The political economy of North American innovation and industrial policy: the role of State and Provincial government.

Abstract:

This paper highlights how the processes of economic globalization are interpreted and acted upon by sub-national levels of state, in particular North American state and provincial jurisdictions faced with an increasingly competitive international marketplace for innovation. It seeks to problematize the contradictions present between the supposed retreat of the interventionist state in these jurisdictions, notably the rise of the competition state and the contemporary policies aimed at constructing competitive advantage in new economic sectors that are industry-policy in all but name. Yet in so doing, it seeks to move beyond the traditional study of interactions between nation-states by analyzing sub-national actors and their primacy in the aforementioned policy responses to global economic change. While significant scholarly attention has been devoted to the uploading of responsibility to the supra-national level, and a similar attention paid to the downloading of responsibility to the city/municipal level, lost in these narratives has been attention to the role of sub-national state/provincial levels of governance. This effort thus develops Freeman's assertion that the sub-national is increasingly more important than the national in the promotion of innovation by dissecting the role of state and provincial jurisdictions in the development and direction of new economic sectors perceived as high-value and future-oriented. In so doing, this paper highlights the central role of state/provincial government in the creation of economic development regimes, and the strong propensity towards industrial policy-like strategies therein.

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Introduction

Whether measured through shares of global R&D spend, shares of peer-reviewed journal publications, or shares of high-value patent applications, the building blocks of innovation are increasingly dispersed across both developed and developing economies. And while this democratization of innovation potential through science and technology portends significant benefits for developing countries, it magnifies the economic challenge facing mature industries economies in the 21st century.

Long-held suppositions regarding the material advantages held by mature industries economies in the transition towards new, high-value sectors, services and processes are thus less immediately relevant in a global economy where innovation and Schumpeterian creative destruction are equally enabled in mature and developing economies. As Zysman et al (2007) 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".

How then will North American jurisdictions in Canada and the United States react to this process of global economic transition and this evolving political economy of innovation and industry?

This paper seeks to analyze these responses through the analysis of two case studies that highlight how the processes of economic globalization are interpreted and acted upon by sub-national levels of state in North America. Faced with an increasingly competitive global economy, the state of Arizona and the province of Ontario have sought to reinvent themselves as leaders in the global knowledge economy through a series of targeted funding programs. While geared towards innovative research, an analysis of these programs shows an active and purposeful role for government, one that includes sectoral targeting, direct corporate support and the restructuring of industry-academia relationships to promote active commercialization. In so doing, these case studies provide grounds to problematize the academic debate regarding the role of the state in the economy, notably the disappearance of industry policy, as well as to analyze the tools and power that this level of government holds vis-à-vis international capital.

The paper is structured as follows. The first section locates this research within two academic debates, the first regarding the evolution of the state, the second with regards to levels of state. The second section presents two short case studies on the aforementioned jurisdictions. While evidently limited in depth, these case studies present the rationale for what this author sees as contemporary forms of industrial policy, albeit more hidden adaptations of it. The third section concludes with an overview of key findings and their relevance to the theoretical debates on the state.

One methodological note should be highlighted: this paper has been developed through an analysis of public documents, archived meeting notes, and interviews with policy makers and industry stakeholders. For the purposes of this product interviewees have been anonymized. The case studies included are part of a larger research project on sub-national reactions to the global economy and present a shortened version of their findings.

A theoretical frame: the state in the economy

This project looks to develop an understanding of how states react and transition to processes of global economic change. As Freeman and Louca (2002) explain, "The very notion of transition is a difficult one, particularly in social sciences and in economics: change, instability, mutation, and bifurcation are difficult concepts to measure and to assess, in contrast with permanence, continuity, linearity, and structure—but history is transition, and societies and their economies exist only in time." The analysis of transition is thus integral to understanding the global political economy and how it is continually shaped and reshaped by the reflexive relationship caused by continual change.

