

PART 2

Defending Our Rights

How we got here: The evolution of Canadian IP rights and their economic impact

Richard C. Owens with Michael Robichaud

JUNE 2017



True North in
Canadian public policy



True North in
Canadian public policy



Board of Directors

CHAIR

Rob Wildeboer

Executive Chairman, Martinrea International Inc.

VICE CHAIR

Jacquelyn Thayer Scott

Past President and Professor,
Cape Breton University, Sydney

MANAGING DIRECTOR

Brian Lee Crowley

SECRETARY

Lincoln Caylor

Partner, Bennett Jones LLP, Toronto

TREASURER

Martin MacKinnon

CFO, Black Bull Resources Inc., Halifax

DIRECTORS

Pierre Casgrain

Director and Corporate Secretary of Casgrain
& Company Limited

Erin Chutter

President and CEO of Global Cobalt Corporation

Laura Jones

Executive Vice-President of the Canadian Federation
of Independent Business (CFIB).

Vaughn MacLellan

DLA Piper (Canada) LLP

Advisory Council

John Beck

Chairman and CEO, Aecon Construction Ltd., Toronto

Navjeet (Bob) Dhillon

President and CEO, Mainstreet Equity Corp., Calgary

Jim Dinning

Former Treasurer of Alberta

Hon. David Emerson

Former federal cabinet minister, corporate director
and public policy adviser

Richard Fadden

Former National Security Advisor to the Prime Minister
and former Deputy Minister of National Defence

Brian Flemming

International lawyer, writer, and policy advisor

Robert Fulford

Former Editor of Saturday Night magazine, columnist with
the National Post

Wayne Gudbranson

CEO, Branham Group Inc., Ottawa

Stanley Hartt

Counsel, Norton Rose LLP

Calvin Helin

International speaker, best-selling author, entrepreneur
and lawyer.

Peter John Nicholson

Former President, Canadian Council of Academies, Ottawa

Hon. Jim Peterson

Former federal cabinet minister, Counsel at Fasken
Martineau, Toronto

Maurice B. Tobin

the Tobin Foundation, Washington DC

Research Advisory Board

Janet Ajzenstat

Professor Emeritus of Politics, McMaster University

Brian Ferguson

Professor, Health Care Economics, University of Guelph

Jack Granatstein

Historian and former head of the Canadian War Museum

Patrick James

Professor, University of Southern California

Rainer Knopff

Professor of Politics, University of Calgary

Larry Martin

Principal, Dr. Larry Martin and Associates and Partner,
Agri-Food Management Excellence, Inc.

Christopher Sands

Senior Fellow, Hudson Institute, Washington DC

William Watson

Associate Professor of Economics, McGill University

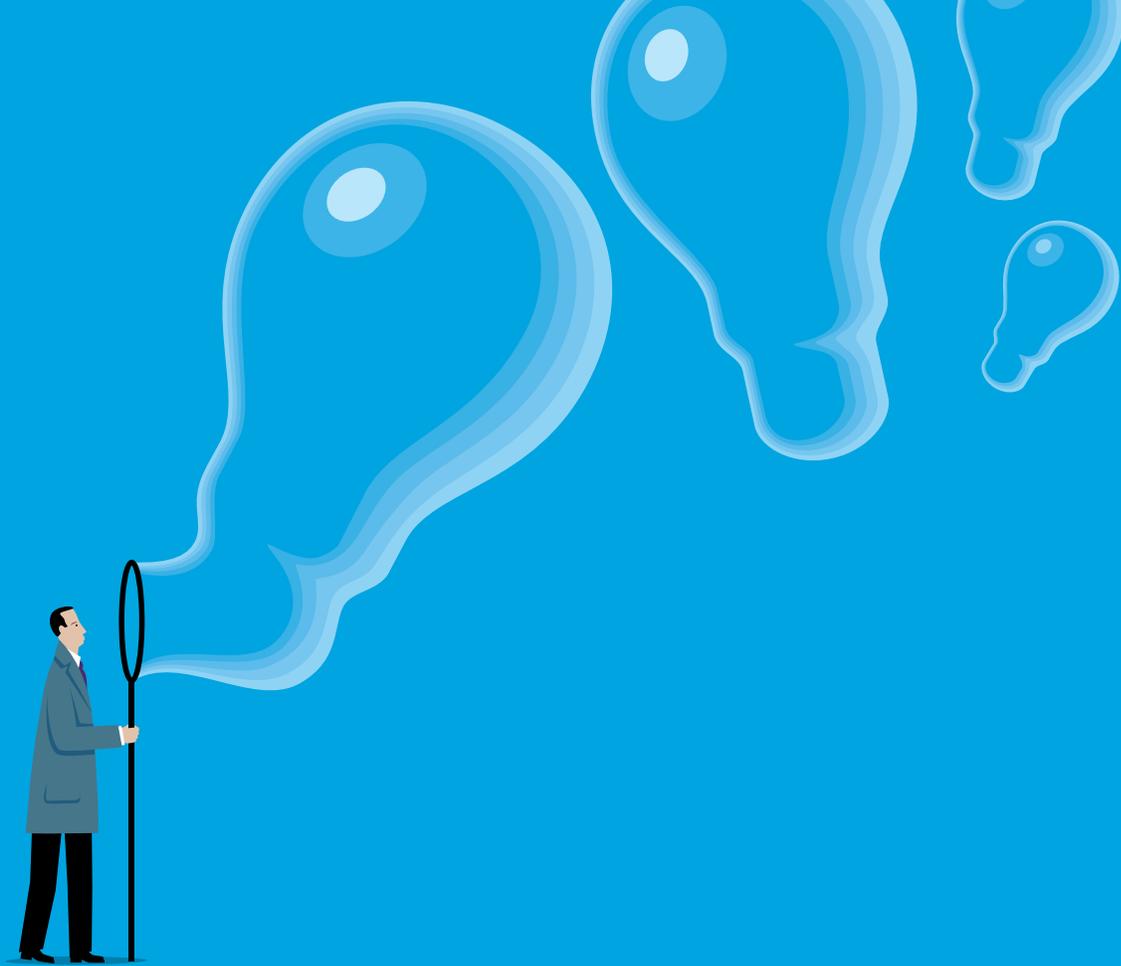


Table of Contents

Executive Summary.....	2
Sommaire	3
Introduction.....	5
Intellectual Property in Canadian Trade and Commerce.....	6
Response of the Canadian Economy to IPRs	14
The Recent Development of Intellectual Property Laws in Canada.....	23
Milestones in Canadian Intellectual Property Policy	25
Conclusions	26
About the Authors	28
References	29
Endnotes	35

The authors of this document have worked independently and are solely responsible for the views presented here. The opinions are not necessarily those of the Macdonald-Laurier Institute, its directors or supporters.

Executive Summary

The importance of intellectual property to the Canadian economy is beyond dispute, and as the first paper in this series by the Macdonald-Laurier Institute firmly establishes, there is a very strong correlation between intellectual property protection and economic benefits. Not only that, there is a strong moral case for defending the rights of Canada's creators and innovators.

This second paper examines the history of IP rights in Canada and the impact on Canadian industry, and concludes that the driving force behind IP policy should be Canadian innovation. Serious reform has been relatively recent, enacted in an attempt to bring Canada into an increasingly digital era. Between 1921 and 1988, the *Copyright Act* remained largely unchanged. Trade has also liberalized over that time, and Canada's IP laws have had to catch up to international norms.

Strengthened IP policies have generally correlated with gains in most measures of an innovative economy over the last 30 years. To take one example, reforming drug patent terms has been associated with an estimated \$4.4 billion increase in pharma R&D spending in the period 1988–2002.

Even so, recently there has been cause to doubt Canada's commitment to IP protection. *The Copyright Modernization Act 2012* in particular showed a worrisome tendency to limit copyright, not to sustain its critical protections. The judicial branch, in the form of the Supreme Court of Canada, similarly has reawakened from its long slumber on IP issues to come up with a series of doctrinally wrong and unfortunately IP-unfriendly judgments.

We may be feeling the effects. For example, private sector R&D spending has shown a recent decline after years of growth. Canada is behind in R&D spending and patenting activity relative to its OECD counterparts.

In support of stronger IP policy, BlackBerry co-founder Jim Balsillie recently urged Canadians to compare this country's IP policies with those of the US over the last 30 years: "If Canada performed similarly, our economy would now be generating an extra \$100-billion annually."

And so the federal government's recent commitment to develop an "intellectual property strategy" is welcome. This is not to be confused with a "made in Canada" approach that defies international norms, as some critics, including at times Mr. Balsillie, would have it. IP, because of its heavy impacts on trade and because its rules derive from international treaties to a very great extent, is about international standards and developments, not sheltered parochialism.

Part of the justification for weakening IP protections or only targeting certain industries for strengthening them is that Canada is a consumer of IP protected goods and services, not a producer. The data don't bear this out. Canada has a slight trade *surplus* in copyright protected goods and services. And while Canada imports more than it exports in high-technology goods, the deficit is not high in proportion to the total trade of around \$200 billion annually. We need to further encourage such high-volume trade, not worry about whether or not it happens to be in deficit.

