spanish firm CAR, for example, has called the privileging of domestic bids an “extremely negative protectionist message” and an aberration to the WTO set of regulations (Potorac 2010). To be fair, while certainly an aberration to the aims of the WTO, the actions of the government of Quebec did comply with the letter of WTO law. It did so, however, thanks to the emergency passage of Bill 116, “An Act concerning the acquisition of cars for the Montréal subway,” passed by the Charest government with the support of the opposition Parti Québécois. As the explanatory notes of the bill state, the Act “aims to rule out any legal action concerning the process under way for the making of the acquisition contract, as well as any legal action relating to acts performed under this Act” (Quebec 2010C). It does so through language that positions the Bill 116, and the privileging of the Bombardier/Alstom bid, as a response to an “emergency.” Here the emergency is defined as two-fold: first, a safety and infrastructural one owing to the age and condition of current assets, and second, an economic emergency tied to the need to create employment in the province (Hamad 2010). This definition of emergency is integral to the prohibition of legal action against the province. By doing so, Bill 116 may have sought to satisfy the WTO’s Agreement on Safeguards (Article XIX of GATT 1994). Therein safeguard measures are defined as emergency actions where imports “cause or threaten to cause serious injury to the importing Member’s domestic industry” (WTO 2014). While the use of discriminatory procurement is not amongst the eligible safeguard actions, the use of the term “emergency” in the province’s legislation provides the framing for the legal application of the safeguard measure.

In debates regarding the adoption of the Bill, then-Minister of Transport Sam Hamad justifies the introduction of legislation as necessary by noting that ongoing legal threats and legal pursuits launched by firms against the province had unnecessarily slowed the process of implementing the province’s transportation plan. Bill 116 would thus “allow us to push these legal attempts aside and gain time” (Quebec 2010D). Despite the Province’s experiences in this latter case, it has not stopped seeking to privilege local industry in the allocation of public procurement contracts. As Sophie Cousineau writes in the *Globe and Mail*, the Province provided similar domestic prioritization as a means of providing demand-side support to the Province’s nascent wind energy industry (Cousineau 2013). Cousineau writes, “The Liberals had

made ‘buy Québec’ requirements in the first public tenders, with conditions such as a 60-per-cent local content. This decision gave birth to a wind manufacturing industry that could stop turning without new contracts. About 2,000 direct jobs are at risk, including 800 in those two high-unemployment regions” (ibid). As is the case in both digital media and the life sciences, changes in government since the introduction of this support have not stopped the flow of industrial policy support to this sector.

When asked about the Province’s current strategies and their congruence with international trade law, Sisoko admits that they are taking risks. However, he adds that the policies are designed to provide privileged access to domestic firms, albeit without going so far as to cause trade partners to shut down on reciprocal access.¹⁴⁸ It’s a fine line between the two, he notes, but one that can and must be found.

Conclusion

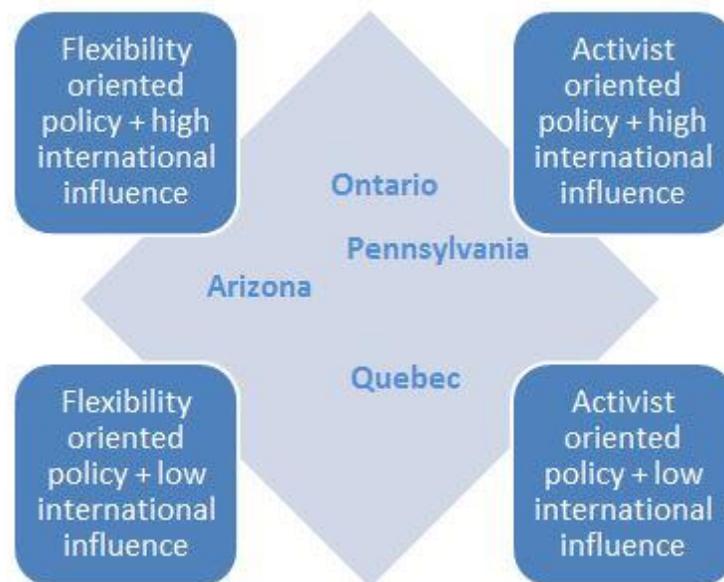
In laying out these investments and strategic policies, the government of Quebec notes in policy documents that “given that most countries have recently adopted industrial policies or their equivalent aiming at the modernization of domestic firms... Quebec cannot be an exception” (Quebec 2013). This notion of what others are doing is an important influence on Quebec’s strategies and its activist role in the economy but remains secondary to unique internal conceptions of Quebec’s place within Canada and the world. Restructuring that place began nearly five decades ago during a period of political and social upheaval aimed at unshackling the province from its traditionally conservative cultural roots. It continues today as a result of ongoing perceptions held by both policy makers and industry stakeholders regarding the province’s ability to compete with other nations, and the tools necessary to do so.

