# Measuring the 'developmental state' in liberal countries
## industrial policy agendas in Canada and the United States, 1989-2023

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May 28, 2023

draft 1.0 — comments welcome

**Abstract**

Despite widespread belief that government action is required to promote innovation and sustainable growth, little is known about state intervention in nominally liberal economies. This paper adds precision to the concept of "developmental network states" by leveraging a new dataset on program expenditures in Canada and the United States. Two premises advanced in the literature on liberal developmental states are assessed: (1) that liberal developmental states are characterized by "coordinated decentralization" and (2) that programmatic durability and success depend on political insulation. The first premise is evaluated by developing measures of coordination and decentralization using a mixed-methods approach that involves case investigation of data points identified via quantitative analysis. The second premise is evaluated by assessing the correspondence between political turnover and policy change. The discussion proceeds to disentangle political insulation from possible confounders related to political attention and degree of consensus, failure to control for which may result in over-estimation of the effect of political insulation. Biased estimation should be taken seriously, as it may lead analysts to unduly favour insular technocracy over more inclusive and democratic alternatives. Case analysis reveals that political insulation varies on at least two dimensions related to government interference and lobbying. Some constraints and opportunities affecting political influence vary predictably across Canadian and American institutions governing the budgetary process, while others vary idiosyncratically according to institutions governing policy subsystems. Complexity is handled by a simple typology of developmental states.

**Keywords:** comparative policy agendas; developmental states; entrepreneurial states; industrial policy; innovation; mixed-methods

**JEL classification:** H5, L52,O25, O38,

# Introduction

Industrial policy is currently front-page news in North America. Yet scholarly understanding of industrial policy is surprisingly limited (Lane, 2020). Indeed, a concerted North American research agenda on industrial policy all but disappeared following the apparent defeat of its proponents in the "industrial policy debate" of the 1980s (Graham, 1992; Johnson, 1984). A dedicated research program is necessary, however, given challenges involved with measuring state intervention in highly fragmented "hidden developmental network states," the likes of which are said to characterize liberal market economies (Block, 2008; Ó Riain, 2004).

This paper contributes to a research program on industrial policy in nominally liberal countries by making progress on three fronts: compilation of quantitative indicators of government spending, operationalization of concepts drawn from qualitative research, and assessment of premises advanced in prior literature. The objective is to aggregate findings so that "the trees may be seen for the forest." The argument is that quantitative indicators serve as a complement to case-oriented research that will prove useful for identifying, analyzing, and comparing shifts over time and between jurisdictions.

The discussion proceeds in four steps. The first section engages with the literature on political agenda-setting to leverage budgetary data on industrial policy in Canada and the United States from 1989 to 2023. The second section operationalizes concepts from the existing literature on liberal developmental states, namely "coordinated decentralization" and "political insulation" (Block, 2011; Keller et al., 2022). The third section undertakes mixed-method analysis of causal mechanisms underlying data points to assess two premises advanced in the prior literature: (1) that liberal industrial policy is characterized by coordinated decentralization, and (2) that policy durability and success is a function of political insulation (Breznitz & Ornston, 2018; Negoita, 2011). The fourth section evaluates the findings and identifies conceptual ambiguities that warrant refinement.

Whereas the coordinated decentralization thesis is found to be mostly supported by the data, political insulation is vulnerable to confounders and, thus, biased estimation. For reasons both theoretical and empirical, it is prudent to distinguish between sources of, and motivation for, political interference, as extolling political insulation may unduly favour insular technocracy over more inclusive, democratic, and effective alternatives. Incidentally, literature on "political missions" champions the positive effects of political interference in economic matters (Mazzucato, 2021). Case analysis reveals that political insulation varies on at least two dimensions related to government interference and lobbying. Some constraints and opportunities affecting political influence are determined by institutions governing the budgetary process, while others are determined by institutions governing policy subsystems. A research program based on a configurational typology of developmental states is advanced, which is consistent with contemporary

scholarship on business systems and varieties of capitalism (Kogut & Ragin, 2006; Witt & Jackson, 2016).