The key takeaways from this analysis are:

- Canada is in a surplus in trade in copyright goods and services and has only a relatively small deficit in patented ones. Any attempt to manipulate IP policy as though Canada were essentially an IP-importing, less-developed country would be a complete mistake.
- Trade balance is fluid, reflecting consumer choice and comparative advantage, and should not affect IP policy.
- Any negative trade balance initiated by strengthening IPRs is only temporary and will be overcome by increases in domestic innovation.

- Stronger IPRs encourage foreign direct investment, resulting in technology diffusion and productivity improvements.
- Pharmaceutical R&D devolves to smaller firms, as does high-tech innovation, and smaller firms benefit disproportionately from stronger IPRs.
- Canada's patent-protected outputs have grown over the last 30 years, coincident with the strengthening of Canada's patent regime.

The first paper in this series recommends eliminating copyright term limits or at least bringing them up to international standards; broadening the range of patentable subject matter; facilitating patenting by small- and medium-sized enterprises; and implementing recent trade agreements.

To this we would add a fifth recommendation: The government should **recognize that an alleged trade deficit in IP-related goods is not a sound basis on which to weaken IP protection**. Indeed, it is a basis to strengthen IP protection.

A review of the history of Canadian IP policy reveals that its development has been largely coupled with trade policy. It has generally strengthened over recent years, but in a reactive rather than proactive manner (and slowly reactive at that). Hence the current government's plan for a new "IP strategy" in response to Canada's innovation economy needs is refreshing.

The driver for that IP policy should be innovation in Canada. It should not be about reducing drug prices, addressing trade imbalances, increasing the public domain, or redressing perceived injustices of property rights. It should be made for Canada, not made in Canada.

Sommaire

L'importance de la propriété intellectuelle pour l'économie canadienne est incontestable et, comme le démontre avec autorité le premier document de cette série de l'Institut Macdonald-Laurier, la protection de la propriété intellectuelle et retombées économiques vont habituellement de pair. Qui plus est, défendre les droits des créateurs et des innovateurs canadiens se justifie pleinement du point de vue moral.

Ce deuxième document porte sur l'histoire et les répercussions sur l'industrie canadienne des droits de propriété intellectuelle (PI) au Canada avec, en guise de conclusion, une invitation à faire de l'innovation l'élément moteur des politiques en la matière. Les efforts de réforme sérieuse, qui ont cherché à faire accéder le Canada à une ère de plus en plus numérique, sont relativement récents. Entre 1921 et 1988, *la Loi sur le droit d'auteur* est demeurée essentiellement intacte. Le commerce étant devenu plus ouvert durant cette période, les lois sur la PI au Canada devaient donc rattraper les normes internationales.

Au cours des trente dernières années, le renforcement des politiques en matière de PI a généralement été étroitement corrélé avec l'amélioration de la plupart des mesures d'une économie innovatrice. À titre d'exemple, de 1988 à 2002, sur fond de réforme du régime des brevets sur les médicaments, les dépenses en R et D dans le domaine pharmaceutique ont connu une progression estimée à 4,4 milliards de dollars.

Malgré cela, il y a eu lieu de douter de l'engagement récent du Canada à l'égard de la protection de la PI. *La Loi sur la modernisation du droit d'auteur* de 2012, en particulier, a démontré une tendance inquiétante à restreindre le droit d'auteur plutôt qu'à renforcer ses éléments critiques. Le pouvoir judiciaire, par l'entremise de la Cour suprême du Canada, s'est également animé après un long silence sur les questions de la PI, rendant une série de jugements contraires à une saine doctrine et malheureusement hostiles à la PI.

Nous en ressentons peut-être les effets. Par exemple, les dépenses du secteur privé en R et D ont baissé récemment, après des années de croissance. Par rapport à ses homologues de l'OCDE, le Canada tire de l'arrière en ce qui a trait aux dépenses en R et D et aux prises de brevets.

Favorable à une politique plus forte en matière de PI, le cofondateur de BlackBerry, Jim Balsillie, a récemment invité les Canadiens à comparer nos politiques de PI avec celles des États-Unis depuis trente ans : « Si le Canada agissait de façon parallèle, cent milliards de dollars de plus seraient injectés dans l'économie du pays chaque année ».

L'engagement récent pris par le gouvernement fédéral pour élaborer une « stratégie de la propriété intellectuelle » vient donc à point. Il n'y a pas lieu de confondre cet engagement et l'approche contraire aux normes internationales « made in Canada », comme ont fait certains commentateurs, y compris M. Balsillie par moments. En raison de ses imposantes retombées sur le commerce et parce que ses règles sont établies dans une très large mesure par des traités internationaux, la PI est une question de normes et de développement international, et non pas de repli sur soi.

On justifie en partie les actions visant à affaiblir la protection de la PI ou à la mettre en œuvre uniquement dans certaines industries par le fait que le Canada est un consommateur de biens et de services protégés par la PI, et non pas un producteur. Les données ne confirment pas cette hypothèse. Le Canada enregistre un léger *excédent* commercial en biens et en services protégés par un droit d'auteur. Aussi, si le Canada importe plus de biens de haute technologie qu'il n'en exporte, le déficit à ce chapitre est disproportionné par rapport à la valeur de nos échanges avec l'étranger, qui s'élèvent à 200 milliards de dollars annuellement. Nous devons favoriser encore plus ces échanges à haut volume, et non pas nous préoccuper du fait que des déficits se produisent ou sont évités.

Les faits saillants de cette analyse sont les suivants :

- Le Canada enregistre un excédent commercial en biens et en services protégés par un droit d'auteur et seulement un déficit relativement faible en médicaments brevetés. Toute tentative d'altérer la politique de la PI en faisant appel à des motifs discutables, comme si le Canada était essentiellement un pays en développement importateur de PI, constituerait une erreur.
- La balance commerciale est malléable, ce qui reflète l'expression des choix des consommateurs et notre avantage comparatif. Elle ne doit donc pas être un facteur à considérer dans la formulation des politiques en matière de PI.
- Une balance commerciale qui réagit négativement au renforcement des droits de propriété intellectuelle (DPI) n'est qu'un phénomène momentané, rapidement surmonté grâce à l'augmentation de l'innovation nationale.
- Des DPI forts favorisent les investissements étrangers directs, ce qui élargit la diffusion de la technologie et renforce la productivité.
- La R et D dans le domaine pharmaceutique est dévolue à des entreprises plus petites, de même que l'innovation dans la haute technologie, alors même que les entreprises les plus petites bénéficient de façon disproportionnée de DPI renforcés.
- Les produits canadiens protégés par des brevets sont plus nombreux depuis trente ans, ce qui coïncide avec le renforcement du régime de brevets.

Le premier document de cette série recommande de supprimer les limites dans le temps des droits d'auteur ou au moins de les aligner sur les normes internationales; d'élargir l'étendue des domaines brevetables; de faciliter les prises de brevets par les petites et moyennes entreprises; et de mettre en œuvre les accords commerciaux récemment conclus.

Nous ajoutons maintenant une cinquième recommandation : Le gouvernement doit **reconnaître qu'un déficit commercial allégué en biens protégés par la propriété intellectuelle est hors de propos aux fins d'affaiblir la protection de la PI**. En effet, l'argument devrait au contraire servir à renforcer la protection de la PI.

L'examen de la politique de la PI au Canada révèle que son histoire a été en grande partie associée à la politique commerciale. Elle s'est généralement renforcée au cours des dernières années, mais d'une manière plutôt réactive que proactive (et a évolué très lentement). Le plan actuel du gouvernement pour une nouvelle « stratégie en matière de propriété intellectuelle » axée sur les besoins de l'économie de l'innovation canadienne est donc rassurant.

Le moteur de la politique en matière de PI doit être l'innovation au Canada. La politique ne doit pas simplement chercher à réduire le prix des médicaments, résorber les déséquilibres commerciaux, élargir le domaine public ou réparer les injustices perçues à l'égard des droits de propriété. Elle doit être définie pour le Canada, et non pas en faveur d'un « made in Canada ».

Introduction

In its March 2017 budget, the Government of Canada promised a renewed intellectual property rights strategy. Intellectual property rights (IPRs) are critical to any innovation economy, and an important non-fiscal policy lever. They don't cost the government anything. Strong IPRs correlate highly with favourable innovation outcomes. This seems to be true at any stage of economic development, but, as studies show, it is particularly so for an advanced and open economy like Canada's. It is also particularly true for an economy so populated by small- and medium-sized enterprises (SMEs) as is Canada's. IP is critical for innovative SMEs to have a fighting chance dealing with larger firms, as well as to increase their access to capital. It is critical, generally, to improve Canada's innovation economy.