Across this period the province’s intervention has shifted in form and focus, but has remained firmly present in successive political and policy shifts. An initial focus on the creation of leading domestic firms via Quebec Inc., gradually gave way to a more refined industry-specific focus on the life sciences and digital media technologies. In turn, the lessons and insights taken from the government’s leadership in the development of these sectors have informed the development of current policy efforts towards the re-invigoration of the province’s

¹⁴⁸ Sisoko 2014.

manufacturing sector. Here the target is quite broad, and includes both established and new firms, but again the role of the province as catalyst, director and investor is clear.

Using both supply and demand-side interventions, the government of Quebec is far more than a champion of domestic enterprise. Rather it plays an active role alongside firms, providing for both the macroeconomic environment that facilitates and shapes firm activity, as well as actively participating in micro-level features regarding market demand and firm investment. Moreover, it focuses these activities on pushing the province forward towards new industrial fields perceived as encompassing the next wave of economic growth. In so doing, the state takes a leading role in directing and channeling the waves of Schumpeterian creative destruction by creating the initial winds to creates those waves, and ensuring sufficient turbulence through interventionist actions to keep them churning forward.



Returning once again to our matrix of motivations and reactions, Quebec highlights the most internally-focused motivation amongst the four empirical cases studied in this dissertation. This internal-orientation is far more akin to the “raison d’etat” proposed as passé by Cerny. Socio-cultural particularities present in Quebec drive this internal motivation, and nuance the impact of international competitive pressures. Those exogenous pressures, however, are not totally muted. Rather the race for innovation and a competitive advantage for domestic firms

against growing regional and international competition is nuanced by the unique constitutional and cultural construct that Quebec represents.

As for actions, Quebec highlights an exceptionally activist sub-national state. Like Ontario, the policies enacted by this activist state towards the privileging of domestic industry have been judged as contravening international trade law. Such judgements, however, are not seen as having a significant impact on the subsequent design of policy towards the development of new industrial sectors. Moreover, in the knowledge-intensive sectors that are the focus of this dissertation, Quebec focuses its activism through a combination of tax incentives and, increasingly, direct grants and investments. While investments towards academic research provide a foundation for the province's targeted sectors, their success is perceived as dependent on the allocation of public revenue towards their private commercial activity. Like in Pennsylvania, Quebec takes direct ownership stakes in the companies it allocates funding to, and in so doing highlights a unique vision of how the competition or entrepreneurial state can be defined. Using every tool at its disposal, Quebec's approach to growing its domestic life sciences and digital media industries highlights all but a push for labour flexibility as Cerny and Jessop propose. Rather this is omitted as the province has instead looked towards direct intervention, direct investment and a leading role in its efforts to transition the economy into a competitive position.

Chapter 7: Recalibrating theory and practice at the sub-national level

This dissertation has sought to investigate how the sub-national state intervenes in the economy, and how the sub-national state in particular has become a key agent in the process of economic transition in mature economies. In so doing, it has investigated the concept of industrial policy, or the state's promotion of specific sectors and specific firms, through direct engagement and a variety of fiscal measures. Of particular interest for this dissertation has been the promotion of sectors perceived as innovative and future-oriented. The result is a far more nuanced understanding of the role of the sub-national state in the promotion and development of these new innovative sectors. Building on a rich empirical analysis, this dissertation has presented four case studies of how sub-national jurisdictions have sought to facilitate the creation of new sectors through a variety of policy levers.