## Measuring the developmental state

Contemporary literature on developmental states takes its orientation from Evans (1995), who employed inductive, historical institutionalist methods to analyze and understand catch-up economic development in laggard economies. The strength of the approach lies in its ability to allow researchers to "see the forest for the trees" by honing in on the intersection of structure and agency in causal processes underlying economic development (cf. Granovetter, 1985). Less progress has been made on "seeing the trees for the forest," as the latter continues to be held up by "the primitive state of our empirical indicators" (Evans, 2014: 104).[1]

According to Chalmers Johnson, "industrial policy is first of all an attitude, and only then a matter of technique" (Johnson, 1984: 7). From such a perspective, measuring the developmental state is foremost an exercise in assessing government attitudes toward state intervention in the economy. Theory and method on political agenda-setting are appropriate for such a task, as they capture government attention and attitudes toward social and economic issues (Walker, 1974).

The conventional approach to studying policy agendas involves leveraging budgetary data to track political commitment over time (Jones et al., 2009; Lindquist, 1990; Wildavsky, 1964). Contemporary approaches have gone a step further to quantify textual data, thereby enabling analysists to track shifts in political discourse —for example, in media and government reports, political debates, and speeches (Baumgartner & Jones, 2015; Skogstad & Wilder, 2019; Wueest, 2018). A problem for our purposes is that empirical indicators of industrial policy are liable to confuse inputs with outputs and are otherwise difficult to demarcate and aggregate in a way that maintains a relationship between the measurement unit and the policy that produced it (Lane, 2020).

For example, OECD measures of research and development expenditure give no indication about the policies that produced them and little information about the source of funding. Moreover, because OECD data are solicited from governments, differences in accounting practices preclude comparisons across countries —or, as is often the case, within the same country over time. As shown in the left panel of Figure 1, using OECD indicators of government budget allocations for research and development paints a picture in which state intervention has trended downward over time in both the US and

[1] Lament over dearth of empirical indicators is echoed in the literature on industrial policy: "non-tariff measures, such as subsidies and quantitative restrictions, may be the preferred tools of social planners [yet] observability of such barriers and the lack of complete cross-country data is the bane of contemporary trade research" (Lane 2020: 116-117). As Anderson and Van Wincoop (2004) emphatically put it, "the grossly incomplete and inaccurate information on policy barriers available to researchers is a scandal and a puzzle" (693, cited in Lane 2020: 117).

Canada, notwithstanding mild and temporary upswings in response to recessions in 2001, 2009, and 2020.

Data from the Comparative Agendas Project (CAP) gets somewhat closer to measuring industrial policy directly, but is still at too high a level of aggregation. The right panel of Figure 1 displays US federal outlays for budget items conceptually adjacent to industrial policy through to 2017 —the latest year for which data are available. According to CAP indicators, US federal spending related to industrial policy is dominated by space and military research and development (R&D) (Weiss, 2014). Consistent with the US series in left panel of Figure 1, spending by function has been rather stable over time and exhibits the same counter-cyclical trends.