And Canada needs to do better at innovation. To quote former Research in Motion co-CEO Jim Balsillie (2017):

Fast-forward to today and Canada has achieved zero growth in our innovation outputs despite hundreds of billions of taxpayers' dollars spent on inputs. Compare that with the United States, which relentlessly built 21st-century policy infrastructure and saw its innovation productivity grow at 1 per cent per annum over the past three decades. If Canada performed similarly, our economy would now be generating an extra \$100-billion annually.

We differ generally with Mr. Balsillie's analysis of Canada's intellectual property (IP) policies, but in his recognition of our innovation deficiencies he is right. From our perspective, we want to see created a solid, strong IPR infrastructure for the 21st century.

This paper, second in a series of three, builds on the themes of the first. We examine the impacts of trade and foreign investment on IP policy in Canada, and examine how research proves that the particular characteristics of the Canadian economy make it best suited to a policy of strong IPRs. We examine the innovation economy of Canada as a whole, and also in particular the pharmaceutical and information and communications technology (ICT) sectors. This paper also sets out a recent history of Canada's main IP laws, to demonstrate that they have evolved primarily in response to international treaties, and to demonstrate that the trend has been to strengthen IP protection.

In the first paper of this series, we reviewed how IPRs are strongly justified philosophically and morally, under theories of Lockean entitlement to products of labour, and Hegelian and Kantian theories of personality. We also demonstrated that IPRs are essential for utilitarian reasons, as incentives to the creation, disclosure, and distribution of IP. They are important signals, reducing cost of capital to SMEs. They facilitate firm formation as well as collaboration among firms.

Various critiques of IPRs were discussed in the first paper and dismissed. One such critique is offered by critics who argue against international IP norms, in favour of a "made in Canada" approach. This

“made in Canada” approach however is poorly defined, and no coherent explanation is offered of how Canada is so different as to demand a radically different approach to IPRs. IP, because of its heavy impacts on trade and because its rules derive from international treaties to a great extent, is about international standards and developments, not sheltered parochialism.

The Canadian government has most recently tacked somewhat in the wrong direction on IP, away from traditional protections. The recent *Copyright Modernization Act* (CMA) in particular showed a worrisome tendency to limit copyright, not to sustain its critical protections. The judicial branch, in the form of the Supreme Court of Canada (SCC), similarly has reawakened from its long slumber on IP issues to come up with a series of doctrinally wrong and IP-unfriendly judgments. Internationally, Canada has faced criticism for its IPR performance with middling rankings in international indices and studies that have demonstrated Canada’s continual poor showing in terms of innovation and IP production.

In the first paper we demonstrated strong economic and theoretical evidence for the incentive effects of IP. Turning now to the perspectives – trade and economics – of this paper, we will see how consistent the policy recommendations that flow are with those of the last paper.

Intellectual Property in Canadian Trade and Commerce

Trade

Although data on copyright policy and its economic outcomes are elusive (Towse 2013),¹ several empirical studies have attempted to gauge the importance of copyright to the Canadian economy. Some of these studies have looked at the total output value of so called “creative industries”. The Conference Board of Canada estimates that the arts and culture industry contributes about 7.4 percent to Canada’s real GDP, and employs roughly 1.1 million people (Cowan 2015). This is a significant contribution, without accounting for the substantial contributions of more technical, copyright-dependent industries – software and electronic gaming. Pure technology, protected by patents primarily, is not the only innovation game, and the technologists and the artists are, of course, increasingly interpenetrating the worlds of one another.

Copyright industries are important in Canada’s trade, as well. Recent data from Statistics Canada demonstrate a considerable trade surplus in trade in copyright industry services, such as advertising and computer systems design (see table 1).²

TABLE 1 Commercial services transactions for the copyright industry, 2007–2014

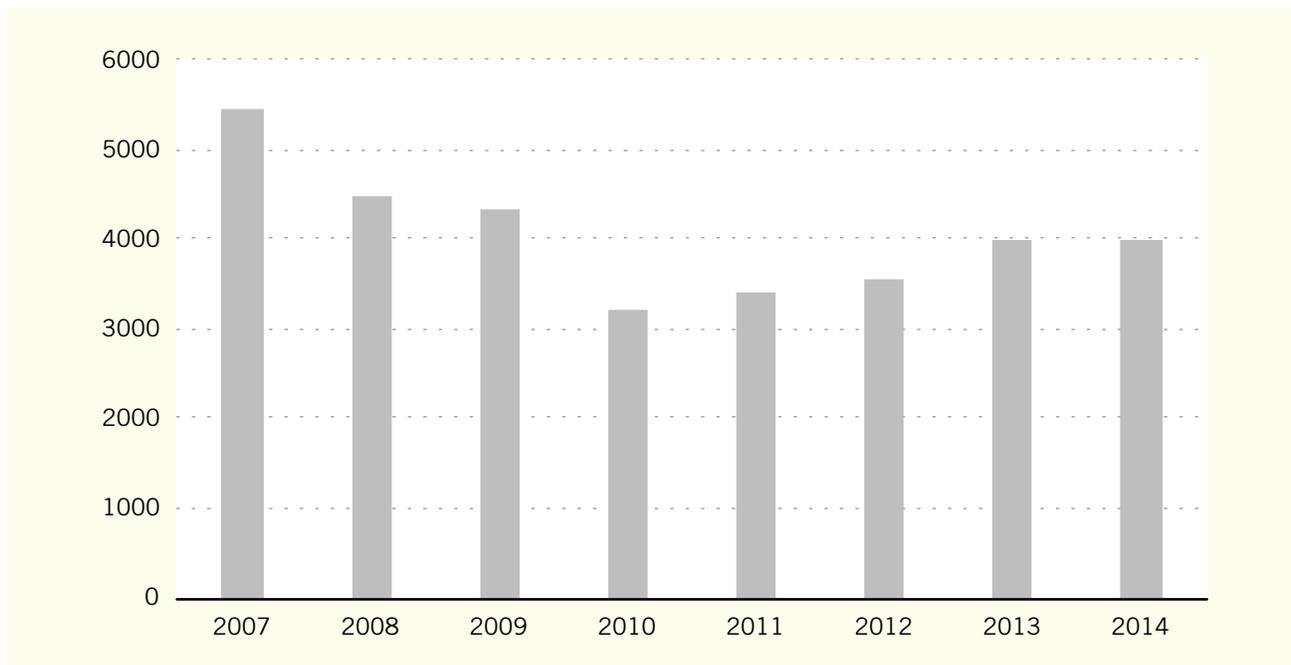
Commercial services transactions for the “copyright” industry*	IN MILLIONS OF DOLLARS							
	2007	2008	2009	2010	2011	2012	2013	2014
Receipts (exports)	9,652	10,391	11,676	10,760	11,698	12,809	13,193	15,014
Payments (import)	4,186	5,889	7,368	7,533	8,316	9,271	9,207	11,023

*Copyright industry covers NAICS 511, 512, 5151, 5415, 5418, 711, and 712

Source: Personal correspondence with Denis Caron of Statistics Canada.

Data from Trading Economics show the same thing (see chart 1).

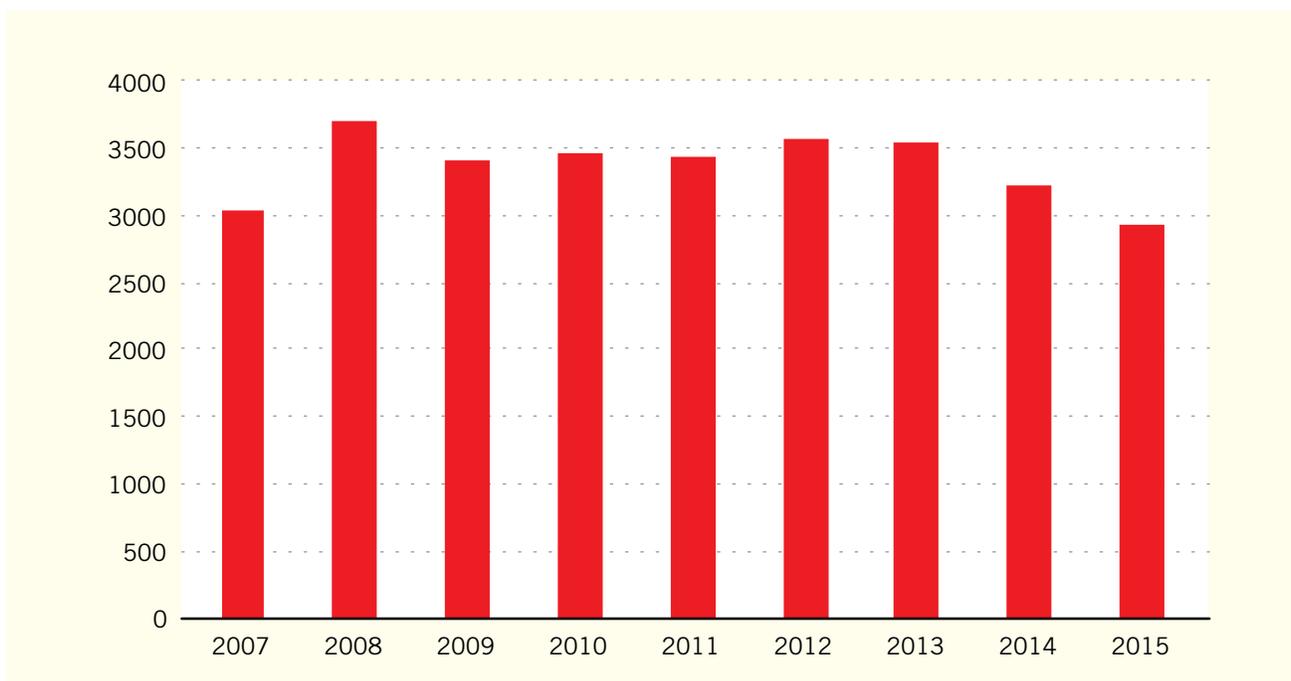
CHART 1 Canada's balance of trade in copyright related commercial services, 2007–2014 (CAD millions)



Source: Data from www.tradingeconomics.com.