These levers highlight that the spectrum of theoretical frameworks from the IR field that seek to explain the role of the state in the economy are, on their own, insufficient to explain how contemporary states, in particular sub-national levels of the state, operationalize their roles. Rather, the strategies employed by the four case jurisdictions highlight the use of a broad spectrum of roles for the state. This spectrum includes, in various ways, elements of the competition state, the entrepreneurial state, the Schumpeterian Welfare State and, albeit far less often, the developmental state. And in all but one case, the operationalization of these strategies and approaches is done in a manner that seeks to minimize the visibility of the state's role. This is defined as a stealth state approach to intervention. All together what emerges from this dissertation is a more nuanced view of how elements of extant theoretical concepts related to the role of the state are present and how they interact to create a more fulsome understanding of how the sub-national state promotes the development of new industrial sectors. Table 2 highlights the results of the case studies and the diversity and complexity of the strategies employed in each jurisdiction.

Table 2: Jurisdictional approaches to state involvement in the economy

Jurisdiction	Theoretical Model
Arizona	Moderate presence of the competition state's focus on labour and regulatory flexibility; moderate focus on entrepreneurship and skills development; moderate focus on public research; strong prioritization of stealth state approach.
Ontario	Minimal presence of competition state; prioritization of entrepreneurial state approach to research; development state approach to investment in specific firms; use of third party intermediaries for disbursement of state funds and sector priorities.
Pennsylvania	Minimal presence of competition state; prioritization of entrepreneurial state approach to research; development state approach to investment in specific firms; use of third party intermediaries for disbursement of state funds and sector priorities.
Quebec	Significant aspects of developmental state model for both industry and firm-specific direction, investment and ongoing support.

Developing this answer to the primary research question has reflected on the relevance and accuracy of the portrayal of the state in a wide swatch of, albeit primarily national-level focused IR and business-oriented literature. Here the state's desire to promote domestic competitiveness is the primary theoretical axe upon which this dissertation has sought to reflect upon. Palan and Abbott sum up this perspective by noting that the contemporary state is driven by a "pervasive belief in national competitiveness as the means for generating economic growth and rising living standards" (1996:5). These authors add that 'the manner by which governments execute competitive policies in an integrated economic market has shifted from predominantly

demand-side measures to supply-side measures, and ‘the distinction between national and international policies is no longer tenable...’ (ibid).

To be sure, and as the literature review included attests, there is no single definition or depiction of how this competition-orientation is structured. This thesis, and in particular the four case studies that form the core of it, subsequently serves to highlight how the sub-national state conducts itself both alongside and in front of domestic firms and sectors. And, in particular, it seeks to problematize the depiction of the state, and here the sub-national state, as a toothless actor. Across these four empirical cases we see a variety of initiatives that each serve the same end. That is, state-driven policies that facilitate and catalyze the development of new industrial sectors perceived as having the potential for employment growth. This is the state seeking to “construct” advantage in specific areas of economic activity (Cooke and Leydesdorff 2006). How they achieve these ends is by no means easily scripted. In each case, the sub-national state adopts policies along a spectrum of economic activities ranging from very superficial ones related to the development of enabling infrastructure to very interventionist ones related to the investment by the state into particular firms.

The choice of subject for this analysis – the sub-national state – has not received the attention it deserves in IR literature given the active role it plays. As a result, digging into the role of the sub-national, in particular as it relates to the economy and transition between processes of competitiveness, is fascinating. For the sub-national, and in particular the state and provincial level studied herein, has increasingly become a key actor in the development of new industrial sectors and the facilitation and/or development of cycles of innovation and economic progress.

As has been shown, the sub-national state plays an active role in certain aspects of planning, facilitating, coordinating and financing industrial transition, in particular as it relates to the development of new, innovative sectors and firms. Industrial policy, theorized by many to have disappeared in favour of movements towards labour flexibility and open-markets, is instead quite prevalent at the sub-national level studied here. Yet as the case studies included in this work highlight, this activist role in the economy, one predicated on promoting economic transition and innovation, is often a quiet or stealthy one. By structuring this activism through a variety of channels, the significance of the sub-national state’s role is partially obscured. This

finding reflects similar insight from Suzanne Mettler on the U.S. financial system and its ‘submerged’ activism (2011). Only through in depth analysis can one see the true extent of the sub-national state’s activism, and how it leads, prods and pushes private sector participants.

