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The Resurgence of Industrial Policy and What It Means for Canada

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Summary

- Industrial policy, though long considered taboo in advanced Western economies, remains widely practised and is seeing a resurgence.
- Like other countries, Canada is once again engaging actively and more openly in industrial policy. In fact, it has a profusion of industrial policies, what it lacks is a strategy.
- The authors present the case for and against sector-specific policies and propose guidelines on how to maximize their impact in the Canadian context.

Sommaire

- Pendant longtemps, les politiques industrielles ont été considérées comme taboues dans les économies occidentales. Pourtant elles sont répandues et connaissent actuellement une renaissance.
- Comme bien d'autres pays, le Canada mène de nouveau, et de façon plus ouverte, une politique industrielle active ; en fait, il maintient toute une série de mesures sectorielles. Or c'est la stratégie qui lui fait défaut.
- Les auteurs présentent les avantages et inconvénients des politiques visant à appuyer des secteurs particuliers et proposent des critères permettant d'optimiser les retombées dans le contexte canadien.

Industrial Policy Is Back

For several decades now, the idea that governments should direct industrial policy interventions to specific sectors of the economy has been viewed with more than healthy skepticism. However, as this article demonstrates, the consensus against industrial policy stands in stark contrast to pervasive government practices. While the rationales and approaches have varied across countries and over time, the reality is that governments have long targeted industry- and region-specific measures to promote their economies. The truth is that everyone uses industrial policy — some more successfully and some more openly than others.

Indeed, industrial policy has experienced a resurgence in recent years, and governments are becoming increasingly frank on the subject, particularly since the great recession of 2008-09. As evidence, consider the following developments: the European Commission proposed a "fresh approach to industrial policy";[1] the US committed itself to taking "strategic decisions about strategic industries";[2] and Japan expressed a desire to create a new "Japan Inc."[3]

Not only are many industrialized economies reviewing their use of industrial policy, but international organizations are also getting involved. The United Nations Conference on Trade and Development is "rethinking" industrial policy.[4] The World Bank has reintroduced it into the development tool kit (albeit with qualifications).[5] The International Monetary Fund has debated it[6] and the Organisation for Economic Co-operation and Development (OECD) has studied it — although rather squeamishly, framed in quotation marks: "Fostering New Sources of Growth: Is There a Role for 'Industrial' Policy in the 21st Century?"[7] The *Economist* lamented this broader global trend in an article titled "Picking Winners, Saving Losers: Industrial Policy Is Back in Fashion. Have Governments Learned from Past Failures?"[8]

Rightly or wrongly, but undeniably (and definitely uncomfortably for many economists), industrial policy has come in from the cold. The reasons for this renaissance are multifaceted, but a key driver was the global recession in 2008-09. This economic crisis forced many governments to address head-on the very real and urgent policy question of whether to support specific industries, such as finance and automobiles, that many viewed as systemically important to the macroeconomy. In addition, the slow recovery that followed the crash has left governments across the world desperate for ways to stimulate their weak economies — and many advanced Western economies are now looking jealously at much faster growth in Asia and other emerging economies that promote the role of less conventional government interventions in the economy.

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In Canada, sector-specific policy debates are active and heated: Should the Canadian (and American) governments have intervened to assist the automobile sector? Is the significant shift in the industrial structure of the economy away from manufacturing to the resource sector indicative of so-called Dutch disease, and if so, what should policy-makers do about it?[9]

In this context, Canada's federal government has not been idle. The 2012 federal budget sought to expedite resource management by streamlining regulation, while the 2013 budget was intended to help manufacturers succeed in the global economy by renewing funding to the Federal Economic

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Development Agency for Southern Ontario (a regional development agency created in 2009 as a response to the global financial crisis, ostensibly to support the manufacturing sector in Ontario). In addition, in Budget 2013, the government effectively endorsed the recommendations of the report of the Special Adviser to the Minister of Public Works and Government Services to promote Canada's defence industry by developing key industrial capabilities and to reform procurement to include Canadian industry before project approvals.[10] The budget also committed the government to stable funding for the Strategic Aerospace and Defence Initiative, in response to the report of the Aerospace Review.[11]

Canadian provinces are also getting into the act. To give one example, in April 2013 Quebec announced that it will unveil a new industrial and manufacturing strategy with a central role to be played by a new agency, the Banque de développement économique du Québec. The explicit aim of this initiative will be to intervene in Quebec's economy to boost regional development, the output of specific sectors (such as mining and oil exploration) and other private investment projects.

The goal of this article is to examine these global trends in industrial policy and what they mean for Canada. We do this by reviewing the basic theory underpinning industrial policy as well as the broad body of evidence on its role and effectiveness in economic development over history and in today's major economies. We find that Canada has a long history of industrial policy interventions, and we conclude that having policy that is truly neutral across sectors is inconsistent with the highly heterogeneous nature and policy requirements of different sectors.

Theory and Evidence

Industrial policy is generally understood to mean "official policies concerning the direction of economic activity to particular parts of the economy" (*Oxford Dictionary of Economics*).