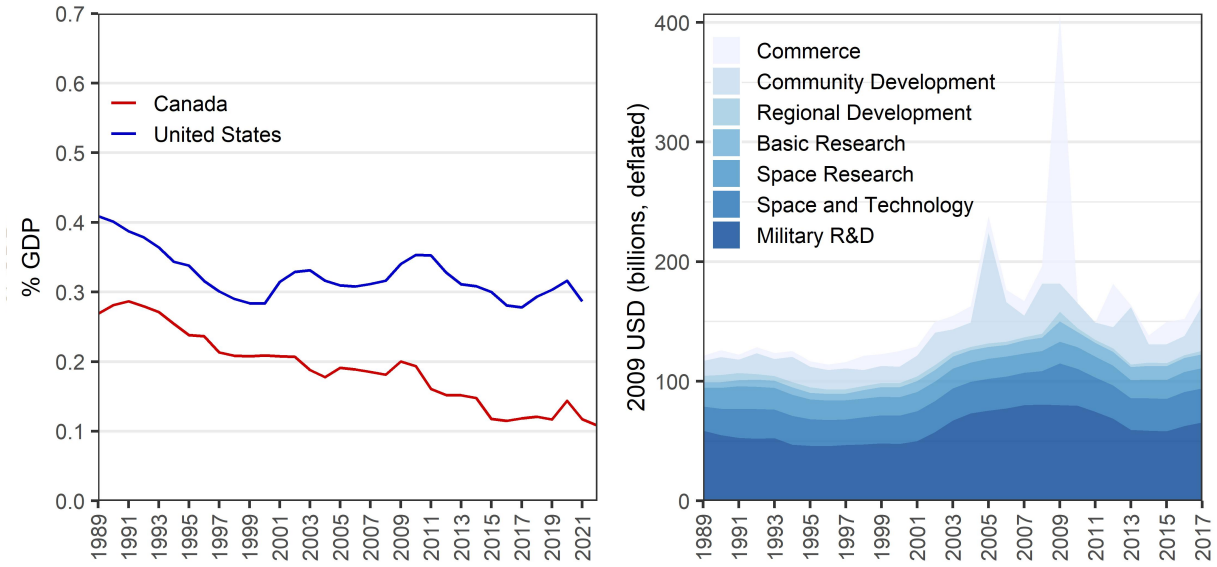


**Figure 1:** Existing measures of industrial policy

Source: left panel based on OECD.Stat Government Budget Allocations for R&D; right panel based on Comparative Agendas Project (CAP) United States Budget Authority Dataset.

Although illuminating for understanding government priorities over time, information about programs is lost in aggregation, regardless of whether analysts use OECD or CAP indicators. Moreover, comparable data on Canadian policy agendas do not exist, and neither data source sheds much light on recent developments (cf. Gauvin & Montpetit, 2019). Measuring the developmental state requires program-level data, specifically: indicators of program genesis, termination, commitment, and purpose. Because the state in liberal market economies devolves most direct responsibility for producing goods and services to non-state actors, measuring policy purpose requires

information about recipients of government assistance and procurement contracts (Milward & Provan, 2003).

Figures 2 and 3 present preliminary data from a forthcoming dataset on industrial policy program spending in Canada and the United States, whereby vertical dashed lines represent change of government. As shown in Figure 2, Canadian federal industrial policy is administered by several departments and agencies, with space and military research playing a much smaller role in Canada compared to the US (Migone et al., 2023). Canadian industrial policy can thus be described as decentralized, even without consideration of significant industrial policy activity at the provincial level (Wilder & Howlett, 2015). The true story is in fact even more decentralized, as industrial R&D programs under agriculture, transportation, and natural resource ministries are omitted from Figure 2, as are Crown corporations and delegated agencies funded by grants and contributions at the next level of disaggregation.