To be sure there are times when this role is purely facilitative, one where the state role is limited to the development of a flexible labour and regulatory environment. There are others when the state fits Porter’s model of the state as a non-discriminating enabler vis-à-vis infrastructure, exports and investment attraction. Across these different versions of a light state, the theoretical contributions of Cerny, Jessop and Porter ring true insofar as the sub-national state plays a rather broad, non-discriminatory role that benefits all firms and all sectors equally.

This dissertation highlights, however, that such non-discrimination is not the norm for these sub-national states. Rather, in the jurisdictions studied, the sub-national state takes on a far more activist and interventionist role in the development of new sectors and the survival of domestic firms therein. While Mazzucato’s (2013), Block and Keller (2011), and Ruttan’s (2006) work on the entrepreneurial state reflects a portion of this work, in particular as it reflects the push for the commercialization of publicly-funded research, it gives insufficient attention to the policy levers related to the direct investment, direct subsidization and protection and prioritization of firms in targeted sectors as highlighted herein. Eisenger’s (1988) work on his version of the entrepreneurial state similarly omits this broader vision of how the state engages with specific firms. Paul (2005) and Thomas’ (2000, 2011) work on the competition for investment between states does touch upon this state-firm interaction, yet it does so while focused on incumbent firms and their relocation across borders. Where this work goes further, is on in bringing light to the relationship between the state and domestic firms , in particular new ones, whose sustainability rests in large part on the state’s largesse. This speaks most closely to Fosler’s (1988) work on the state’s role in industrial creation strategies. However, while Fosler notes that this “is gambling on a process that few understand... (and) contains considerable risk and a great deal of uncertainty,” the case studied presented here show far less risk aversion than he perceives (Fosler 1988:109). And while this sub-national state role is not as determinative as what is defined as the developmental state, the state’s leading role in planning, coordinating and financing industrial activity in targeted sectors is not far off.

Some of the differences between the insights presented here and that contained in the extant literature may be the product of time. Industrial policy in North America has not received significant scholarly attention within IR over the past two decades. While scholars such as Zysman, Tyson and Reich produced much scholarly work on the American approach to economic transition in the 1980s, and Aitkinson and Coleman (1989) on the Canadian approach during the same period, far less attention has been paid to more recent iterations of this type of transition. More generally, where it has, this has predominantly been focused on the topics' role in the development of emerging and developing economies, not the mature industrial economies that are the subject of this study. This work serves to highlight the ongoing relevance of the topic, and the sub-national, in debates related to the global political economy, and an overall need to update our conceptions of how the state reacts to processes of change. While other fields, notably urban geography and public policy, have more actively focused on the role of the sub-national in the economy, within IR this type of exploration has been far less present.

This dissertation has subsequently sought to provide an updated context upon which to better our understanding of how industrial policy is operationalized in sub-national states across the U.S. / Canada border. In so doing, and by building upon the extent body of IR literature with an in-depth empirical exercise, this dissertation adds further support to an understanding of the state, and in particular the sub-national state, as one that maintains significant agency with regards to the economy. Where this work is unique is insofar as the agency of the sub-national state with respect to economic activism is particularly understudied within IR. As a result of the research presented here, we see the sub-national state exhibiting a strong activist role, akin to Aikinger's strategic industrial policy, albeit one that is operationalized in a wide array of explicit and stealth processes. These processes exploit existing weaknesses in the governance of global trade, as previously identified by Weiss (2005), and highlight a form of renewed or restructured embedded liberalism insofar as the state acts to shield, protect and nurture sources of domestic employment. One outstanding question relates to how this activism at the sub-national level interacts with changes in the agency of national level states. This deserves subsequent research attention.

A review of the four case studies highlights several emergent common threads that speak to these insights. The four case studies highlighted in this dissertation, while offering distinct

approaches to economic development and economic transition, contain a series of these common threads that bear joining in order to better understand how the contemporary sub-national state operates. To be sure, the sub-national state structures its intervention in a variety of means. In some cases, albeit a minority and in very limited fashion therein, these approaches or actions are consistent with the theorized definitions of the ultra-flexible, competition state and its cousin the Schumpeterian Workfare State. In others, the actions are structured in support of the entrepreneurial state thesis as presented by Mazzucato. And in others, the state's approach to developing new industrial sector borrow lightly from the concept of the developmental state. Viewed together, what emerges from this work is a highly contextualized depiction of how the state intervenes. And in so doing, it highlights that no one theoretical container is sufficient to capture the complexity of contemporary sub-national intervention.