Under the widely accepted practice of the last several decades, governments have taken on the role of providing public support for economic development in a horizontal sense: providing infrastructure, creating incentives for investment and human capital development, and tailoring economic framework policies to promote growth, but without targeting support to particular sectors or companies. Meanwhile, identifying areas or activities where resources should

flow is better left to the market, today's commentators argue. Governments, as the logic goes, should always and everywhere avoid picking winners and saving losers. In this sense, governments are supposed to be neutral as to which sectors and firms expand and which shrink.

But industrial policy is, by definition, policy that is not neutral. Instead, it involves what can be thought of as vertical interventions, which direct resources to particular activities. This horizontal/vertical distinction can be blurred in cases where nominally horizontal support has de facto vertical effects. For instance, while support for research and development (R&D) is available to all sectors of the economy, at the end of the day it ultimately flows mainly to R&D-intensive sectors. Horizontal and vertical interventions are sometimes referred to as soft and hard industrial policy, respectively.[12]

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The tools of industrial policy are many and varied — and not always overt. They include the following:

- targeted financial support, such as subsidies or loans from publicly capitalized banks established to fund business start-ups;
- trade policies, such as varying tariff rates across industries, nontariff measures that effectively discriminate against imports in particular sectors, the use of antidumping and antisubsidy measures against major competitors, and export subsidies that favour specific industries or products;
- tax incentives that promote particular activities or technologies;
- government procurement policies to support particular industries, such as defence, which can provide an assured market for new technologies during development;
- investments in specific supporting economic infrastructure; and
- regulatory exemptions to attract, preserve or foster the growth of particular industries.

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Local positive externalities

Externalities are the benefits or costs associated with an economic activity that are not captured or borne by the firm undertaking that activity and that spill over to others. When firms cannot fully capture the benefits of an investment — a case of "incomplete appropriability" — not enough of the desired activity will be undertaken, from the perspective of what is best for

society. Government interventions to help establish or to develop industries that generate substantial positive spillovers can thus provide economic gains to society. From the government's perspective, it is important that the spillover benefits occur locally; if these benefits leak to other regions, the rationale for using local taxpayers' funds is eroded.

The most widely used and justified policy to harness local positive externalities is cluster policy: initiatives that seek to emulate the success of renowned clusters such as California's Silicon Valley or Northern Italy's industrial districts. Since clusters are usually sector specific (such as Saskatoon's biotechnology cluster), cluster policies typically qualify as vertical initiatives, even if government support is mostly horizontal (infrastructure, training, incentives for investment or for innovation and so on).

Governments should limit support to existing and emerging clusters rather than trying to create them where they do not already exist.

Given the theoretical importance of externalities for industrial policy, a strong empirical record of successful cluster policy would provide strong support for industrial policy. However, evaluating cluster policies is difficult because an essential feature of successful clusters is "chemistry," which is difficult to engineer and harder still to measure. The OECD has acknowledged a lack of "robust tools to measure whether or not such policies are successful."[13] The general conclusion reached from cluster policy analysis is that, to minimize the risk of resource misallocation, governments should limit support to existing and emerging clusters rather than trying to create them where they do not already exist.[14]

Strategic trade policy

With increasing returns to scale, ramping up output to supply export markets lowers the average production cost of the exporting firm and boosts its international competitiveness. As James Brander and Barbara Spencer argue, it is advantageous for a country to capture a larger share of profitable, imperfectly competitive industries as this results in profit shifting.[15] If countries can capture global market share through proactive trade policies, they can help shape their comparative advantage — a recurring theme in contemporary industrial strategies around the world.

This theory explains, for example, the export-subsidy competition between Brazil and Canada in regional aircraft. Given the cost savings to a carrier from maintaining aircraft purchased from a single manufacturer (such as reduced inventories of spare parts and lower training costs for personnel), capturing the first order from a carrier can often mean a larger market share for future orders. By the same token, as economists analyzing the issues in game-theory

terms have noted, "When other governments are simultaneously pursuing trade policies, a prisoner's dilemma can arise at the policy level."[16] Specifically, both governments would be better off with a level playing field with neither government subsidizing its domestic firms, but neither wants to be the first to remove its subsidy while the other country's subsidy is still in place because this would disadvantage its firms. As a result, neither government withdraws support; both remain stuck in the bad policy equilibrium, where both sides subsidize, rather than the good policy equilibrium, where neither subsidizes.

A testimony to the reality of these risks is the fact that Canada and Brazil brought cases of illegal export subsidies against each other at the World Trade Organization (WTO). Both lost their cases, while foreign customers of Bombardier and Embraer benefited from lower prices — financed, in effect, by Canadian and Brazilian taxpayers.

On the other hand, testimony to the potential benefits of strategic trade policy is provided by the market for computer memory (dynamic random access memory chips, or DRAMs), where strategic trade competition occurred and clear winners eventually emerged. When a German company, Qimonda AG, went bankrupt, DRAM prices soared and its rivals' share prices spiked, benefiting them enormously.