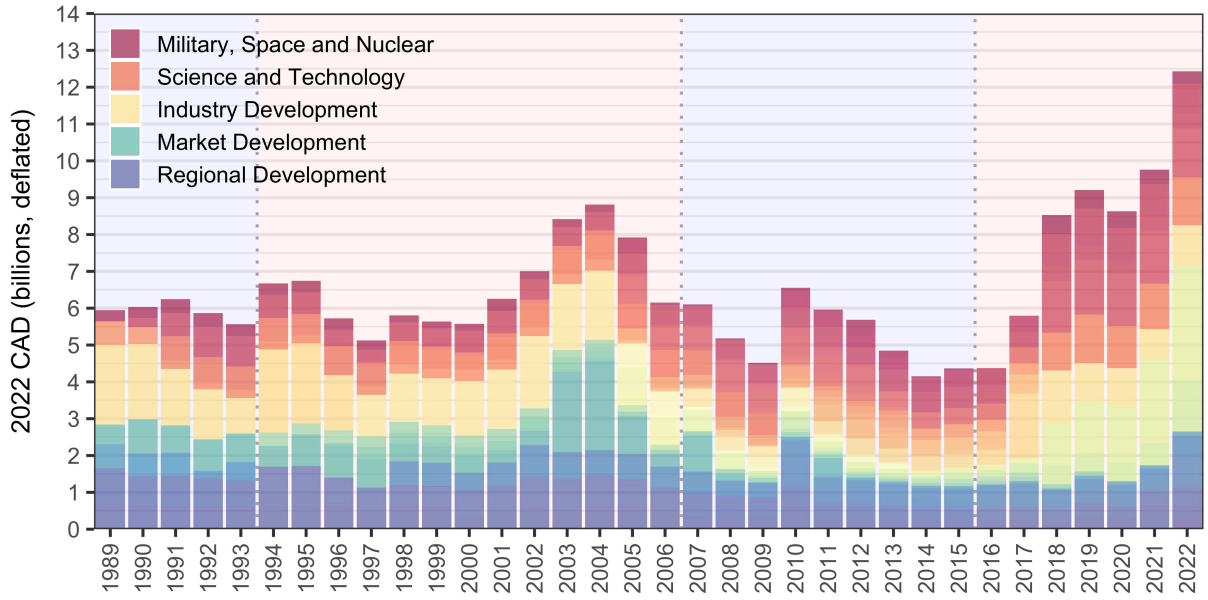


**Figure 2:** Canadian federal industrial policy program expenditure, 1989–2023

Source: based on Canadian Federal Budget Estimates. Click to explore interactive features.

In terms of overall spending, we observe general stability over time punctuated by countercyclical patterns identified above in the context of Figure 1. On one hand, it is clear that industrial policy endured Canada's alleged "neo-liberal turn" in the late 1980s (Doern & Tomlin, 1996; Howse & Chandler, 1997). On the other hand, it seems industrial policy activity has been on the rise since 2017. It is also evident that some programs exhibit greater stability over time and across electoral cycles than others, a point to which we return in the next section.

As mentioned above, finer granularity is achievable by drilling down to the item level. Looking at US data now, Figure 3 shows the composition of grant recipients for the Advanced Research Projects Agency —Energy (ARPA-E) from the time of its genesis in 2009 to the present. Two features stand out. One is the sheer number of grant recipients, which consist mainly of universities and technology firms, whereby the average grant is $1.8 million. The second notable feature is the lack of a consistent expenditure trend over time. Both features merit case investigation, per the following sections.