To be sure, the era of the “grand projects” or major state-funded projects is likely done. Yet in their place has come an era of “grand missions” that see the state as the primary catalyst and driver for a vision of a different economic tomorrow. Five key themes emerge from this dissertation that speak to the state role in these processes of Schumpeterian transition:

1. The sub-national state structures its activity in shaping economic transition and the development of innovative industry by channeling funds through intermediary organizations. Enabled by the relative anonymity that this channeling provides, the role of the sub-national in the economy is far less public. While the role of universities and post-secondary institutions as pipelines for research and development is well known and well reported in the work of Mazzucato (2013) amongst others in all four of the cases studied, new organizational structures have been established to facilitate the development and flow of innovative products and process in targeted sectors. This flow, lest it be forgotten, is specifically to private sector hands, regardless of the public funding upon which it is built.

The subsequent ‘stealth’ nature of the sub-national state, despite its activism, comes as greater focus is placed on the two-level game present between forums of global economic governance, for example the WTO, and its (national/federal) level members. Sub-national activism indicates that this is a three-level process, however such fora rarely acknowledge this. The ruling against the Province of Ontario's green energy program,

sponsored by Japan and the European Union at the WTO, is an example where this three-level dynamic is at play. Here the Canadian Federal government was forced to play an intermediary role in administering the dispute.

2. A focus on entrepreneurship and “growing your own” in targeted industries has largely replaced the competitive subsidization that saw sub-national jurisdictions compete against each other for the relocation of mature business or for new investment. To be sure, even within targeted innovation industries, the attraction of anchor businesses remains present, however it has lessened in prominence across the jurisdictions studied.

This shift in strategic thrusts is revealed through the interviews conducted for this dissertation to be based on an increasingly prevalent acknowledgement that the game of competitive subsidization is not one that provides a sustainable economic base. Rather, the loss of leverage that such fiscal games entail, provides a far greater incentive for policy makers to look inward and focus on the development of domestic firms. This intent is reflected in Jessop’s vision of the Schumpeterian Workfare State, and insofar as this focus includes broad allusions to “small business, it also encompasses Cerny’s reflections on the pro-business competition state. Yet the breadth of both of these depictions belie the intentional prioritization of entrepreneurship and start-up activity in specific sectors including renewable energy, life sciences and ICT.

These sectors, nearly universally described by policy makers and government documents as innovative and future-oriented, highlight that promoting entrepreneurship on its own is not enough. Rather the sub-national state seeks to promote entrepreneurship in specific sectors to achieve two complementary goals – first, to reduce the reliance on multi-nationals who possess a propensity to shop for incentives, and second, to catalyze the development of a next wave of firms in targeted sectors that, so the hope goes, will provide sustained employment growth in the immediate and mid-term future. These home-grown firms are believed to be more likely to remain located in their place of birth, and thus represent for policy makers, a potentially more stable return on investment for policy investments.

3. While strengthening the general business environment for the benefit of all firms and sectors, notably through investment in infrastructure and fundamentals like education, remains a priority, targeting select industries that are defined by policy-makers and politicians as innovative is key to sub-national efforts. This runs against the advice of those like Porter who note that efforts to target are more than likely to result in failure, and as a result, advocate that competition and innovation should be promoted across the economy, agnostic of sector preference. The policy-related aspects of Cerny's writing on the competition state largely mirrors this thinking, highlighting that the state's push for competitiveness focuses on broad macro-economic elements as opposed to firm or sector level factors.