The evidence tabled in WTO litigation concerning civil aircraft and semiconductors shows that government involvement in developing these industries was both significant and pervasive. Given the export orientation of these industries, a substantial portion of the benefits from domestic public support undoubtedly flowed to outside countries. But it is also true that the economies that fought the hardest for these industries dominate them today: the US, Japan and Korea in semiconductors; the US and the European Union in large-body civil aircraft; and Canada and Brazil in regional aircraft.

Another successful use of strategic trade policy occurred in the development of Japan's and Korea's automotive sectors, at least in providing protection in the domestic market through nontariff measures. Korea's engine tax was set at a threshold that hit imports but not domestic models.

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The industries described above are generally amenable to strategic behaviour because they feature high sunk costs of entry; high R&D costs to develop the next generation of products; steep learning curves as production begins; and massive economies of scale in production, distribution and after-sales service. But these sectors are not exceptions to the rule; indeed, many are central to the modern economy.

Infant industries

The concept of learning by doing is at the heart of the infant industry argument for industrial policy. It is based on two well-established empirical facts: first, that there are steep learning curves in the early stages of developing industrial processes; and second, that many of the technical and managerial advances brought about by experience in producing one good have applications in producing others.

Although learning by doing may have limits for any given product, because at some point a company or industry attains the state of the art, it nonetheless continues to operate as next-generation products replace existing ones.[17] Accordingly, support at the early stage of gaining experience can kick-start the establishment of an industry that would otherwise not come into being, which can in turn drive the development of other related technologically advanced businesses.

Theorists have long emphasized that to justify government intervention, the learning-by-doing gains must at least partly spill over to other firms or industries. When the benefits of learning are entirely confined to the original target, government involvement is not warranted; instead, what is needed is a well-functioning capital market to finance the costs of learning.

The current cohort of advanced countries systematically used infant industry protection to promote domestic industrial development to good effect when they were developing economies.

In practice, the infant industry argument is most closely associated with industrialization policies adopted by developing countries to promote import substitution. Paul Krugman and Maurice Obstfeld, surveying developing countries' experience in this area, reach no firm conclusion since it has been difficult empirically to separate the role of industrial policy from other factors — most importantly that of trade — in the development successes that have been achieved.[18] Dani Rodrik, surveying the same evidence, makes two main points: "The development landscape is littered with…products of industrial promotion efforts that resulted in low-productivity, uncompetitive enterprises that never operated at full capacity...[This] has reinforced the common view that industrial policy has been a force for ill rather than good. At the same time...it is rather difficult to identify instances of nontraditional export successes in Latin America and Asia that did *not* involve government support at some stage" (emphasis added).[19]

Other analysts point out that the current cohort of advanced countries systematically used infant industry protection to promote domestic industrial development to good effect when they themselves were developing economies. England used import tariffs, export subsidies on finished goods and export taxes on raw materials to promote local processing, never mind other

restrictive trade practices (such as the *Navigation Acts*) when beginning and continuing its industrialization. The US and Germany imposed high tariff rates on manufacturing in the nineteenth century. Japan had extensive import controls until the 1970s. In reviewing this history, Ha-Joon Chang suggests that modern advocacy of free trade and laissez-faire industrial policy by the now-industrialized countries amounts to "kicking away the ladder" after they have climbed it.[20]

However, one does not have to look that far into the past to find cases of successful infant industry support in the already industrialized countries, where it has usually taken the form of public procurement, the policy area least subject to multilateral disciplines. Elie Cohen, in his analysis of France's *grands projets*, identifies assured government procurement as critical to the success of every major project other than the establishment of the oil company Elf. In a similar vein, Cohen refers to the "real" industry department in the US as not Commerce but Defence, because of the latter's massive procurement program.[21]

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For high-risk, high-return ventures, the presence of assured demand appears to be vital. As recounted by the inventor of the integrated circuit, the first generation of integrated circuits, developed for the US Minuteman missiles and the Apollo space program, cost $100 per chip for small quantities and $50 for larger quantities. While a small quantity was bought by private enterprises, defence procurement was essential for the viability of the infant industry that would become Intel and its competitors.[22] Similarly, for transformative projects such as the launch of the Leaf, Nissan's electric car, in the British northeast, public support was required to get the project on the road, both to provide supporting infrastructure (a network of recharging stations) and to assure market uptake — which included a commitment by the UK government to subsidize buyers of electric cars by £5,000 per car.[23]

The key characteristic of public support in this regard is assured, price-insensitive demand: the public sector effectively serves as the "launch customer" to allow an industry to establish itself. Recent critiques of infant industry policies stress that venture capital — or, where venture capital is lacking domestically, foreign investors — can step in to provide the necessary "patient capital" to support new firms or industries as they move up steep learning curves. However, in light of the historical record, it is doubtful that even modern global venture capital markets can replace public support in genuinely high-risk projects, especially where there is a divergence between private and social returns.

Overall, the empirical record on the effectiveness of the infant industry argument associated with import substitution is mixed. The most that can be firmly concluded against it is that other policies might be more effective and cost-efficient.