Analyzing how states respond to exogenous-change responds to several pieces of scholarship. Notably the work of Rodrik (1997), and his concept of "globalization's dilemma" as it relates to the hollowing out of the state and its decreasing ability to finance distribution to those negatively impacted by the forces of economic globalization, and of Ruggie (2008) who notes that globalization has in fact made it impossible to reconstitute the social bargain at the national scale. In contrast, this research will highlight that the state remains an active benefactor in the creation of new economic sectors and processes in an explicit thrust for employment. In so doing it supports the concept of strategic industrial policy – defined by its focus on learning infrastructure, technologies and clusters – introduced by Aikinger (2007).

Thereafter orthodox views that state activism in the economic and trade arena has largely been disabled by the mesh of rules-based multilateral, regional and bilateral trade frameworks are shown to be fundamentally lacking. Assertions such as Ostry's (2000:53) that domestic policy has become an oxymoron in an age of supra-national trade governance are shown to be of limited analytical value given the continued intervention of the state in the structures of domestic economic production. Weiss' (2005:724) comment that "an influential view 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" is similarly challenged by the growing role of state actors, at several levels, in those very processes of upgrading.

Yet an argument around activism alone is insufficient to provide a wholly novel approach to understanding of how states react to transition. Rather one must more fully understand how this activism takes shape. Doing so situates this work as a response to the work of Cerny and Jessop (and others) and their respective takes on the Competition State and its focus on supply-side support for competitiveness. Cerny's assertion that the state never left (Cerny 1990, 1997, 2010), focuses on the transformation of the state's mission, its "raison d'etre", from that of the internally-focused welfare state to an externally-oriented competition state that prioritizes profitability and competitiveness over employment and labour security.

Jessop's (1993, 2002, 2008) post-Fordist, Schumpeterian Workfare State stakes out similar ground, arguing 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. Like Piore and Sabel (1984), Jessop concentrates on the shift from Fordist mass production to innovation-driven flexible specialization. His work is differentiated from that of Cerny through a more broad analysis of what constitutes the state, its competitive nature and how economic policy is reflected domestically as a result.

Both approaches to understanding this version of the contemporary state provide a significant 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 narrative lends itself to the view that the state is solely reactionary to the effects of globalization, a thoroughly unsatisfying account that privileges the divorce of the state from its exogenous influences (Palan and Abbott 1996). Rather, as both Cerny and Jessop highlight, the concomitantly proactive and reactive strategies utilized by states to manage the various interactions of the domestic with the effects of globalization highlight a renewed awareness of state agency, albeit in different forms, and as Jessop emphasizes, at different spaces and sites.

However the nuance provided by this literature on the Competition State, evidently helpful in delineating the evolution of the state, requires further development to more accurately comprehend the role of state in the early stages of the 21st Century. For while Cerny creates an ideal-type vision of the Competition State that largely neglects the diversity of competitive strategies employed by states, as well as the diversity of state structures that affect how and from where such strategies are developed, Jessop's more spatially-diverse perspective privileges the shift from national to supra-national (or meta) governance and neglects the growing influence of sub-national actors. In particular, a gap exists as it relates to the strategies and reactions of State/Provincial regions in Federal states, notably North American ones, to the changing global economy around them. This project thus seeks to develop this area of thinking as a means of understanding how mature industrial economies, across levels of governance, interpret and react to largely exogenously-driven change.

Do they follow Cerny's framework on the Competition State and its pro-competition, pro-market distancing of the state from intervention in markets and from the provision of welfare to strategic industries? Or do they more closely mimic Jessop's concept of the Schumpeterian workfare state (SWS) and its focus on the role of the state in the promotion of innovation? This research project highlights elements of both, however in so doing, it simultaneously provides a unique perspective on how the continuation of strategic and targeted intervention, albeit in differentiated form and function, coalesce with a focus on innovation and industrial upgrading.