Copyright-related goods such as books, movies, and games offer a somewhat different picture, one of a declining deficit (see chart 2).

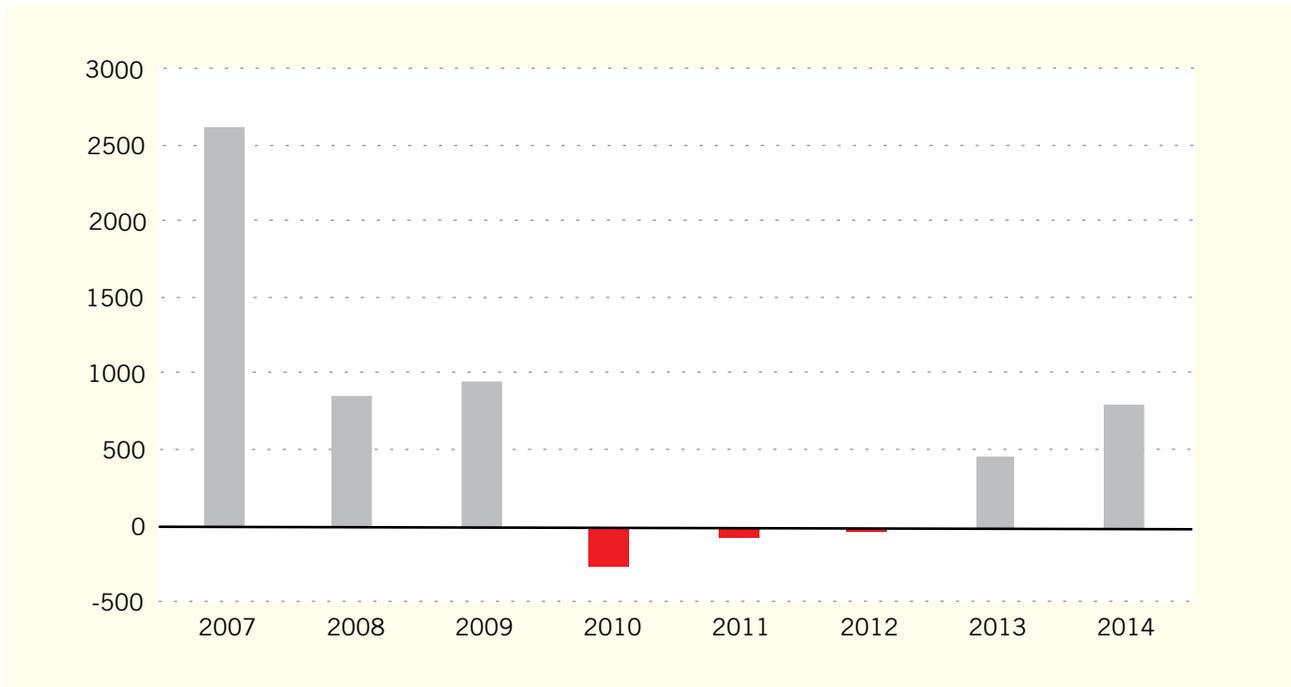
CHART 2 Canada's deficit in published and recorded goods, 2007–2014 (CAD millions)



Source: Data from www.tradingeconomics.com.

These graphs, based on data collected on copyright industries, demonstrate not only that Canada trades robustly in copyright goods and services, but that Canada is in a net surplus position in this trade, as chart 3 illustrates.

CHART 3 Balance of trade for copyright goods and services, 2007–2014 (CAD millions)



Source: Data from www.tradingeconomics.com.

The copyright industrial base is often divided into two categories: core copyright industries and total copyright industries. The definition put forward by the International Intellectual Property Alliance (IIPA) states that core copyright industries are “those industries whose primary purpose is to create, produce, distribute or exhibit copyright materials”, whereas total copyright industries includes other design intensive products and support industries (Siwek 2009). Examples of core industries are obvious – books, movies, sound recordings, and performing arts. Design-intensive industries include things partially protected and incentivized by copyright, like toys, games, fabrics, and jewelry. Then there are the support industries that draw substantial revenues from the core, industries like transportation and telecommunications, not to mention dependant industries like paper manufacturing, and the manufacture and distribution of televisions, Blu-ray players, stereos, and the like. A Heritage Canada report confirms that, in 2011, Canada’s core cultural industries constituted about 3.1 percent of its total GDP, and had grown by about 20.3 percent between 2002 and 2011 – much faster than the Canadian economy as a whole. Copyright industries, like other areas of innovation, are where we need to be looking for economic growth.

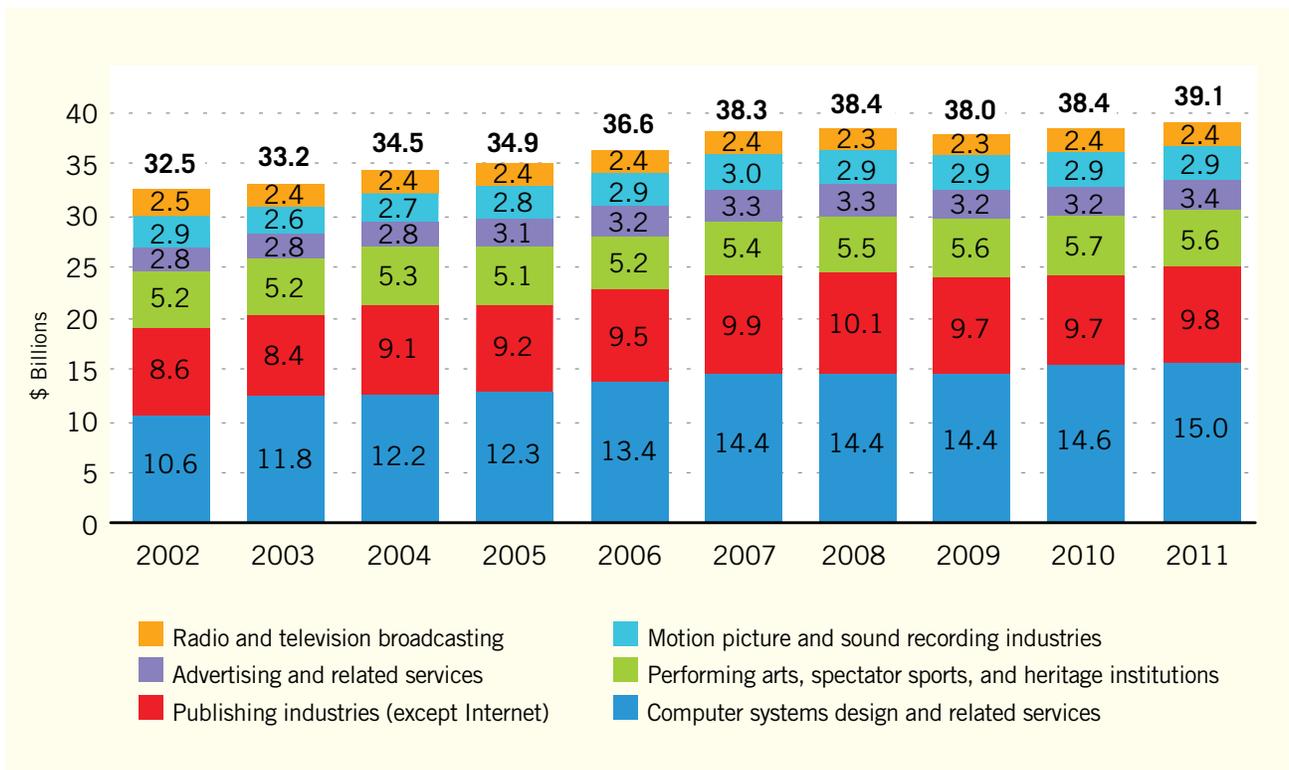
“ Copyright industries, like other areas of innovation, are where we need to be looking for economic growth.”