Coordination failures

Complex goods or projects require a range of complementary inputs and supporting services, which are the outputs of other firms or industries. Without some of these inputs and supporting services (some of which may be nontraded and hence not readily available from international sources), a start-up in one sector might require simultaneous investments in other sectors to be viable. In this context, the possibility of a coordination failure arises. Indeed, Rodrik ascribes much of the success of the Korean and Taiwanese policies to the role of government in addressing coordination in the development of industrial sectors.[24]

However, even in advanced industrialized countries, the possibility of missing markets cannot be dismissed: London's Canary Wharf project, now advertised as "Manhattan on the Thames," was in receivership until the British government decided to extend the Jubilee Line of London's Underground to the Docklands. Private sector capital did participate from the beginning, but most of the funding for this enabling infrastructure was public. (In this case, the supply of transportation services was not forthcoming from the private sector; notwithstanding that, in the end, the project was a success.)

Nonindustrial policy reasons for industrial policy

Governments often find that policy goals outnumber policy tools, as evidenced by the many complications in the tax code that are due to multiple incentives being provided through tax expenditures. Policies that influence the structural evolution of the economy — and thus fall under the general category of industrial policy — may therefore be adopted for reasons other than an explicit desire to shape comparative advantage, move the economy up the value-added chain or develop pillar industries, although inevitably the justification for such interventions will include conventional industrial policy objectives.

The most significant of these nonindustrial policy motives fall into three broad groups. First, national security concerns can lead to systematic support for sectors producing goods that have military strategic value, such as transport, telecommunications and advanced electronic equipment. Second, concerns about food security, the environment, energy and cultural identity can all lead to sector-specific support.

The third group of motives generates ad hoc responses to economic shocks, responses that can be as varied as the shocks themselves:

- Macroeconomic stabilization concerns: The need to maintain essential services or the fear of the broader impacts of failure of systemically important firms has often led governments to bail out or nationalize important firms faced with bankruptcy.
- Easing adjustment costs: Governments may spread out costs associated with the exit of sunsetting industries such as tobacco farming or textiles in industrialized countries.
- Preventing disruption of particular regions: In single-industry towns or regions, because of the geographic concentration of many sectors, sector-specific shocks can imply region-wide distress. Governments may provide support after fishery closures, for example.
- Preserving a national icon: Britain nationalized Rolls-Royce for this reason when it was faced with bankruptcy.

The efficacy of ad hoc government industrial interventions cannot be assessed as a group; every case is different. Many interventions have positive outcomes:

- Canadair was nationalized twice by the Canadian government before serving as the basis for Bombardier's successful regional jet program.
- Rolls-Royce, which was bankrupted in 1971 by cost overruns in developing a new aircraft engine, perfected it while under government stewardship and, upon privatization, rode the success of the engine to a major share of today's global market.
- The Korean semiconductor firm Hynix, rescued from its 2001 bankruptcy by the government, is now the world's second-leading manufacturer of DRAM chips.
- The Nordic experience with nationalization of the banking system during crises in the early 1990s showed that decisive action minimized fiscal costs and allowed a return to private sector management on an orderly basis.

On the other hand, as Paul Romer has quipped, "A crisis is a terrible thing to waste."[25] Markets work well to allocate resources, not because individual entrepreneurs are prescient, but because the penalty for wrong bets is failure.

Motives like national security, food security, the environment, energy and cultural identity can all lead to sector-specific support.

This point is evident in the failure rate of business start-ups, according to Statistics Canada: "For the majority of new firms, life is short and uncertain. Most entrants exit shortly after birth. About one in five new firms survive to their tenth birthday. This process of entry and failure is costly, both in dollar terms and in the time-costs borne by entrepreneurs."[26] But while costly and perhaps inefficient for some individual firms, the Darwinian process of selection can benefit society overall by reallocating resources to better uses over time.

Interventions inevitably raise many issues, including the way they can inhibit the market-based reallocation of production to more socially efficient uses.

In fact, government interventions typically prevent or slow this reallocation process. For example, Chrysler, which required support during the 2008-09 global financial crisis, had been previously rescued, in 1979. That rescue weakened its competitors, General Motors and Ford. At the time, GM's chairman attacked federal help for Chrysler as "a basic challenge to the philosophy of America."[27] It is ironic that GM was nationalized in 2009 even as Chrysler was being bailed out a second time. Moreover, there are also difficult aspects of fairness at play in such interventions: as AIG's former chairman noted in 2011, "Goldman Sachs, Morgan Stanley and others were permitted to become bank holding companies and have access to cheap federal funds, while AIG was denied this opportunity."[28]

The most that can be said in general is that, notwithstanding the general distrust of sector-specific government intervention, timely and decisive ad hoc interventions, including outright nationalization, can turn out well. At the same time, interventions inevitably raise many issues, including the way they can inhibit the market-based reallocation of production to more socially efficient uses; questions of fairness and equity; and the potential of moral hazard, meaning that firms may be encouraged to take excessive risks if they expect that the costs of their failure will be partially borne by others.