A theoretical frame: levels of state

Across this body of work, the notion of intervention and the influence and control over domestic economic policy is dictated primarily at the national level. This is especially true as it relates to the, albeit limited, literature that covers industrial policy in the two national jurisdictions covered in this project, the United States and Canada. And while the concept is largely absent from publications related to US and Canadian economic policy in the late 1990s and throughout the first decade of the 21st century, where it does exist in earlier work is largely focused on the Federal state and its role in industrial promotion.[1] This privileging of the national level, however,

[1] The work of Atkinson and Coleman (1987) 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 thus 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. George (1983) does address the question of provincial industrial policy but finds that, generally, no Canadian provinces has targeted specific industries for its high-

renders our understanding of the global political economy predictably incomplete. A more accurate depiction of the levers of power on economic policy must examine the state relative to increasingly powerful and autonomous sub- and supra- national levels of governance. This latter area of focus, on supra- or meta-governance, is privileged by Jessop, as well as Palan and Abbott (1996). In it, the national (and by extension the sub-national) are conceived as receptors for rules and policy constructed higher up the chain. By way of contrast, the growing literature on cities and regional clusters (Wolfe, Taylor) privilege what Sassen referred to as the "deeply embedded" human and natural resources of place (1994:631).

Brenner provides a necessary critique to either view, noting that the theoretical vacuums built around both the "nation" and the "city" mistakenly present "isomorphic, self-enclosed block of absolute space" when reality is far more representative of "a polymorphic institutional mosaic composed of partially overlapping levels" (1999:53).

All together, this project seeks to add to Brenner's vision of the polymorphic state, in particular as it relates to 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 project seeks to contribute to, one that is increasingly driven by policy decisions at the State/Provincial level.

In contrast to the attention paid to both national states and increasingly "global" cities, far less attention is paid to the median role of state and provincial governance. The role of American states in economic development is best analyzed by Paul (2005) and Thomas (2000, 2011). Thomas' (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). Eisenger's work on the Rise of the Entrepreneurial State (1988), while focused on the sub-national role in export promotion, does include a cursory look at high-tech promotion. However this latter analysis, while helpful in delineating the then-nascent role of the state in industrial high-tech promotion, is quite limited given 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; and Brennan (2004) who 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

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growth prospects, and finds a generally congruent Provincial-Federal policy stance. He does note that Quebec has developed a unique, dirigist stance, and that Ontario has, at times, applied "shots of oil" to industry, but that generally offensive or anticipatory approaches have been sidelined in favour of defensive or reactive approaches to intervention.

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. 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 contemporary challenge. Yet like Atkinson and Coleman, its Federal focus hides the increasingly rich role of sub-national levels of government in promoting industrial policy.

project asks related to the drivers of sub-national industrial promotion, and how levels of governance interact.

Where this research goes further is in the analysis of the sectoral content of these strategies, the drivers for them, and how these targeted policies are positioned amidst a vague differentiation of public and private.

Part 2: Case studies of sub-national intervention

The following section presents two cases of sub-national reactions to the processes of global economic change. In both cases, perceptions of exogenous economic pressure lend themselves to a more activist, or interventionist, role for the government in the economy. Moreover, in both cases this intervention targets specific industries identified as "high-potential" for government investment and privileged treatment. While a focus is placed on the drivers for these programs, equally important is the form and function of the programs, insofar as they raise questions about how such policy is communicated and how it reflects on the relationship between states and capital.

Case study 1: Ontario's Innovation Agenda

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 has focused primarily on the adoption of programs and policies geared towards the development of "innovative" knowledge-sectors, notably green or renewable energy technologies, information communications technologies, the life sciences, and the (ambiguously named) advanced manufacturing.

Across these industries, strategies employed to catalyze their competitiveness include direct granting programs, interest-subsidy programs and, as in the case of Ontario's green energy sector, local content requirements. In addition to these programs, third party, non-government research institutions and knowledge brokers have simultaneously been developed and funded as a means of further advancing the Province's goals. Together these elements coalesce into a targeted government-led strategy aimed at advancing the Province's competitiveness. And despite the direct grants and subsidies provided to domestic enterprise, these programs do so in a manner that skirts WTO rules on allowable subsidies, and, as is the case on local content provisions, positions these programs in spaces that lack governance detail and thus are subject to legal definition.[2]

[2] Weiss (2005: 722) provides an important contribution on the evolution of the trade and industry policy of leading OECD states. She notes that the 2000 breakdown of negotiations over the definition of non-actionable trade measures has allowed all aspects of research and development and "innovation" funding to fit as quazi-permissable thanks to the next to impossible task of defining their future impacts as harmful.