Examples of core industries are obvious – books, movies, sound recordings, and performing arts. Design-intensive industries include things partially protected and incentivized by copyright, like toys, games, fabrics, and jewelry. Then there are the support industries that draw substantial revenues from the core, industries like transportation and telecommunications, not to mention dependant industries like paper manufacturing, and the manufacture and distribution of televisions, Blu-ray players, stereos, and the like.

A Heritage Canada report confirms that, in 2011, Canada’s core cultural industries constituted about 3.1 percent of its total GDP, and had grown by about 20.3 percent between 2002 and 2011 – much faster than the Canadian economy as a whole. Copyright industries, like other areas of innovation, are where we need to be looking for economic growth.

Chart 4 demonstrates the makeup of copyright industries for recent years.

CHART 4 Core copyright based industries annual GDP output, 2002–2011

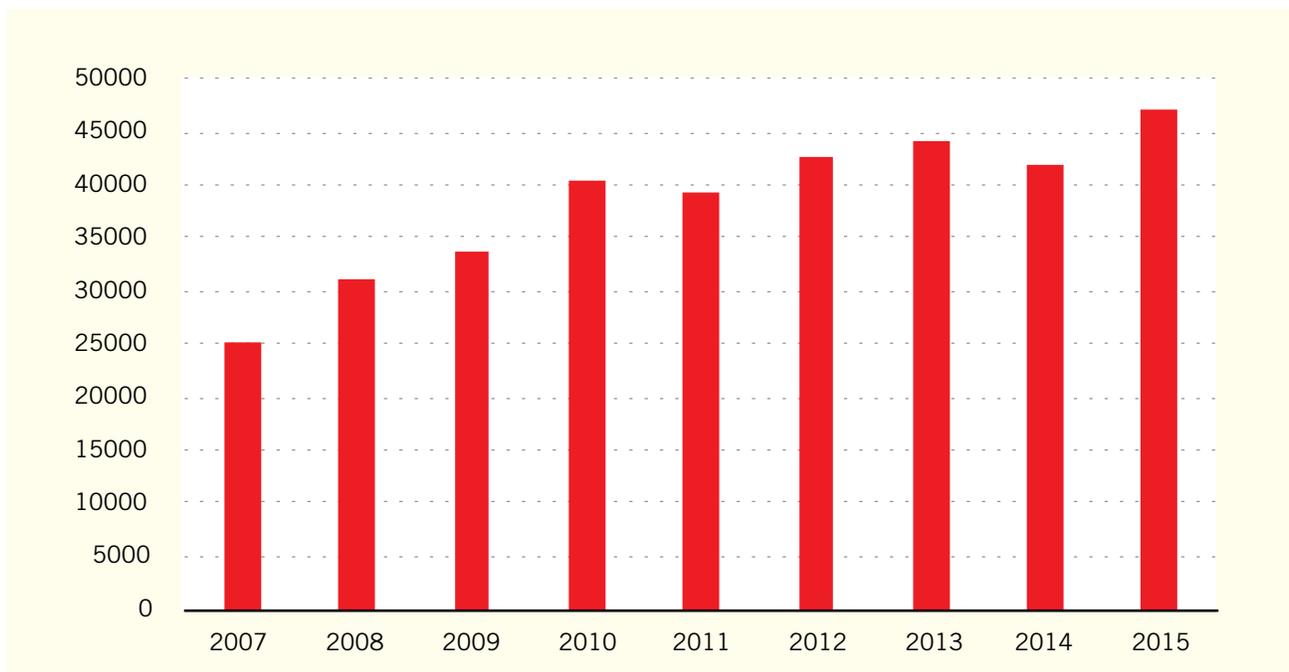


Source: Canadian Heritage 2013, figure 2.

Patent industries

Chart 5 demonstrates that Canada was, as of 2015, a net importer of high-technology goods.

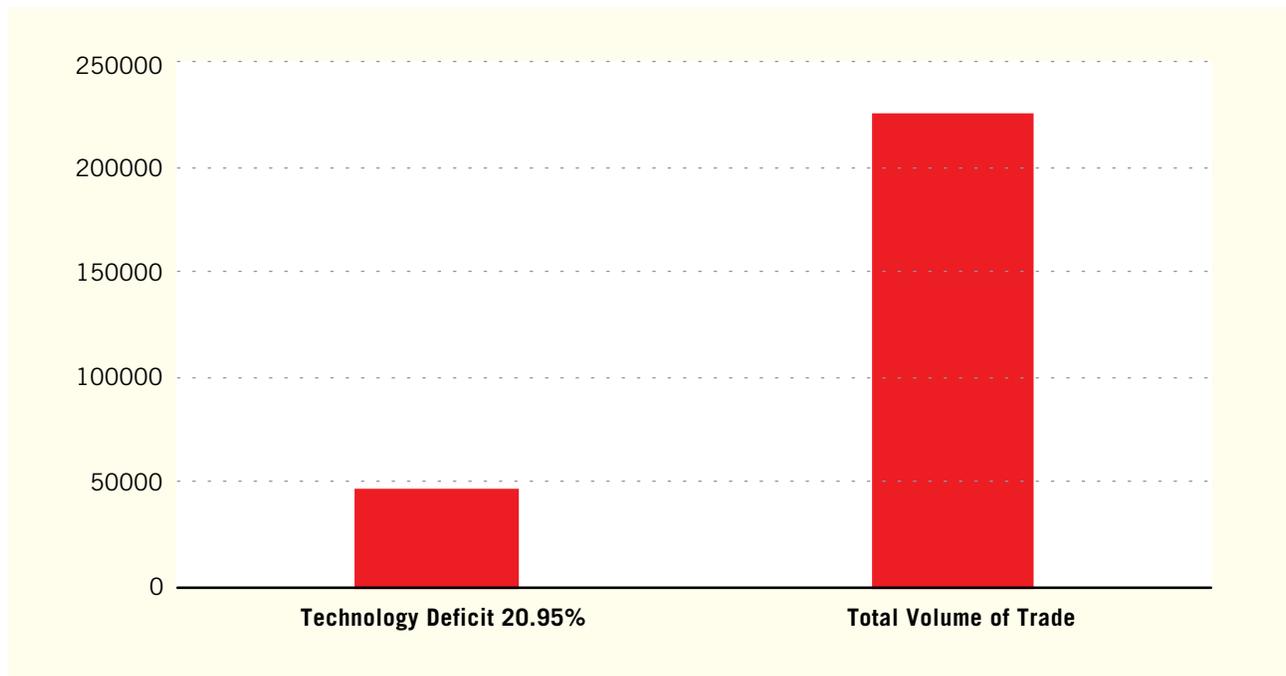
CHART 5 Canada’s technology deficit 2007–2015 (CAD millions)



Source: Data from www.tradingeconomics.com.

However, it is important to understand that this deficit occurs in relation to a high volume of trade and is low as a percentage of that trade (see chart 6).

CHART 6 Canada’s technology deficit versus total trade in technology (CAD millions)



Source: Data from www.tradingeconomics.com.

Canada’s high technology exports are significant, in other words, and will benefit from strong IPRs. The size of the deficit, under \$50 billion, is not insignificant – but, it is only 21 percent of the total trade, which is well over \$200 billion. We need to further encourage such high-volume trade, whether or not it happens to be in deficit.

IP policy and trade balance

Trade balances are never static. They are reflective more of consumption habits than relative economic strength. Rarely, if ever, would they be a proper basis for policy recommendations. Nonetheless,

“ There is bruited about in Canada the view that our trade deficits should lead to weaker IP policies.”

there is bruited about in Canada the view that our trade deficits should lead to weaker IP policies.³ Some critics believe that to harmonize Canada’s IPR regime with its trading partners, principally the US, would increase the costs of technological inputs for Canadian firms. Canadian firms would then be forced to pay royalties and licensing costs for patented technological inputs, that they would not have to pay did we not allow the patents in the first place. This is a “loser’s” perspective, better suited to a socialist, less-developed country than a rights-based economy like Canada’s. Indeed, it should be obvious

from our first paper that the way to stimulate IP production and trade is to enhance IPRs, not to weaken them. But even if there were some policy dependency on trade balances, as alleged, the reality is that the nonexistent trade deficit would not justify them, as shown above.

Advocates of this approach, called the *input transaction cost theory*, further argue that the input cost problem is exacerbated because Canada does not have large firms owning large patent portfolios to trade with, instead of paying fees (Jim Basillie, quoted in Castaldo 2016). The problems for net importers of technology, the argument goes, will be made still worse as firms based out of net-exporting countries with greater R&D and manufacturing capacity use the target country's newly-strengthened laws to protect and market their pre-existing IP, thus crowding out domestic innovation (Barnett 2011).