Does industrial policy work?

Empirical studies of industrial policy have not definitively settled questions about its general efficacy. There are many studies identifying cases of apparent success or failure but the counterfactual case is typically not established: perhaps successful ventures would also have done well without the policy interventions.

Indeed, systematic analysis of industrial policy writ large faces significant practical difficulties. First, consistent and comprehensive data sets on the wide range of formal and informal tools in the industrial policy tool kit simply do not exist. Second, the complex motivations behind government intervention are difficult to reduce to a single measure of success suitable for statistical testing. Third, controlling for the historical context in which a given industrial policy was used is problematic. Fourth, strategic goals often take considerable time to achieve, involve numerous complementary initiatives and may require persistence in the face of setbacks. At what point does one declare success or failure? As Rodrik notes, "The conceptual difficulties involved in statistical inference in this area are so great that it is hard to see how statistical evidence could ever yield a convincing verdict."[29]

At the same time, it is important to keep in mind that broader economic development is not easy. Only 35 of the 188 economies (or 19 percent) in the

data set of the International Monetary Fund's April 2013 *World Economic Outlook* are classified as "advanced," whereas the remaining 153 (or 81 percent) are classified as "emerging market and developing economies."[30] Over the past three decades industrial policy evidently was used but was generally de-emphasized. Assessments of the efficacy of industrial policy during this period are inconclusive; but by the same token, the evidence on the efficacy of *de-emphasis* of industrial policy is also inconclusive. The recent apparent revival of interest in proactive industrial policy should be understood in this light.

Current International Practice

United States

Like many countries, the US does not have a formally articulated industrial policy. Indeed, such a policy is incompatible with the prevailing American philosophy of free enterprise. Nonetheless, government influence over the evolution of its industrial structure is pervasive:

- The US has by far the largest military procurement budget in the world (equalling that of the next seven countries combined). This provides assured, price-insensitive demand for advanced systems across a wide range of areas.
- Government-funded advanced research has had important commercial spinoffs. For instance, the military's Defense Advanced Research Projects Agency created the precursor to the Internet.
- National security rationales have resulted in selective protection and promotion of specific sectors, such as shipping, which is protected by the *Jones Act*.
- Generally, as a country where special interests exert powerful influence over economic policy, the US adopts what is effectively industrial policy in its negotiating stance in international trade agreements: for example, its support for expanding intellectual property rights concessions is driven by pharmaceutical and entertainment-content stakeholder interests. The application of tariff policy is a form of industrial policy, as are selective bailouts of economically significant companies, including de facto nationalization of GM, AIG, Fannie Mae and Freddie Mac during the recent financial crisis by the Obama administration, the rescue of the US airline industry after 9/11 by the Bush administration, and of Conrail and Continental Illinois previously.
- At the state and local level, policies and industrial development initiatives inspired by Michael Porter's theories on local clusters are ubiquitous.[31]

In addition, the US has a spate of programs in the category of horizontal or soft industrial policy, particularly to promote small businesses; the Small Business Innovation Research program is one. The result is not necessarily a

coherent, well-defined industrial policy, but it amounts to a significant degree of government intervention in specific sectors, and thus in the overall structure of the US economy. Most importantly, the Obama administration has committed the full force of its "convening" power to bring together US public, scientific and industrial assets, backed by the power of its procurement capacity, to engage in the battle for future industries, as embodied in the Advanced Manufacturing Partnership.[32]

European Union

The European Union's approach to industrial policy as set out in its Europe 2020 strategy is orthodox, involving support for horizontal framework policies, albeit with some vertical elements, mainly in areas like sustainable development (climate change and energy) and innovation. Even in these areas, interventions are self-consciously horizontal.

At the same time, the European Commission has floated the idea of a "fresh approach" to industrial policy, predicated on the view that "Europe needs industry."[33] The key areas where sector-specific initiatives are proposed are space manufacturing; clean and energy-efficient vehicle technologies; pharmaceutical and health-care-related industries; value chain participation in chemicals, textiles and creative industries; transition to a low-carbon economy in the energy-intensive industries such as steel, nonferrous metals, paper and chemicals; and strengthening the industrial dimension of the European Union's innovation policy.

More recently, the prolonged recession in the eurozone has added a sense of urgency: "Several new technology areas are converging to lay the foundation of the new industrial revolution based on green energy, clean transport, new production methods, novel materials and smart communication systems. These will change the global industrial landscape and our competitors in the U.S. and Asia are investing heavily in these areas. Europe needs new industrial investment at the time when lack of confidence, market uncertainty, financing problems and skills shortages are holding it back." The European Commission is now talking about reindustrialization and about mobilizing all instruments available.[34]

Within the EU framework, member states have considerable leeway to implement their own policies, and there is considerable variation in national approaches. The United Kingdom, for example, has generally championed horizontal business framework policies while expressing its industrial policy through the regional development agencies, which have promoted science parks, high-technology incubator facilities and clusters. However, Vince