Driving forces

The impetus for Ontario's intervention in the market is multi-faceted. Endogenous issues related to labour and industry cost structures interact with exogenous pressures related to international and extra-jurisdictional 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). Interviewees for this project note, however, that this pressure is felt less from "low-cost countries," and more from competing high-cost jurisdictions. As a former senior bureaucrat from the Ministry of Economic Development attests, 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 right-of-centre Premier Mike Harris, 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 provision of direct support to private enterprise has marked the Province's attempts at economic renewal and forward progress.

Across sides of Ontario's political spectrum, the focus on exogenous economic pressure is clear. In 2008, the Ontario government proposed the "Ideas for the Future Act," a tax credit initiative for innovative companies. In describing the rationale for the Act, Minister Yasir Naqvi, Minister 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… (Naqvi 2008).

A perceived transition in the global economy is further pointed to as a rationale for a more active government policy by Peter Tabuns, an opposition party member, 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)

More recently, 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).

Across party lines, perceptions related to international competition drive a more active, and interventionist role for the Provincial government. Thereafter, the direction for action portrayed as essential given global economic forces, is shifted towards "innovative" sectors identified as forward-looking and knowledge-based. As Ontario's 2008 Budget indicates, this targeting seeks to identify and exploit "industries that will provide the high-paying jobs of tomorrow."

At the heart of this strategy is the Province's $3.2 billion Innovation Ontario Agenda. It highlights the government's strategy 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. In comments made to the Standing Committee on Estimates prior to the launch of the Innovation Agenda, then-Minister of 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 2006).

Spending is subsequently highly focused on a series of industries defined by the government as "strategic" and/or "innovative." Central to this policy is the $1.15 billion (over 8 years) Next Generation of Jobs Fund. Launched in 2008, 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." The Fund targets industrial growth in five sectors: advanced manufacturing, biotech and pharmaceuticals, renewable energy, digital media and information communications technology, financial services. In announcing the Next Generation of Jobs Fund as the "cornerstone of the government's economic development strategy" in Budget 2008, then-Premier Dalton McGuinty focused on the exogenous impetus for the program, and its roots in international economic competition. In particular he notes, "We're stepping up because Ontario is not going to let others steal our future out from under us" (Ontario 2008). 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 an active role in the development of new industries and new enterprises.

In addition to the Next Generation of Jobs Fund, Ontario provides a series of targeted funding envelopes including the $150 million Innovation Demonstration Fund (IDF) for clean technology companies, the $160 million Biopharmaceutical Investment Program for the lifesciences sector, and a $160 million "Ideas-to-Market" strategy for emerging technology companies aimed at "born in Ontario" entrepreneurs.

To be sure, the Province continues to use supply-side tax incentives as a means of attracting investment and employment in both nascent and traditional industry. And the $500 million Automotive Industry Manufacturing Strategy directs funds towards the development and adoption of new technologies and innovations in Ontario's historical manufacturing sector of strength. However the aforementioned funding strategies for nascent sectors place a distinct prioritization on direct support for targeted sectors that allows for an understanding of such policies as industrial policy and a form of explicit state intervention.

Based on interviews conducted, the decision to target specific industries is predicated on two factors. The first, as noted by a former Ontario Minister interviewed for this project as well as several Ministry staff, is predicated on a belief that you have "to go where the puck is going to be."[3] The second is an explicit acknowledgement that a jurisdiction cannot compete globally in every area. The 2006 Ministry of Research and Innovation Strategic Plan subsequently notes that "Without better focus and a more strategic approach, we risk missing out on opportunities to realize the full value and impact of (our) investments. More critically, we risk slipping from the first rank of economic prosperity" (Ontario 2006b).

Interviews with both political and senior-level Ministry staff indicate that an element of "picking winners" does take place, albeit framed by the attempt to focus on what the jurisdiction can be "best, or at worst top three in the world in." This provides a useful segue into the academic debate regarding the role of the state. For at the heart of the theoretical competition state is a discarding of the strategic projects that most commonly defined earlier versions of industrial policy.