Jim Balsillie, for instance, has suggested a reduction in Canadian IPRs to address the deficit in Canadian trade in IP. In a discussion of the Trans-Pacific Partnership (TPP), he says,

Barack Obama has said publicly that TPP is about writing the rules for the 21st-century economy. It's about controlling the rules of the restriction systems in a way that helps those companies that have large, pre-existing IP positions. Canada has only one of those companies, which I built, called RIM. I'm simply saying TPP [by making Canada's IPRs stronger] makes it much harder for a smaller emerging company to break into the club. (Castaldo 2016)⁴

Actually, the TPP, by requiring some strengthening of Canadian IP policy, would make it much easier, not harder, for smaller emerging companies to "break into the club". SMEs benefit more from strong IPRs than larger companies do (see below). That said, what Mr. Balsillie appears to suggest is that if you let Canadians copy and steal, the country will eventually absorb enough IP to create a positive trade balance (and maybe then qualify for stronger IPRs, perhaps?). In other words, subsidize! So how well does a subsidy policy work to strengthen any industry and make it competitive? We all know the answer to that question. Subsidies sap strength and consume competitiveness. We do not confiscate other property as it crosses the border. Let us not start with IP.

In any event, trade-based anti-IP arguments are at best very short-sighted ones that a) ignore the possible long term effects of technology transfer and domestic innovations as multi-national corporations (MNCs) license their technology to Canadian firms, which in turn produce further innovations of their own, b) overlook the recent proliferation of start-ups in Canada, which happen to be exactly the type of businesses that accrue the greatest benefit from stronger IP protection, and c) derive from literature that pertains mostly to developing countries, not highly developed economies like Canada's, as discussed more fully below.

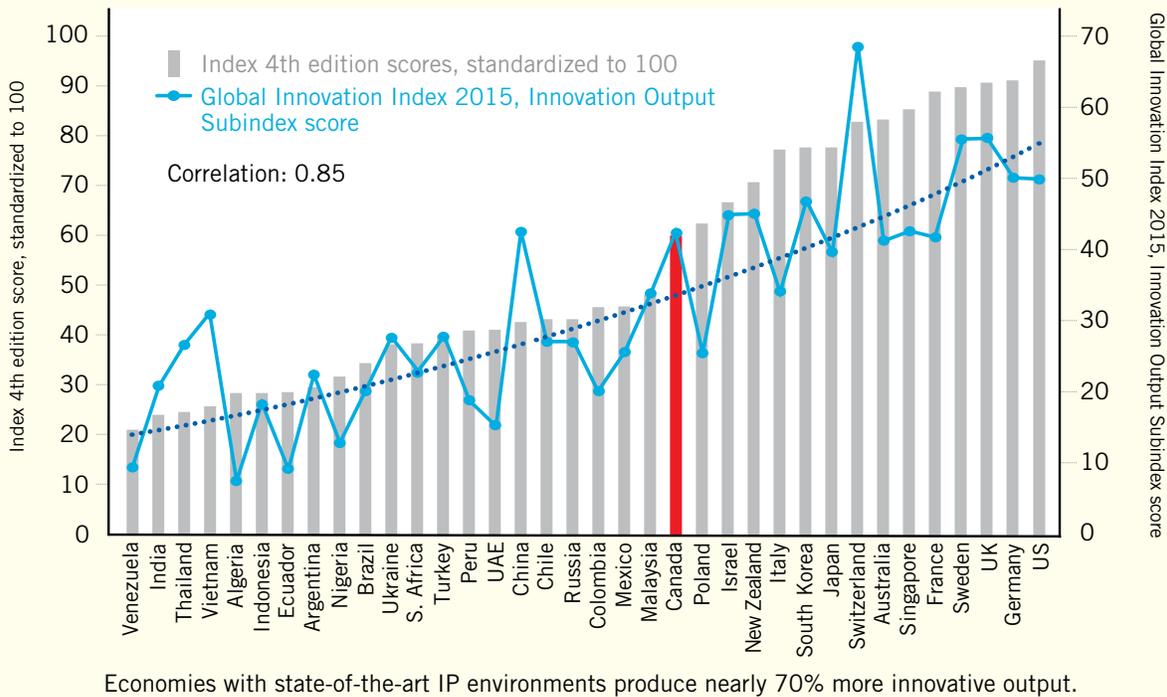
The argument for reducing IPRs, or not to strengthen them, is deeply flawed also because it discounts the significant, negative effects of weaker IPRs on local innovation. Not only would foreign innovation be devalued in the domestic economy, Canadian innovation would be too, because we cannot allow Canadians to protect inventions and works that foreign investors cannot. Finally, this strategy also supposes that it is appropriate to deny trading partners the ability to appropriate the value of their products in Canada, a sort of developing country policy more characteristic of India than a rich OECD nation like Canada.

So: no. The way to a stronger innovation economy is not to encourage Canadian IP theft.

Chart 7 shows the importance of strong IPRs to innovation.

“ We do not confiscate other property as it crosses the border. Let's not start with IP.”

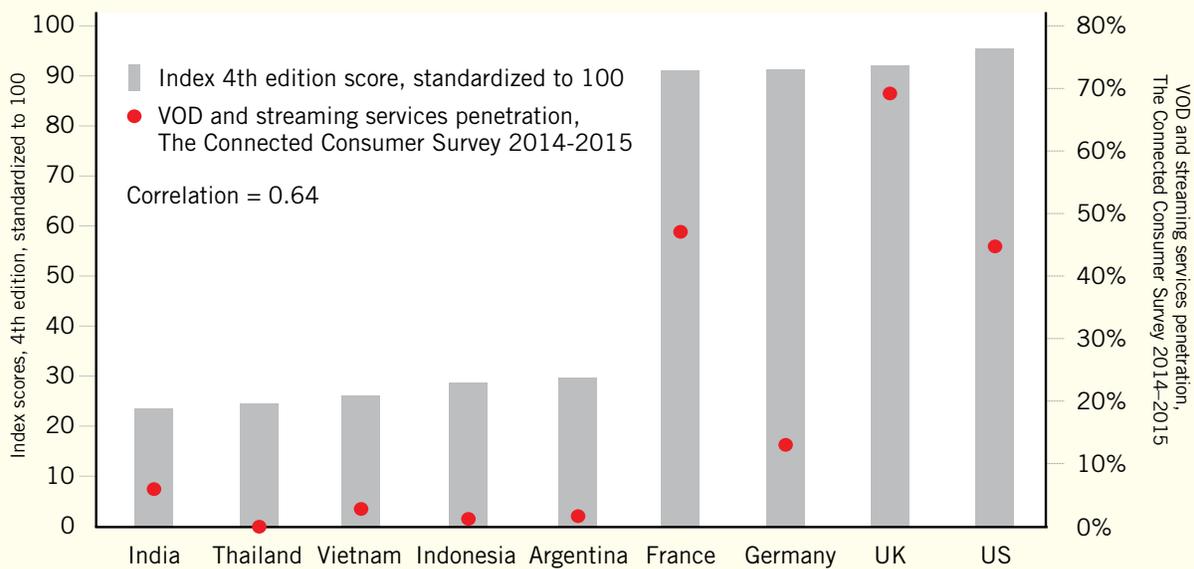
CHART 7 Fourth edition GIPC scores and 2015 Global Innovation Index scores



Source: GIPC 2016.

Strong IPRs also enhance consumer and producer welfare by increasing imports. Chart 8 demonstrates how strong IPRs ensure access to protected content.

CHART 8 Fourth edition GIPC score and VOD and streaming services penetration



Source: GIPC 2016.

The minds of creators require feeding to be inspired, and a copyright regime that provides access to internationally-generated content, and access to improved delivery platforms of that content such as video and audio streaming, is a great spur on creativity. The more open our cultural horizons the better, *pace* Canada's absurd and anachronistic content requirements.

An excellent study of the history of industry and innovation in Switzerland conclusively contradicts the input transaction cost theory (Khan 2005). In a more recent study than the Swiss one, Shih-Tse Lo (2011) conducted a comprehensive analysis of patent reforms in Taiwan in 1986, and concludes that strengthening patents increases both foreign direct investment (FDI) and inventive activity in patent intensive industries as operationalized by rates of patenting and R&D spending.

What is important to understand too is that net losses, if any, associated with strengthening IPRs would be short term, and the net gains in productivity and innovation generated by stronger IPRs more than make up for them. The innovation economy is a highly dynamic system. In a 2001 study, in the short term analysis, the harmonization of IPRs resulted in substantial "rent" payments to technology exporting countries from countries that license their IPR. More specifically, McCalman (2001) found that the implementation of the *Agreement on Trade-Related Aspects of Intellectual Property Rights* (TRIPS) resulted in the transfer of \$4.5 billion to the US, as the value of its patent rights appreciated. McCalman finds that nearly half this amount (around \$2 billion) was paid out by Canada, the UK, and Japan, with Canada being the single biggest net loser in this international value transfer. But McCalman's initial findings failed to account for the net benefit in increases in innovation that could accrue from harmonizing and strengthening IPR laws. McCalman (2005) himself corrects this in a subsequent study, arguing that "the increase in income associated with the TRIPS agreement is more than sufficient to offset the negative transfers of income a country may experience, resulting in all countries having higher steady-state income paths." He went on to say that "[u]ltimately, Canada, like the other countries considered, is predicted to benefit in the long term".