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Cable, the business secretary in the coalition government of David Cameron, has reintroduced sectoral policies into British political economy discourse, and British industry has responded enthusiastically, promising to hold the government accountable for the development, over the course of 2013, of strategies for 11 sectors in which British industry sees Britain as having competitive advantage.[35]

France, which has a history of economic *dirigisme* (sometimes referred to as "Colbertism"), looks back with nostalgia at the *trente glorieuses* (30 glorious years) of uninterrupted postwar expansion, 1945-75, a period in which France launched a range of ambitious state-led *grands projets* linked in the public mind with transforming a largely rural economy into an industrial power.[36] There were, of course, disappointments (such as the Concorde), but there were also the transformative successes: the TGVs (*trains à grandes vitesses*), as well as Airbus and Arianespace, which now control more than 50 percent of the global market for large-body civil aircraft and space launches, respectively. France moved away from intervention in the 1980s, but concerns about deindustrialization led to an about-face in the mid-2000s and an attempt "to reinvent the magic of high tech Colbertism."[37] The result has been a spate of initiatives, including regional cluster programs (*pôles de compétitivité*) and the establishment of an industrial innovation agency, a national research agency and the OSEO program for the promotion of small and medium firms. The most prominent outcome of the new industrial policy in France in the postcrisis era was Nicholas Sarkozy's *grand emprunt* (big loan), a €35 billion scheme supporting investment in research in priority high-tech sectors. French policy under the François Hollande government remains unclear, although it is tending toward more stimulus at this writing.

Germany, which had seen its industrial model, known as Modell Deutschland, come under heavy criticism in the 1990s and early 2000s, turned heads by grabbing top spot for merchandise exports from the mid-2000s on, until being finally surpassed by China in 2009. The strength of the German system is rooted in its deep institutionalization, including the network of quasi-public research institutes, such as the Fraunhofer Society, which support innovation; the training and apprenticeship system; and patient finance from banks with close ties to the industrial sector as well as from quasi-public financial institutions. Germany's decentralized governance system has also generated a spate of often overlapping economic policies aimed at competitiveness, including the conventional horizontal initiatives to improve the framework for business combined with initiatives in key infrastructure sectors, most notably in the transportation and logistics sector; initiatives to promote the information

society and small business; and, perhaps most importantly, its high-tech strategy. Its main operational feature involves vertical interventions such as a set of multiyear funding programs in 17 fields (biotechnology, nanotechnology, information and communications technologies, medical technologies, environmental technologies, space technologies, aircraft technologies and others), which are regularly relaunched and redesigned through a competitive tender system.

East Asia

While in the West, open use of industrial policy has waxed and waned, in Asia, it has never gone away. East Asian economies feature deep ties among government, finance and industry:

- Japan's deeply rooted, centuries-old cultural links among government, finance and industry today are manifest in the *keiretsu* system, best illustrated by Toyota, now the world's leading automaker.
- Similar links are manifest in Korea's *chaebol*, or conglomerates. The prime example, Samsung, has recently become the world's leading electronics manufacturer.
- Singapore's massive sovereign wealth funds — the Government Investment Corporation and Temasek Holdings, controlled by the finance ministry — might be better characterized as engaged in industrial investment than in industrial policy.

While the role of vertical policies in Asia's industrialization has been disputed because various economies followed a wide variety of policies but achieved similarly strong growth,[38] the central feature of the East Asian model — the underwriting of investment risk by the public sector — is alive and well, as the policies in the region's largest economies show.

China's declared goal of moving up the technology value chain is being pursued relentlessly. This goal is being supported by a panoply of measures, including fiscal incentives such as grants or preferential financing to "encourage" industries in higher-technology exports; strategic use of government procurement and standard setting; incentives to attract human resources, including expats who have acquired expertise abroad; provision of specific infrastructure; and direct investment in what are seen as key technology sectors.[39] Under the latter policy, China has established over 50 national laboratories located in enterprises producing digital televisions, next-generation Internet, advanced-generation LCD panels, large-scale integrated circuits, regional aircraft and other products targeted for development in China's current economic plan.

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Meanwhile, Japan recently declared its intent to renew the "Japan Inc." model and announced a strategy to promote five strategic sectors: infrastructure, environmental products, medical services, cultural industries and new fields such as robotics and space. As a reminder of the staying power of Asian business-government relations, the Mitsubishi Regional Jet, which is to take flight this year, is the result of the long, slow reentry of Japan into aircraft production; this drive started with a commercial flop in the 1960s that nonetheless gained Japan a partnership deal with Boeing.[40] This arrangement was followed by decades of building up a supply chain relationship with Boeing, all supported by an infusion of US$1.6 billion over the years by the Japanese government.