The explicit targeting highlighted in Ontario, however, highlights that this very much continues to exist, albeit in disaggregated fashion based on industry rather than strategic project. This strategy was explicitly captured in remarks made by Michael Bryant, then-Minister of Economic Development, at a business luncheon hosted by the Toronto-based Canadian Club in May 2009 (Bryant 2009). There, in a speech entitled "Reverse Reaganism", the Minister created a controversy by noting that his government intended to "invest company by company, industry by industry" to ensure the health of the economy. He continued, "this is government picking winners and losers, government as entrepreneur." 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 leap ahead, and help those older companies facing consolidation battles survive." He adds, "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."

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 admitted that this level and form of intervention was unorthodox, noting that "this is supposed to be the thing that governments weren't supposed to do." 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 2009c). Interviews conducted for this project highlight that while this competitively-driven intervention was largely unpopular amongst both political and bureaurcratic decision-makers, it was nearly-universally understood as a "necessary evil."

Later, in remarks made to the Standing 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

[3] What would a Canadian case study be without a reference to hockey?

driving a part of the economy by creating an incentive to bring people in(to) the province" (Bryant 2009b).

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 and domestic privileging is very much the same.

What is evident across these business support programs is the focus on new, generally high-value, high-technology industries and the government's attempts to create new areas of global competitive advantage. For example, the 32 recipients of IDF funding have exclusively been companies whose activities are highly focused on green/clean initiatives. Funding support for the 32 recipients has ranged from the mid-six figures to the ceiling of $4million with an average grant amount of over $2 million. Recipients of Next Generation of Jobs Funding are similarly targeted, with ICT companies having received one-third of the 33 grants, and advanced manufacturers a similar share. The export potential of such innovations, and the government's explicit funding support, lends credence to the perception that the Government of Ontario is picking winners akin to an interventionist industrial and strategic policy.

A second element of the Provincial government's strategy has been the development of a pipeline of new, startup companies in these targeted fields. While entrepreneurial promotion is a common policy strategy, the sectoral targeting within Ontario's approach, and its congruence with the governments' focus on five specific sectors, lends itself to the conclusion that the Government of Ontario is actively pursuing a targeted industrial promotion strategy.

In so doing, however, the government has actively channeled funding through third-party "innovation centres", notably the Toronto-based MaRS and similar "centres of excellence" set up across the Province. For example, MaRS delivers the Investment Accelerator Fund on behalf of the Government of Ontario. In so doing it provides up to $500,000 in seed funding for qualified companies in Ontario. As noted, the industry prioritization for this granting program is focused on advanced materials and manufacturing, information technology, cleantech and life sciences. Since the program's inception, over $26 million has been invested in 57 companies. Several components of the IDF are seemingly structured, allowing funding to flow from third-party organizations, thus minimizing the perceived government role in picking recipients.

While this latter funding is far smaller in aggregate size than the aforementioned Next Generation funding (which averages over $20 million per grant), it flows to "made in Ontario" startups and nascent enterprises. While the 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. And while interviews have so far been inconclusive on this matter, it demands further attention given the potentially significant impact it may have on the balance of power between capital and the state.

All together, this case study provides a unique analysis of the industrial and innovation strategies employed at the sub-national level, and the manner in global economic change is interpreted and acted upon by government officials. In so doing, this case highlights the persistence of state intervention in the economy, albeit in a differentiated manner than traditional, big project industrial policy. As such, Ontario's approach develops a third typology of the contemporary state in the economy, one that is far more interventionist than Cerny's competition state allows, 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.