“ There is empirical evidence to suggest that Canada stands to gain long-term trade benefits through international IPR harmonization.”

There is empirical evidence to suggest that Canada stands to gain long-term trade benefits through international IPR harmonization. A study by Mohammed Rafiquzzaman (2002) demonstrates that in countries with stronger IP laws, Canadian manufacturing firms generally captured a greater market share, and in general, that Canada exported more to countries with stronger IP laws. Such data clearly sustain the wisdom of the IP provisions of the TPP.

It is also suggested that the balance of patents held by Canadians in Canada, *vis-à-vis* other trading partners like the US, is a basis for not strengthening IPRs, regardless of any current level of trade. Such reasoning is deeply flawed. Bigger, richer countries will always have more patents; it is proportionality that is significant. The other 205 countries (Wikipedia 2017) with inventors patenting internationally will always outnumber patenting Canadians. We can (and should) only expect Canadians to patent at the same rate as Americans, not in the same volume. And it is precisely the economy characterized by smaller players that most needs strong IPRs to stand up to the bigger players in the bigger economies, as supported by so much evidence adduced in this series of papers.

Response of the Canadian Economy to IPRs

Research suggests that poorer countries benefit less from the extension and harmonization of IPRs than wealthy countries (see Falvey, Foster, and Greenaway 2006; Greenhalgh and Rogers 2010; and the previous paper in this series). This can be attributed to the lack of enforcement and adjudication in poorer countries, rather than the inefficacy of rights incentives on their own. Canada is well-positioned in enforcement (albeit with insufficient border interdiction of counterfeit goods) and very strong in adjudication, generally insufficient court capacity and attendant delays notwithstanding. Moreover, IPRs would not operate in the same way in Canada as they do in developing countries. We are too advanced; our educational and institutional bases are strong.

International technology flows

Technologies spread. In a paper discussing trade, this is admittedly a modest insight. But consider quality of life. If each of us, as is said, is effectively richer than JP Getty was in his time, this is almost completely owing to technological progress (Will 2017). A heart transplant pioneered in South Africa saves lives around the world; the US-created Internet now links almost all mankind. There are more examples of this effect than one could count. It is hard to overstate the benefits and beauty of spreading access to technologies that save and benefit human life. Pause a moment to consider this, the core of our project – not IP for IP's sake, not even for capitalism's sake, but for the good of mankind and the progress of her spirit and well-being.

Innovation, spurred by IPRs, has vastly accelerated in the age of international IP agreements. We need not only incentives for domestic creators and inventors to share their products with the rest of Canada, but for foreign ones to share their inventions with us as well. And strong IPRs make Canada a more attractive place to do that.

“ A heart transplant pioneered in South Africa saves lives around the world; the US-created Internet now links almost all mankind.”

Technology is shared across borders through joint ventures, licensing, and FDI. For developing economies, an argument in favor of strengthening IP laws is that to do so attracts FDI, which builds productive economies and avoids redundant R&D expenditures. Technology-producing firms feel less concerned that their technology will be imitated in countries with strong patent protection – they apply for patents on their innovations in the developing country once it im-

proves its patent system, then sell and use their technologies there (Lee and Mansfield 1996). For this reason, patent applications by foreigners tend to spike significantly when a country strengthens its IP laws (Lee and Mansfield 1996).

There is some research to suggest that FDI is the primary means by which technology diffusion occurs in poorer countries, but only once they strengthen IP laws (Falvey, Foster, and Greenaway 2006). Developing countries benefit substantially from the productivity spillovers that come about from adopting more advanced technologies. Moreover, this encourages local training in technology.

While Canada is not poor, it still benefits mightily from FDI and technology transfer. This occurs with international research collaborations among university labs. It is also naturally the case in almost any foreign-owned plant investment, whether in the automotive, food, or other manufacturing area. Knowledge of these technologies diffuses among social networks, supplier networks, and with the

movement of trained workers. The technology could be anything – fine-tuning robotic arms, filtering milk, better curing rubber, production line efficiencies – it does not matter. The nation gains.

Empirical evidence indicates that technology-related FDI increases total factor productivity (TFP) in developed countries. TFP accounts for effects in total output growth other than inputs of labour and capital. If all inputs are accounted for, then TFP can be taken as a measure of an economy's technological growth – it is the explanation for productivity increases.

Technology growth and efficiency are widely regarded as two of the biggest influences on TFP (Easterly and Levine 2001). To some extent this is because of the non-rivalrousness of IP (which was discussed in the first part of this study) – that many may use the same technology at once to improve the productivity of numerous firms. Of course, it is this very non-rivalrousness which itself creates the basic need for IPRs.

Sourafel Girma and Katharine Wakelin (2007) looked at a sample of multinational electronics firms operating in the UK and found evidence of both intra- and inter- industry productivity spillover effects to domestic enterprises, although these were confined to the regions in which the foreign firms operated. Productivity and opportunity spread: based on Sourafel and Wakelin's findings, Canada has much to gain in terms of productivity when foreign high technology firms do business here.

A 2005 Statistics Canada report finds that foreign firms operating in Canada not only had brought the technology of their parent companies, but were more closely tied than domestic firms to international networks of innovation. Indeed, MNCs operating in Canada were more likely than Canadian firms to use new technology from unrelated firms. This is something else we have to learn from foreign firms.

MNCs operating in Canada were just as likely as domestic firms to develop links to universities and “other local innovative consortia” (Baldwin and Hanel 2000). These characteristics of FDI have very important innovation consequences. First, they increase the importation of advanced research ideas, and second, they form *innovation clusters*, which accelerate technological growth and investment. The innovation cluster is widely used as a basis for Canadian innovation policies. These clusters are geographically concentrated groups of similar businesses. An example might be how an oil find would bring in drilling services companies, engineering services, and developers of seismic measurement algorithms and software.

“ How very much we gain from being an open economy!”

In total, foreign-controlled plants accounted for about two thirds of the growth in Canadian labour productivity between 1980–1999 (Statistics Canada 2005). How very much we gain from being an open economy!

While to some it seems intuitive that consumers will lose where innovators gain, this is not so. The premise is that innovators' ability to raise prices due to stronger rights empties the pockets of consumers who otherwise could use the IP goods for free. But this view is misleading and lacking in nuance; it fails to account for how richly consumers benefit from robust commercialization and commercial distribution systems – systems reliant on exclusive rights. Indeed, the frequent failure of scholars to account for the great value of the commercial economy, particularly with respect to copyright-protected goods, is a glaring weakness in academic and popular commentary. Moreover, to assume the creation and availability of any IP without IPR incentives is itself to err greatly. Thus

consumers gain not only by the creation, effectively *ex nihilo*, of new IP, but also from the attendant services that package and adapt it to their needs and distribute it.

Nonetheless, much commentary, and even jurisprudence, assumes a zero-sum game, an “us vs. them” approach. It is as though those who commercialize and create were an alien, predatory class, instead of integrated into society and in service to it. It is assumed that the public domain is somehow opposed and diminished by the existence of private rights. But it is not. IP is by definition new and original; even if access is restricted by price or licence terms, the public domain can only be enriched by its presence.

“ It is as though those who commercialize and create were an alien, predatory class, instead of integrated into society and in service to it.”

posed and diminished by the existence of private rights. But it is not. IP is by definition new and original; even if access is restricted by price or licence terms, the public domain can only be enriched by its presence.

A study by Nunnenkamp and Spatz (2004) looks at data from 166 countries and finds that strengthening IPR laws was indeed associated with increased investment by US firms, and in countries with the capacity to imitate US technology (measured by average years of schooling), FDI was more likely to be replaced by licensing, as local firms adopted foreign innovations and

turned them into domestic enterprises. Smith (2001) reaches similar conclusions: a one-unit increase in the widely-used Rapp and Rozeck index of international IPR strength (discussed in the first part of this study) was associated with a 0.6 percent increase of affiliate sales and licensing in countries with this capacity to imitate.

Also consistent are findings by Qian (2007), who finds that in less-developed countries, introducing patent protection for pharmaceuticals did not increase domestic innovation (measured in terms of R&D spending), but in more developed countries (as measured by education levels, economic freedom, and economic development), patents did stimulate innovation in the pharmaceutical sector. Ginarte and Park (1997) find, based on a sample of 60 countries over the 1960–1990 period, that strengthening IPRs by 50 percent was associated with a 10.5 percent increase in capital investment rates, a 40 percent jump in the R&D investment rate, and a 0.2 percent increase in aggregate growth, but that these effects were concentrated in above median income countries (Putnam and Tepperman 2011). Using firm level data in developed and developing countries, Allred and Park (2007) reach similar conclusions.

Thus from the perspective of trade, including technology transfer, the strengths of IPRs and of their enforcement institutions matter to Canada – a lot.