Yet across the four cases analyzed in this dissertation, we see instead that the micro-economic remains at the forefront of the sub-national state's thinking. In particular, in each jurisdiction we see an explicit focus on the development of sectors defined as "strategic" owing to perceptions that said sectors are innovative and likely sources of future economic and employment growth. Across cases, the selection of strategic sectors is driven largely through consultation with stakeholders and, broadly, seeks to build on research-related competencies present in the jurisdiction. That said, across cases we see that the extent cluster or research expertise is in some cases quite immature. The promise of "innovation" often builds on weak foundations. While one might find grounds for critique on this basis, the pressures resulting from simultaneous exogenous and endogenous economic pressures leaves policy makers with little choice but to quickly attempt to develop the undeveloped. Moreover, as extant structures in the targeted industries are often similarly undeveloped, this too leaves more space amongst uncoordinated actors for the state to play a more activist role. In some cases, this activism is light insofar as it coordinates the activities of various public and private actors. However, in others, it is far more heavy, and sees the state take on a variety of roles that direct industry and firm development through direct transfers, investments and preferential policies.

All together, we see the presence of a form of industrial policy at the sub-national level, albeit in a form that has evolved from the "grand projects" that shaped industrial

policy in the pre-1980s. The state's mission orientation in the contemporary sub-national state is now predicated on targeting specific sectors for industry development. To be sure, such privileging does not assure success. As Dr William Read from the Flinn Foundation cautions, "having a technological edge does not mean much, as technology is the most reproducible thing in the world" (Read 2013). This is certainly true as supported by the rise of innovative technological and science-based capacity (and competitors) from emerging economic markets. However, insofar as policy makers are able to shape the competitiveness of their respective jurisdictions, industrial policy represents a means of navigating market failures related to the allocation of capital, as well as to proactively construct, shape and direct new industries that offer a higher ceiling or more lucrative potential vis-à-vis their traditional industrial bases. Subsequently, while the language of industrial policy has been omitted from policy parlance owing to rhetorical support for a "neo-liberal" inspired private-sector precedence, the realities of global economic competition, and of the democratization of innovation capacity, has seen its resurgence at the sub-national level where public voice and public tax dollars are more easily channeled for these purposes.

4. Competitive pressure from emerging economies is a factor driving sub-national transition efforts, and the subsequent intervention in economic markets. However, this pressure is equally, if not more so, felt from regional neighbours whose comparative resource and asset mixes make for more acute competition in the high-value sectors these jurisdictions seek to develop.

The transition of China, India and others from low-value manufacturing towards higher-value and value-added processing is mentioned by policy makers and stakeholders across the four cases as factors contributing to, or necessitating, a more active role for the state in the development of new markets. Repeated allusions to the process of economic "catch up" being experienced by emerging economies segue to a focus on how government could and should help domestic sectors and domestic firms push further ahead. Yet as the chapter herein on the *democratization of innovation* highlights, the success and competitiveness of China and India in higher-value, cum innovative, fields is

by no means guaranteed. However, the potential they hold to disrupt the capture of innovation rents is a significant driver for policy and stakeholder concern.

More pressing to those interviewed, however, is the competition between provinces, between states, and between proximate provinces and states. Despite legislation and policy on both sides of the border that in theory stands to limit “cross border violence” on economic policy and industrial incentives, the evidence presented throughout this dissertation highlights that sub-national states see their most significant competition for employment and investment coming from neighbouring jurisdictions.

5. Across the cases covered in this dissertation, and across the time periods studied, changes in political leadership and thus political rhetoric do little to alter the activism of the state. It would seem that political ideologies offer little resistance to economic realities tied to employment and the ability to transition to new areas of industrial activity. To be sure, the cases highlight that while some jurisdictions have approached industrial policy and the role of the state in explicit terms, others have shied away from public discussion of the role of the state and have instead formulated policy and action through elements of a stealth state. However altogether we see that politics are no match for the drivers of the domestic social and political satisfaction: employment and the perception of future economic prospects.

These economic realities stem largely from a common trend across the jurisdictions studied: the failure and/or significant struggles of industries previously seen as economic stalwarts in each jurisdiction. Along with their failure and/or decline has come a political and increasingly public acknowledgement of the need to facilitate economic transition. The task of facilitating this transition is increasingly held by the sub-national who, across cases though to different degrees, play a central role in directing longer-term shifts in economic activity.

Schumpeterian economic transition, or creative destruction, thus becomes part of the sub-national state’s responsibilities. As noted, at times this role is one that seeks simply to push or prod the private sector or the national government forward. But, as these cases highlight, this is by no means the norm. Instead, across cases we see a sub-

national state that takes a leadership role in both catalyzing private activity but also in actively channeling public activity and public finances towards private aims.