Case Study 2: Arizona's state-directed economic transformation

Long reliant on a combination of its five "C"s (cattle, citrus, cotton, copper, and climate), Arizona's attempted reinvention as a locus for innovative, knowledge work 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. Broadly perceived as a pro-business state replete with attractive taxation and labour (right-to-work) laws, Arizona has not been a historically big spender on research and development, and is not traditionally viewed as an "innovative" or knowledge-oriented jurisdiction (AZBR 2005). 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 and subsequently incented 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, Pew 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, has stagnated.[4]

Efforts towards the transformation of 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). The Arizona Partnership for the New Economy (APNE) 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). This framework for future growth was premised on the changing nature of technology, notably the impact of telecommunications and information technology that "reduced production and transportation costs and created new markets." While the report makes mention of "global competition" and the subsequent premium now placed on "the ability to improvise, adapt, and create,"[5], it provides no geographic focus or jurisdictional hierarchy related to this exogenous pressure. Rather the impetus for change is positioned as an evolutionary challenge focused on exploiting the opportunities presented by technological change.

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 as follows in her testimony to the Subcommittee on Education and Labor of the U.S. House of Representatives:

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[4] Author's calculations based on NIH, NSF data.

[5] With reference to Douglas North's "adaptive efficiency".

> *"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).*

More recent initiatives by the Arizona Commerce Authority (ACA) 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.*

This exogenous pressure, and the subsequent framing of the sub-national as an autonomous global actor, is shared by stakeholders outside government. A general theme emerges across interviews for this project that exogenous pressures from both domestic American competitors and, increasingly, international ones are a new force driving State-level economic policy. 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 State is thereafter positioned as an independent economic actor in the global economy – influenced and restrained by federal-level policies, but relatively autonomous in the development of unique economic policy that will facilitate state-level economic growth.

To be sure, there remains a traditional element to this strategy, notably the role of the State in investment attraction. Congruent with the work of Paul (2005) and Thomas (2000, 2011), 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).

Beyond this traditional approach, however, is a medium and long-term approach that focuses on the attraction of high-value industry and the development of such industry at home. 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 the "entrepreneurial state." In particular she builds an argument for the required role for the State as investor in nascent private enterprise.

The 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 State becomes a market participant, helping shape the prospects for competition in a very direct manner. 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. 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, several interviewees highlight that business cost competition is insufficient to facilitate this transformation. Rex and Hoffman (2012) agree, noting "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."

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. Therein the role of government is far less strictly defined as being one that provides an enabling environment 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 state provides direct investment into particular sectors of the economy or particular private enterprises.

And central to Arizona's strategy has been the identification and privileging of key economic sectors. As per the Arizona Commerce Authority (ACA), the States' transformation is premised on the need to transition "the Arizona economy to one that is more diversified across core industries and growth sectors like the life sciences science, technology, aerospace and defense and renewable energy" (Arizona 2010). While the aerospace and defense industry builds on longstanding competencies, and large corporate anchors, the other three are considered by both government and non-government stakeholders as "new" constructed sectors that are actively being promoted for their growth, both revenue and employment, potential. These four sectors are prioritized for both state funding through the ACA, as well as funding that is directed through third-party organizations such as Science Foundation Arizona (SFAz) and local research institutions.

The role of SFAz deserves specific attention. Established in 2006 as a non-government, not-for-profit, it derived nearly all its funding from public funds before fiscal issues slowed funding in 2011. Prior to this slowdown, SFAz provided research funding to partner universities but also operated 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." Born amidst perceptions of overt state activism, the investment in SFAz and into the broader *21st Century Competitive Initiative Fund* is presented as a 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 political representatives noted in their response to the proposed bill during legislative debate, 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 sub-national 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 is shown in the expanded version of this case study, the rhetorical call of "flexibility" that third-party organizations such as the SFAz or the more recently established Arizona Commerce Authority afford, has become a means of distracting what is in effect a more interventionist or activist role of government. 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.

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. Funding available to these sectors from the ACA includes a $25 million deal closing fund as well as funding for entrepreneurial startups that will be explained shortly.

This application of public funds to a discriminatory industrial strategy is enabled in part by successive political regimes who have publicly defined support for private innovation as support for public research.[6] 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. 12 percent of aggregate Proposition 301 funds are specifically earmarked for university research and development efforts. Like the aforementioned *21st Century Competitive Initiative Fund* and the SFAz, 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 proposals that involve collaboration between and among the universities and private industry", as well as language and criteria that incents commercialization and technology transfer to the private sector, highlights the very immediate private impact of such public funding. 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. These funding priorities unsurprisingly mirror the "key sectors" identified by the state as integral to Arizona's ongoing economic development. Since 2002, TRIF has distributed an aggregate $572.5 million to the state's public research institutions. The breakdown of this funding by industrial focus is as follows: $180million for life sciences (bioresearch), $34million for renewable energy, and $15 million for optical sciences.