India

For three decades after its independence, India pursued a comprehensive industrial policy that has been disparagingly dubbed the "licence-permit-quota raj" by Indian statesman Chakravarti Rajagopalachari because of the pervasive intrusion of administrative hurdles and government controls into every area of industrial activity.[41] The aim was rapid industrialization, but it proved elusive. India embarked on piecemeal reforms in the 1980s, but after a balance of payments crisis in 1991, it began to dismantle this system much more aggressively. Yet, despite much liberalization, the extent of industrialization has disappointed and India's policy-makers continue to develop plans to promote manufacturing. Thus, industrial policy still figures prominently at the national level in India and perhaps even more so at the regional level. For example, the Indian state of Karnataka (whose capital is Bangalore), home to the global giants Infosys and Wipro, was the first to adopt a comprehensive industrial policy in 1982 and is now concluding its seventh such plan. It unabashedly tries to pick winners with specialized industrial infrastructure for specific special economic zones, such as multiproduct, product-specific, sector-specific and free trade zones.

Canada's Approach to Industrial Policy

Historically, Canada was an active user of industrial policy, but as the country developed, it gradually shifted away from vertical toward horizontal measures. The roots of Canada's policy orientation go back to the trade shocks suffered from the loss of imperial preferences after Britain repealed the Corn Laws in 1846 and after the US abrogated the Reciprocity Treaty with Canada in 1866. These events not only drove Canada to Confederation but also led to the 1879 National Policy of Sir John A. Macdonald, which shaped Canadian economic policy for much of the next century.

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The two world wars and the intervening Great Depression led to an expanded role for the Canadian government in the economy, including the formation of the Canadian National Railway (CNR) through amalgamation of several bankrupt private carriers in 1919, the founding of the forerunner of the Canadian Broadcasting Corporation in 1932 and the creation of Trans-Canada Air Lines (which became Air Canada) in 1936.

Emerging from the Second World War with strong revenue growth due to tax structures developed to finance the wars, Canada's government did not hesitate to step into any breach, sector-specific or otherwise. In 1946, the Central Mortgage and Housing Corporation (now called Canada Mortgage and Housing Corporation) was established to meet the housing needs of troops returning from abroad, and the Canadian Commercial Corporation was set up to promote exports.

However, as early as the 1960s it was recognized that key problems confronting Canada's industry — including an excessively domestic orientation, too small a scale of operation and poor management — ultimately required opening up to international trade and thus to greater competition. During the same era, concern arose that foreign ownership was holding back Canada's innovation. Steps toward freer trade (the Auto Pact, trade liberalization in the General Agreement on Tariffs and Trade and Pierre Trudeau's "third option" push to diversify Canada's export markets) were accompanied by several government interventions. These policies included the creation of the Department of Industry in 1963, followed by the Department of Regional Economic Expansion, the Ministry of State for Science and Technology, and the Export Development Corporation. In addition, the government invested heavily in specific industries through its Crown corporations. Despite this panoply of government actions, however, as the Science Council of Canada put it in 1972, Canada lacked a coherent industrial strategy: indeed, there was considerable discomfort with openly espousing industrial policy.[42]

Canada's approach, which had allowed for government intervention in the 1960s and 1970s, was greatly modified in Brian Mulroney's privatization initiative of the 1980s but did not entirely disappear. Canada entered the 1980s with an impressive arsenal of industrial policy and an even more impressive portfolio of industrial holdings. At the time, Canada had 67 parent Crown corporations, which in turn had 128 wholly owned subsidiaries with combined assets valued at $50 billion. Of these, 32 Crown corporations, including 19 belonging to the federal government, were in the *Financial Post*'s top 500 Canadian corporations. In addition, the federal government had significant equity positions in an additional 22 companies, as well as portfolio investments in over 100 companies and affiliates; these assets, held through

its 47 percent controlling interest in the Canada Development Corporation, were worth $8 billion.[43]

The privatizations of the 1980s did not break up government monopolies; rather, they created the nationally branded companies of Bell Canada, Air Canada, CN, Via Rail and others. The sale of Canadair to Bombardier, which went along with a $1.7 billion contract to service Canadian Forces CF-18s, paved the way for Bombardier's entry into the aerospace-defence sector. Subsequent acquisitions by Bombardier of a series of troubled aerospace firms established Canada as the fourth-largest aerospace provider in the world.

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Moreover, even as Canada negotiated the free trade agreement with the US in the late 1980s, policies were put in place to ensure that a proportionate amount of R&D would be undertaken in Canada's pharmaceutical sector. Similarly, the Industrial and Regional Benefits program instituted in 1986, building on earlier defence-sharing arrangements with the US, required firms winning Canadian government defence contracts to make investments in advanced-technology sectors of the Canadian economy in an amount equal to the contract value. Lockheed Martin was required to let contracts worth $2.3 billion to Canadian firms related to its contract to supply the Canadian Forces with Hercules military aircraft.

Through the 1990s and the 2000s, until the recent crisis, Canada's economic policy remained squarely within the OECD consensus, with no articulated industrial policy per se and a focus on economic framework issues. The latter were pursued largely through nominally neutral policies such as R&D tax credits that were in principle available to all, together with an admixture of cluster and national competitiveness policies, such as the Advantage Canada economic plan designed in 2006 by the first Harper government.[44]

The main exception to this rule over the past decade was a clearly articulated intent to promote a knowledge-based economy in Canada. Other elements of verticality in Canada's policies occurred in the area of government procurement, as with participation in the international Joint Strike Fighter development; in the tax code for research and development, which provides benefits that flow disproportionately to firms in R&D-intensive sectors; in programs such as the Strategic Aerospace and Defence Initiative, a refundable R&D grant program that supports industrial research and precompetitive development projects in the aerospace, defence, space and security industries; in the programs of the regional development agencies that necessarily focus on regional areas of specialization; and in the remaining Crown corporations, such as the Canadian Space Agency.