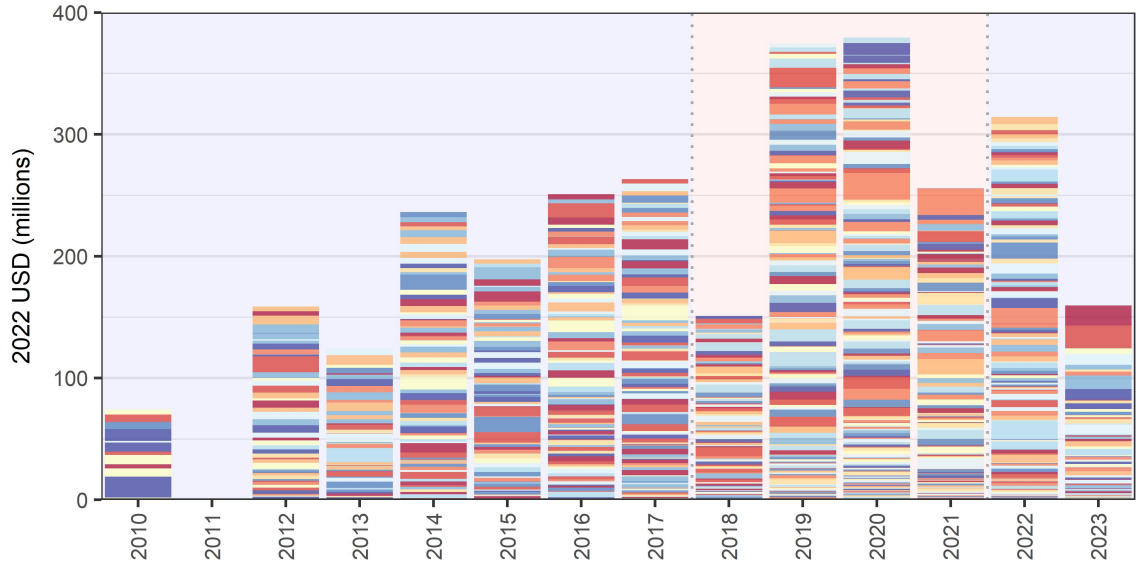


**Figure 3:** US federal grant recipients, ARPA-E
Source: USA Spending Database. Click to explore interactive features.

The preceding discussion has established that existing measures of industrial policy activity paint a vague and misleading picture of state intervention in North America over time. Whereas the conventional measures displayed in Figure 1 give the impression of industrial policy stagnation or retrenchment, more detailed data presented in Figures 2 and 3 reveal a far more complex picture. With descriptive statistics in hand, the following sections explore avenues for operationalizing and testing concepts and premises advanced in the qualitative literature on developmental states, namely "coordinated decentralization" and the virtues of "political insulation" (Block, 2011; Breznitz & Ornston, 2018; Keller et al., 2022; Negoita, 2011).

## Concepts to variables

Many of the concepts used in the literature on developmental states originated in *Embedded Autonomy: States and Industrial Transformation* by Peter Evans (1995). The

crux of the argument is that economic development goes awry when social planners are either not sufficiently embedded in, or not sufficiently autonomous from, the state and civil society. Rather, the ideal social planner acts as a trustee to political principals and civil society clients, brokering negotiations and effectively leveraging resources from both groups in the pursuit of common goals (cf. Miller & Whitford, 2016). In successful developmental states, objectives and resources of state and civil society actors are mutually-reinforcing, not undermined by capture and predation (i.e., rent-seeking) (Evans, 1995: 228–229).

Subsequent research on liberal developmental states has accounted for lack of *dirigisme* in liberal market economies by highlighting agencies' relatively high level of embeddedness in civil society networks (Breznitz, 2007; Ó Riain, 2004). However, because a state beholden to civil society actors is vulnerable to capture by interest groups, the appropriate organizational structure is hypothesized to straddle the boundary between state and civil society. As depicted by the dashed circle in the centre of Figure 4, a "sweet spot" encompasses state agencies at the "periphery of the public service" as well as delegated agencies composed of civil society actors whose authority to make and implement industrial policy is delegated by the state (Breznitz et al., 2018).

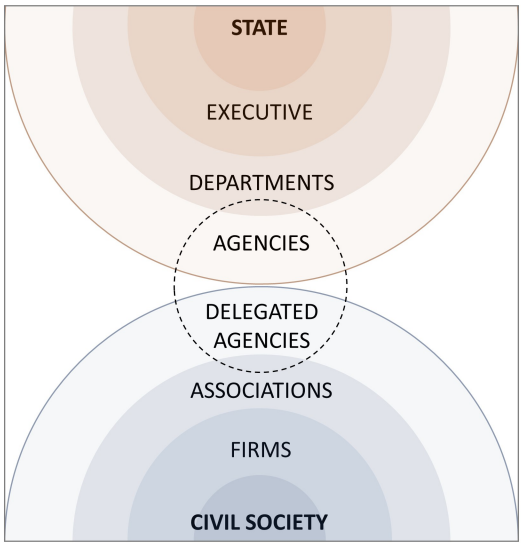


**Figure 4:** Agency in an "embedded autonomy" framework

Source: adapted and modified from Evans (1995) and Breznitz (2007: 33).

Although Figure 4 is useful for ascertaining the locus of decisionmaking authority, the representation is stylized. Both state and delegated agencies vary in the extent to which they are directed by political principals, with some state agencies operating at "arm's length" from the political executive, while some delegated agencies feature cabinet

ministers on their boards of directors. Considerations such as these have prompted scholars to pay attention to degree of political insulation as an explanatory variable when articulating models of successful innovation (Breznitz & Ornston, 2018; Keller et al., 2022; Negoita, 2011).

Obviously, delegating policymaking authority to non-state actors is rife with complications and potential pitfalls surrounding lack of accountability, legitimacy, and fairness. Consequently, as seen in Figure 3, grants and procurement contracts in liberal developmental states are often spread thin, perhaps out of concern for limiting power resources devolved from the state to particular interests and organizations in civil society. That said, liberal market economies are characterized to some extent by "national champions" who arguably receive a disproportionate share of government grants and procurement contracts (e.g., Bombardier and SNC Lavalin in Canada, Lockheed Martin and Raytheon in the US). Diffusion of administrative responsibilities across several agencies and dozens of programs, as seen in Figure 2, may also mitigate against such "clientelistic" tendencies (Atkinson & Coleman, 1989).