Ultimately the sub-national state is an activist economic actor. It invests, subsidizes, catalyzes through policy, supports entrepreneurship and directs the development of industrial activity in targeted sectors. In so doing, it is far more than just an entrepreneurial state. And it is far more than a competition state or a Schumpeterian Workfare State. And while it adopts elements of the development state focus on state-led economic planning and operationalization, it falls short of the centralized, dirigiste model long equated with developing economies (Amsden 1989, Chang 2006, Wade 2005). Rather, what this research highlights is that the extant IR literature on the role of the state is insufficient insofar as it fails to adequately describe and provide understanding as to the complexity and nuance that sub-national states use to structure and operationalize their economic activism. To be sure, this version of the sub-national state, and the policy-makers behind it, are very conscious of the potentially perverse effects of its economic activism. Hence the use of third-party intermediaries and a generally stealthy approach to this activism. However, their actions derive from a perspective on economic change and the need to facilitate economic transition quickly. Accompanied by a perspective that the private sector is either unwilling or unable to achieve this necessary transition, the sub-national state has emerged as a key economic actor in the negotiation of the impacts and the distribution of rents in the global innovation economy and the increasingly rapid democratization of access to it.

Having presented these insights, it is hoped that this work adds to the body of knowledge regarding how jurisdictions, in particular sub-national ones in the United States and Canada, react to exogenously driven economic change. And, equally important, it has sought to shed light on what motivates these sub-national states to intervene. While there is clear delineation between international and domestic motivators, the dissertation's analysis looks to contribute to a conversation that is both academic and policy-relevant as to how modern industrial economies are structured in light of ongoing processes of economic globalization. In addition, it is hoped that this work contributes to a more nuanced understanding of what is defined in the literature as the competition state, the Schumpeterian Workfare State, the entrepreneurial state and the developmental state in relation to sub-national jurisdictions in Canada and the United States. While this research has shown the presence of elements of each across the sub-national

jurisdictions studied, it highlights a far more diverse spectrum of activities that states adopt in order to catalyze industrial and economic transition than is understood in previous literature. Finally, by focusing on the sub-national level this dissertation provides empirical depth to both of the aforementioned concepts and their place in the extent literature. Heretofore the sub-national has largely been ignored in conversations related to the competition state and the entrepreneurial state and this work has sought to rectify this.

To be sure, there remain unanswered questions related to this field of inquiry. The interactions and relationships between levels of government is introduced in this dissertation but is not fully explored. Subsequent research could endeavor to more fully understand what the mesh of governance related to specific industries in specific jurisdictions is comprised of. Moreover, while the case studies highlighted herein report some data on the outcomes of the policies described, this dissertation does not seek to judge the effectiveness of the industrial policies on the desired outcomes of firm and job creation. More thorough quantitative analysis could yield significant policy and academic insights by doing so. Similarly, the sectors chosen for analysis in each case study are certainly not exhaustive. Whether it be ICT in Ontario or Pennsylvania or aerospace in Quebec, the state's role is certainly not limited to the sectors highlighted here. The sectors chosen highlight strong examples of the state's role but they are certainly not the only ones.

A unique finding in this dissertation, one that is not discussed in either the competition state or entrepreneurial state literature, relates to the rise of third-party government intermediaries. These entities are often structured as non-government, private organizations. Their governance and funding, however, leave little light between government and non-government. Is this a means of stealth policy implementation? The governance of such organizations deserves more analysis. Finally, it should be understood that different approaches to industrial policy are rarely mutually exclusive. This work serves to provide much needed empirical depth to the literature on both the competition state and the entrepreneurial state. In so doing this dissertation has referred to a spectrum or menu of policy activities that the state can adopt to achieve its economic and industrial ends. Are there trends within certain industries or within certain types of sub-national governance models that lead to certain choices? Only with more empirical work at the sub-national level will this be clarified. It is worthy of such effort.

Ultimately, this dissertation has sought to shed light on an under-studied component of the global political economy, and has sought to nuance debate about the role of the state therein. Through the empirical dissertation that has been produced, the author hopes he has achieved this.

All errors and omissions are the responsibility of the author.

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