In general, Canada was relatively successful in its framework policies and was ranked in the middle of the pack of the advanced countries in various international benchmarking exercises, though it lagged persistently on its major declared policy target of innovation.[45]

During the global financial crisis, the Canadian government "bailed in" by joining the rescue of North American auto firms and committed massive resources to backstop the financial sector. And notably, consistent with Canada's historic eclecticism, the 2013 federal budget included a policy framework to support manufacturing as the second item on its priority list.[46] While some of the announced measures remain horizontal in nature (such as the extension for two years of the accelerated capital cost allowance for new investment in machinery and equipment in the manufacturing and processing sector), some are distinctly sectoral, such as the aerospace initiative and shipbuilding.

Implications for Canada

When it comes to industrial policy, both Canada and the United States generally claim they don't do it (but they do engage in an awful lot of things that look like it), Europe acknowledges that it does it but doesn't inhale (only horizontal measures, please), and in Asia it is as normal as wine on a European dinner table.

In a world in which sectors are highly heterogeneous in their externalities and investment risk/return profiles, the theoretical case for industrial policy rests on well-established distinctions between the public and private sectors. The public sector can capture positive spillovers; it can, if it chooses, adopt a longer time horizon for its investment; and in contrast to risk-averse private capital, it has little choice but to provide support or "bail in" precisely when private capital is bailing out.

The case against government involvement in industrial activity boils down to two major concerns: distortion and ineffectiveness.

Concerns about distorting the free market allocation of resources are ultimately based on implicit denial that the above distinctions exist or, alternatively, on the contention that if they exist, they are of limited significance, and the cost of raising taxes to fund the corrective public sector activity is greater than the benefit. Readers of this article, who have probably downloaded it from the Internet and are reading it on a laptop or tablet computer, perhaps on an airplane powered by Rolls-Royce engines, are invited to consider the significance or insignificance of these innovations, all of which are by this account "distortions."

The claim of ineffectiveness is more serious. The OECD consensus on the role of government in industrial activity is based on a distillation of experience across a large number of countries that conducted many natural experiments, with varying degrees of success and, as noted above, many failures — often in interventions motivated by purely political considerations. Success is the ultimate pole of attraction, and for some time the OECD consensus held sway precisely on this account, perhaps not least by getting governments to tie their hands and refrain from undue meddling.

By the same token, however, the apparent cracks in the consensus are also based on experience: the advanced countries have had less than 2.5 percent real growth over the past five years and much of the OECD world is in fiscal or economic crisis. Meanwhile, China has grown by 55 percent over that period and India by 40 percent. The market economy with OECD characteristics has met the market economy with Asian characteristics in the context of a global economic environment characterized by high-risk and rapid, perhaps transformative change. It is the market economy with Asian characteristics that is powering ahead, and policy-makers in OECD countries are now taking notice and groping for policy responses.

Canada is again engaging actively and openly in its industrial policies; however, as in the past, it has a profusion of industrial policies but no industrial strategy.

Canada has a long history of pragmatic use of public policies to support industrial development that reflect the many "Canadian realities": the tyrannies of small economic size and large geographic expanse; the challenges of climate, cultural pluralism and head-to-head competition with the world's largest economy next door. Canada is again engaging actively and openly in industrial policy — in the energy sector, in manufacturing and in defence-related industries such as shipping and aerospace. However, as in the past, Canada has a profusion of industrial policies but no industrial strategy.

For our competitors, the next frontier and battleground industries are hardly secrets. The United States has stated which industries it is "not prepared to concede"[47] to its competitors; the European Union has written down its list, as has Japan. China, of course, has long had a general plan and has put the full weight of its state-owned enterprises, its fiscal clout and its domestic regulatory policy toward achieving its goals.

The characteristics of industries where policy support is essential are also well understood:

- those that create strong local positive economic spillovers (such as manufacturing, energy supply, transportation and infrastructure, and already established clusters);

- those with high fixed costs to entry, substantial need for sustained R&D and significant financial risks (such as new technologies and new energy sources); and
- sectors where other countries are actively tilting the playing field in their own favour (such as advanced manufacturing).

But the tyranny of its small size means that Canada should look within these broader areas to those where it has already revealed advantages. Canada's specific context and challenges have generated some niche capabilities that give it the potential to be a world leader. Montreal is a leading centre for translation services, Canada has world-class expertise in long-distance energy transmission, and there are many other examples.

A key challenge for Canadian public policy is to come to terms with these new realities and to better define where Canada should place its bets in a globally competitive marketplace to win a viable share of next-generation industries.

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