According to Fred Block, political insulation is best achieved when an innovation system exhibits "coordinated decentralization" —that is, when "different teams of technologists working in different locations have the freedom to experiment with different ways to solve technological puzzles" (2011: 20–21). In other words, the system is "coordinated" to the extent that state actors articulate well-defined and coherent objectives. In this sense, Block's concept of coordination is analogous to contemporary notions of "mission orientation" (Azoulay et al., 2019; Mazzucato, 2021). Given Block's contention that "decentralization also helps to partially insulate the innovation system from shifts in the balance of partisan advantage and managerial orientation in the nation's capital," decentralization may serve as a proxy for political insulation. "Coordinated decentralization" alone may thus be sufficient to explain industrial policy success in liberal market economies.

In terms of operationalization, the number and variety of entities involved in the formulation and implementation of industrial policy constitutes an intuitive measure of decentralization. On the alternate axis, coordination may be operationalized as an interactive function of the share of resources devoted to industrial policy and the stringentness of conditions attached to state support. The next sections evaluate whether this simplistic typology suffices to explain recent developments in the industrial policy domain in Canada and the United States.

# Analysis

This section examines industrial policy developments in Canada and the United States during the "industrial policy revolution" that supposedly characterized government responses to the Great Recession of 2007–2009 (Stiglitz et al., 2013). Figures 2 and 3

shed some initial light on the extent to which industrial policy is decentralized in Canada and the US. Questions remain, however, about the extent to which industrial policy in Canada and the US is coordinated. It also remains to be seen whether a simple typology that features two axes —coordination and decentralization— suffices to account for political insulation: a factor identified as a determinant of successful innovation by qualitative researchers (Azoulay et al., 2019; Breznitz et al., 2018; Negoita, 2011).

Regarding the Canadian data, Figure 2 revealed that increased federal government expenditure in 2009 was fleeting. In fact, the Harper Conservative government in power at the time spent less on industrial policy than all other administrations in the 1989–2023 period. This picture is obscured somewhat, however, by the fact that the Scientific Research and Experimental Development Investment Tax Credit (SR&ED) has historically accounted for approximately 77% of total government support for business enterprise research and development (BERD) (OECD, 2021).

Direct federal government spending in Canada increased following the election of the Trudeau Liberal government in 2015. The 2017 Innovation Skills Plan comprised the centerpiece of the government's industrial strategy, which consolidated the number of programs administered by the Department of Industry from 92 to 35 (ISED, 2019). Key initiatives consisted of the Innovation Superclusters Initiative, the Strategic Innovation Fund, and Innovative Solutions Canada, which were intended employ regional collaboration initiatives, fund innovation projects, and foster a mission-oriented approach to demand-side funding, respectively (Finance Canada, 2017). In 2020, the Net Zero Accelerator was launched as a part of the Strategic Innovation Fund with a mission to reduce greenhouse gas emissions by 40 to 45% by 2030 and achieve net zero by 2050 (ISED, 2023).

Notwithstanding an emboldened approach to industrial policy, Canada's global position on key innovation indicators —specifically, productivity and BERD— failed to improve. In response, the federal government introduced focused initiatives aimed at improving Canada's position on these indicators, namely the Canada Innovation Corporation and the Canada Growth Fund, the former of which absorbed advisory capacity previously under the competence of the National Research Council's Industrial Research Assistance Program (IRAP) (Finance Canada, 2022). Modelled on innovation agencies in Finland and Israel, the Canada Innovation Corporation operates at arm's length from government so as to "move at the speed of business" (ISED, 2023). For its part, the Canada Growth Fund is administered by the Public Sector Pension Investment Board, and is intended to facilitate the achievement of Canada's net zero objectives by catalyzing private sector investment (Finance Canada, 2022; 2023). The Canadian federal government has also implemented a series of sector specific initiatives, including the Canada Digital Charter (2019), the Biomanufacturing and Life Sciences Strategy (2021), the Critical Minerals Strategy (2022), and the National Quantum Strategy (2023).