To be sure, the type of technology transfer present in Arizona is not necessarily unique. Universities exist to create knowledge and across jurisdictions efforts exist to help commercialize it. 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

[6] Public support for such strategies is found to be high according to survey research conducted by the Phoenix-based Morrison Institute for Public Policy.

provides a valuable example of how the sub-national 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. As one 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 then is commonly thought.

A second trend found within the State’s Corporate support is a shift (albeit limited) of funding to small, nascent enterprises. Then-ACA president Don Cardon noted in remarks about the ACA’s Innovation Challenge that targets nascent startups in the four targeted sectors, "This is an investment in our future…Across the state, our future is being created in garages, campuses, labs, incubators and in the minds of entrepreneurs" (ACA 2012). Eligibility for the Arizona Innovation Challenge is limited to organizations between 2 and 30 employees and with a maximum of $10 million in net assets. Through three tranches of grants ($4 million total / $250,000 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, 2 renewable energy. Similarly, the AZ Fast Grant program provides small grants to nascent in-state technology companies to initiate the commercialization process. While smaller in value ($175,000 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. To be sure, the ACA’s Deal Closing Fund continues to make large, multi-million dollar investments to attract and retain larger firms, however there is a significant focus on developing high-growth small and medium enterprises whose growth prospects may infer a lower, long-term per job investment cost. Like in Ontario, the focus on this sector may also act to lessen the pressure on the State to compete for trans-national capital investment.

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 an executive level industry stakeholder noted, “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.” 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 into targeted industries facilitated by the ACA (Watson 2013).

Conclusion - legitimized corporate support

Across both of these studies, interviews with political, bureaucratic and industry stakeholders highlight that competitiveness in an evolving global economy requires 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. Rather, the above highlights a 'heavy state' definition that sees the sub-national state become a participant in markets, alongside private participants, and thus, through its choice of targeted industry and targeted enterprises, the state has effectively discriminated in favour of some industries and against others, incentivizing investors to potentially do the same.

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. 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 market with respect to personal benefits, corporate support in the two jurisdictions analysed does not recede under the rubric of supply-side policies, rather it becomes hidden in the ambiguity of language that frames jurisdictional competitiveness.

Interpreted alongside Cerny's *Competition State* and Jessop's *Schumpeterian Workfare State*, both cases show an adoption of the language of competition as the primary driving force of state policy. In Arizona, the traditional focus on export-promotion and capital attraction is complemented by a right-of-center, right-to-work regulatory framework that puts downward pressure on in-state wages. In Ontario, less labour flexibility accompanies similar orthodox strategies. These *light-state* strategies, however, are buttressed by a *heavy-state* definition of key priority economic sectors and the appropriation of public funds towards them. As shown, both jurisdictions have made significant allocations of public funds towards private economic activity in chosen economic sectors, notably ones that align with a Schumpeterian perspective on innovation.

Rodrik's argument ("globalization's dilemma") that relates to the state's inability to mitigate the negative impacts of economic globalization, supported by others regarding the limits global economic governance places on policy space such as Weiss, is therefore problematized by sub-national states 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. Policy space for industrial privileging is thus far from extinct and has instead taken on new forms through the development of third-party knowledge brokerage organizations, an explicit focus on university-industry commercialization and an increasing focus on small domestic firms, rather than large international ones.

Thereafter, what is interpreted by Cerny as the exit of the state from large, project driven strategic investment in basic industry ("les grands projets") is, in contemporary Federal jurisdictions, 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, which Jessop sees at the national level, 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. The long-term impacts of this shift towards small domestic players on the balance of power between international firms and local governments must be further studied.

Ultimately, 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. 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.

Subsequently, while the language of industrial policy has been omitted from policy parlance owing to rhetorical support for "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.

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