In response to the United States Inflation Reduction Act, the 2023 Canadian federal budget outlined a series of green tax credits to support sustainable manufacturing

and zero-emissions technologies. Thus, reliance on tax credits continues to characterize Canada's approach to industrial policy. However, the Canadian federal government also co-subsidized a $14 billion Volkswagen electric vehicle deal with the province of Ontario in 2023, and committed $500 million over ten years to the Strategic Innovation Fund to support the development and application of clean technologies in Canada (Finance Canada, 2023).

In contrast to the "out with the old, in with the new" approach to industrial policy adopted in Canada, industrial policy following the Great Recession in the United States has been characterized by efforts to "clone" the Defense Advanced Research Projects Agency (DARPA), which was founded in 1958 (Fuchs, 2009). Consequently, the 2009 American Recovery and Reinvestment Act implemented by the Obama Democratic administration contained several provisions for establishing similar agencies directed at health and energy, while the Biden administration has announced intentions to establish another focused on climate change (Tollefson, 2021) .

The core characteristics of the ARPA model have been described as general organizational flexibility, bottom-up program design, discretion in project selection, and active project management, thereby "lodg[ing] much more control and decision-making power with the funding organization than is typical for public research funders (Azoulay et al., 2019: 75–76, 85). Per the discussion surrounding agencies in an embedded economy framework (i.e., Figure 4), although ARPA agencies are funded by the executive departments that oversee them, they exist on the periphery of the state as evidenced by the fact that directors tend to be selected from civil society on fixed terms —albeit via a political appointment process.

As seen in Figure 3, although there are many grants awarded through ARPA-E, and many grant recipients, funding appears to be unstable from year to year. One reason pertains to the American federal budgetary process, according to which agency appropriations must be approved by Congress on an annual basis. Thus, although a non-trivial level of discretion for formulating and implementing industrial policy is delegated to ARPA directors by the President pending confirmation by the Senate, the agencies are beholden to Congress for funding. Consequently, ARPA-E's budget has fluctuated in tandem with the partisan composition of Congress (Keller et al., 2022: 7).

Clearly, decentralization does not equate to political insulation. For one thing, the fact that ARPA directors are political appointees means that authority delegated to them is not immune to political interference commonly associated with patronage appointments. For another, the politics of the budgetary process loom large in determining the realm of the possible for ARPA directors in a given fiscal year and over the course of a given Congress. Thus, although ARPA directors may have wide scope of action delegated to them, the scale of that action, as well as the individual bestowed with its discretion, is politically determined. As discussed in the next section, although Canadian institutions differ from American institutions in important ways, political powers of appointment and control over the budgetary process are even more centralized

(i.e., executive dominated) in Canada and therefore not any more amenable to political insulation than American institutions.

Regarding coordination, the evidence does suggest that agencies are guided by mission orientations, either by virtue of their enabling legislation or as a result of program focus. For example, ARPA-E's legislative mandate is to promote the commercialization of radically innovative energy technologies; and while program foci at ARPA-E are at the discretion of program directors, program directors are mission-oriented by virtue of their political mandate to boldly pursue radical innovation in energy technologies (Goldstein & Narayanamurti, 2018). However, given the tenuousness of political insulation, a mission championed by government today may be thwarted by government tomorrow. As discussed in the next section, although governments seem to be moving toward greater "arm's-length agencification" as a means of credibly committing to public interest missions, there are potential drawbacks to delegating policymaking authority that may be inadequately appreciated in the contemporary literature on innovation agencies (cf. Miller & Whitford, 2016).

# Discussion

The previous section established that, although decentralization may encompass political insulation in theory, the empirical story of industrial policy in Canada and the United States features both a high degree of decentralization and episodes of political interference. The proposed solution, encapsulated by the blueprint for the new Canada Investment Corporation, is to delegate policymaking authority to non-state actors so as to make them politically untouchable (ISED, 2023). In the terminology of the embedded autonomy framework depicted in Figure 4, seen in a positive light, the move entails less embeddedness in the state sphere, and therefore more autonomy from political interference. However, seen in a negative light, the move entails greater embeddedness in civil society, and therefore less autonomy from private and corporate interests.

Analytically, the concept of political insulation needs unpacking in order to account for both political interference "from above" and political interference "from below" —that is, political interference in the form of lobbying at the subsystem level (Montpetit, 2005). Empirically, scandals surrounding Export Development Canada —an independent, arm's length Crown corporation— are telling, as the agency was reined in by political principals following an Auditor General report alleging capture by oil and gas interests. Normatively, apparent trade-offs in the embedded autonomy framework need not be zero-sum, as mission-oriented terms of reference could set regulatory parameters according to which arm's length delegated agencies must operate.

The preceding exercise in "model-building small-n analysis" identified several variables that may assist in typifying agencies and developmental states (cf. Lieberman, 2005). Prior literature isolated decentralization, coordination, and political insulation as

important variables, while the previous discussion argued in favour of distinguishing between state and civil society sources of political interference. Case analysis revealed that political interference in liberal developmental states varies predictably according to institutions governing the budgetary process, whereby the United States features more access and veto points than Canada (Jones et al., 2009; Tsebelis, 2002). Substantively, although there are more avenues through which to engage in political interference in the United States, there are also as many avenues through which to resist or evade political interference, making degree of issue alignment (i.e., consensus) and political attention decisive (Baumgartner & Jones, 2015; Skogstad & Wilder, 2019). More idiosyncratic, but equally meaningful, variation also exists at the subsystem level regarding insulation from political direction and interest groups, as well as the range of delegated discretion (Montpetit, 2005). An updated typology of developmental states should therefore consider degree of political consensus and "subsystem openness" in addition to coordination and decentralization (Henisz, 2000; Howlett & Ramesh, 1998).

Returning to the theme of "seeing the trees for the forest," a logical next step is to operationalize indices of agency independence and agency capture so that the typology sketched above may be utilized in "model-testing large-n analysis" (Lieberman, 2005: 436). Contingent on how latent variables factor load, it may be possible to devise an index of government coordination that complements existing indices of labour and corporate coordination, thereby "bringing the state back in" to varieties of capitalism theory (Hall & Gingerich, 2009; Schmidt, 2009). In any event, developmental state indicators could be included in clustering and configurational analyses to shed light on the correspondence between developmental states and business systems (Witt et al., 2018; Witt & Jackson, 2016).

# Conclusion

Intervention on the part of "entrepreneurial states" is widely considered to be critical for achieving innovation and sustainable growth in the new age of industrial policy (Mazzucato, 2013). However, scholars continue to lack a systematic understanding of state intervention nominally liberal countries (Hall, 2015). According to the literature on "developmental network states," liberal industrial policy is characterized by "coordinated decentralization" whereby success is conditional on political insulation (Azoulay et al., 2019; Breznitz et al., 2018). Yet, coordination, decentralization, and political insulation have scarcely been operationalized in prior research.

Starting from the position that contemporary forms of state intervention are too complex to fully grasp using purely qualitative methods, this paper extrapolated broad characteristics of developmental network states by undertaking mixed-methods analysis of state intervention in Canada and the United States. Newly compiled data on program expenditures revealed that industrial policy in liberal market economies is highly

decentralized, while case analysis of recent industrial policy initiatives indicated a degree of policy coordination consistent with "mission-oriented" programs and agencies (Mazzucato, 2021). However, case analysis also made clear that decentralization does not equate to political insulation, as even arm's length agencies are apparently vulnerable to political interference.

The discussion section engaged with normative arguments concerning political insulation and identified potential pitfalls associated with increased devolution of policymaking authority to non-state actors. Whereas agencies deeply embedded within the state apparatus may be highly vulnerable to political interference "from above," politically autonomous agencies embedded in civil society risk capture by special interests. A typology was therefore advanced that includes degree of political consensus and subsystem openness in addition to coordination and decentralization. In the spirit of "seeing the forest for the trees," subsequent research ought to develop indices of embedded autonomy at the agency level in an effort to integrate research on developmental states into existing "configurational" research on business systems and the varieties of capitalism (Witt & Jackson, 2016; Witt et al., 2018).


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