Sector-Specific Findings

To examine the structures of certain patent-intensive industries in Canada leads to a deeper understanding of how stronger IPRs improve economic prospects. First, let us look at pharmaceutical R&D.

Pharmaceutical research and development spending

R&D spending by large, patent-holding pharmaceutical companies (PHPCs) in Canada (many of which are subsidiaries of foreign firms; Innovation, Science and Economic Development Canada 2015), seems to have declined in recent years, as measured by the Patented Medicine Prices Review Board (“PMPRB”): from \$1.32 billion in 2007 to \$869.1 million in 2015 (PMPRB 2015).

Part of the reason for this though is the changing structure of the pharmaceutical industry: much of the research previously conducted by larger companies is being conducted externally through

partnerships with SMEs. A study by KPMG (2014) on behalf of Innovative Medicines Canada (IMC) documents many of these new investments, including additional R&D expenditures of \$247 million in 2013. This type of additional research and development was not included in the Statistics Canada or the PMPRB official counts of R&D spending by the pharmaceutical industry, as only research performed by a patentee itself is captured by the PMPRB data (KPMG 2014).

The allocation of R&D to smaller firms might be evidence of an effect suggested by Putnam and Tepperman (2011), whereby stronger IPRs encourage cooperative arrangements between small innovative firms and larger firms with commercialization capacity. Note that, time and again, the evidence points to the importance of strong IPRs for Canadian SMEs. In any event, there is ample evidence to suggest that the perceived recent decline in pharma R&D spending in Canada is at least in part the result of how R&D spending is measured. As a 2011 steering committee chaired by Industry Canada (which later became the basis for the study by IMC) reports:

“Time and again, the evidence points to the importance of strong IPRs for Canadian SMEs.”

The nature of pharmaceutical research and development (“R&D”) activity has undergone significant change due largely to the changing business model of the pharmaceutical industry. However, the way pharmaceutical R&D in Canada is measured has not changed significantly.

In Canada, pharmaceutical R&D is measured and reported by both Statistics Canada and the PMPRB. Each agency applies a somewhat different methodology and analyzes different target populations in an effort to fulfill their mandates . . .

While these agencies capture a large part of Canadian pharmaceutical R&D activities, it was postulated by Rx&D [now IMC] that industry R&D spending and varied investments occur that do not fit in the existing measurement and reporting models. (Canadian Institutes of Health Research 2011)

The steering committee interviewed Canadian pharmaceutical industry insiders on the amount of R&D spending undertaken in Canada. The survey drew a distinction between a) “expenditures eligible for SR&ED [scientific research and experimental development] tax credits based on the definition pursuant to the *Income Tax Act* of December 1, 1987 (and the 2010 amendment),” b) “R&D expenditures and other investments in Canada that do not qualify for SR&ED tax credits”, and c) non-R&D related investments in Canadian health and human capital, such as educational contributions in the form of scholarships and bursaries, and donations and grants to organizations that promote the health, well-being, and human capital of Canadians (Canadian Institutes of Health Research 2011). Looking at these numbers, an argument can be made for stronger IPR protection being more effective than preferential government treatment for certain innovative industries. SMEs, without the help of government tax credits – but perhaps aided by strengthened patent laws – have increased their share of R&D activities just as larger, tax credit-benefiting pharmaceutical firms have scaled theirs back (Putnam and Tepperman 2011).

As Putnam and Tepperman (2011) point out, IPRs can facilitate the commercialization of innovative output by allowing smaller innovative firms (such as domestic biotechnology and tech start-ups) to enter the “market for ideas” by licensing technology to larger firms with commercialization capacity. This is referred to in the literature as a *cooperative commercialization strategy*. An empirical study

by Gans, Hsu, and Stern (2001), based on a sample of 118 start-up projects, demonstrates that strong IPR protection is more likely to encourage these cooperative arrangements – between small, specialized firms and larger ones with commercialization capacity – because the threat that the larger firm would out-manoeuvre and expropriate the smaller firm’s technology was lessened.

While the above may partially explain the recent proliferation of small, R&D-intensive firms in Canada’s pharmaceutical and biotechnology sectors, the question remains of why aggregate R&D pharmaceutical spending has gone down somewhat in recent years. As Schroeder (2007) says, “the global nature of the pharmaceuticals industry makes it very difficult to establish a relationship between domestic policies and R&D expenditure, since decisions regarding R&D activity are often taken at a global headquarters level and are influenced by many factors.” The transition period for countries to accede to the new, higher international IP standards set out in TRIPS ran out in 2006 (the impact of TRIPS on IPRs will be discussed further below). Thus it could be that, following this, larger pharmaceutical companies began conducting more R&D in countries with lower overheads. Whatever the case, preferential government treatment in the form of tax credits does not seem to have been particularly effective in reversing the situation, and there is some evidence that, for a time, stronger IP laws were.

Grootendorst and Di Matteo (2007) quantified the effects of Canada extending drug-patent terms as part of the *US-Canada Free Trade Agreement* (USFTA), the *North American Free Trade Agreement* (NAFTA), and TRIPS. These reforms increased pharma R&D spending in Canada by an estimated \$4.4 billion in the period 1988–2002. Thus, shortly after they were enacted, Canada’s IPR reforms seemed to be quite effective in stimulating pharmaceutical industry R&D. But Canada has fallen badly behind again.

After 2007, Canada’s pharma R&D spending – as measured by Statistics Canada and the PMPRB – began to slide (with a slight increase in 2015) (PMPRB 2015). The factors discussed above make the extent of this decline difficult to know. It must be netted out against spending on R&D devolved

to smaller firms. On balance, and especially given the evidence posited by Grootendorst and Di Matteo, to discount the value of strong IPRs to stimulate R&D spending in the pharmaceutical industry would be a mistake, and scaling IPR laws back would most certainly be a mistake (as this would likely provoke further flight of R&D dollars from large corporations, as well as rob biomedical SMEs of valuable leverage).

Hence, the importance of Canada implementing patent term restoration (PTR). PTR is a process by which some of the term of a pharmaceutical patent lost to regulatory approval delays (during

which no marketing can occur) is restored, up to a limited number of years. The *Comprehensive Economic and Trade Agreement* (CETA) with Europe requires Canada to implement PTR. PTR will be more fully discussed and examined in the next paper in this study.

“ Shortly after they were enacted, Canada’s IPR reforms seemed to be quite effective in stimulating pharmaceutical industry R&D.”

Other sectors

The Toronto Stock Exchange reports that Canada’s technology and innovation sectors have grown faster than any other since the first quarter of 2013 (El Akkad 2015). Revenues for Canada’s ICT sector increased from \$133.44 billion in 2007 to \$169 billion in 2014 (El Akkad 2015). The difference from the growth experienced in the last few years compared to that of the past is that, instead of being made up of a constellation of smaller companies clustered around one large firm (BlackBerry, or Nortel before that), Canada’s tech sector has developed a “start-up culture” (El Akkad 2015): 31,000

of the 36,000 companies in Canada's ICT sector employ fewer than 10 people (Innovation, Science and Economic Development Canada 2016a). Despite its fragmented nature, total job growth in the ICT sector was twice as fast as in the Canadian economy as a whole in 2014 (Innovation, Science and Economic Development Canada 2016a). Interestingly, within the ICT sector, the highest growth was in the IPR-intensive software and computer services sector, whereas the revenues for the lower value ICT manufacturing sector fell.

There is evidence that strong patent rights help software and computer services firms. Following the 1996 US Supreme Court decision in *Lotus Development Corp. v. Borland International Inc.*, which limited copyright protection for user interfaces, patents increased in importance (Putnam and Tepperman 2011). Lerner and Zhu (2007) find that software firms increased their use of patents following *Lotus*, and that this increase in patenting activity was associated with a growth in sales, market capitalization, number of employees, and sales per employee (Putnam and Tepperman 2011). Furthermore, Hall (2004) finds that in some industries, patent portfolios have become an "important signal of viability" for small firms, whereas with large firms this is not necessarily the case.

Software development depends on IPRs – several of them. Software is protected by copyright as well as by patent and trade secret. Patents are increasingly important. A large body of evidence suggests that start-ups and SMEs place greater emphasis on patent protection than larger firms (Barnett 2011). Research by Allison et al. (2004) suggests that in the US, small firms and independent inventors litigate far more (filing roughly three times as many patent lawsuits) per patent than larger firms. The reasons for this are that start-ups do not have access, or the same degree of access, to the extra-legal patent substitutes (such as goodwill, trade secrecy, economies of scope, patent pooling, and economies of scale) that larger, established firms do, and thus have to rely more heavily on legal channels to defend their innovations from expropriation (Barnett 2011). Moreover, SMEs more actively search for capital and the value of patents in increasing access to, and reducing cost of, capital, is significant. Investors like patents.

“ Canada's tech sector has developed a 'start-up culture'.”

Strong IPRs can thus be extremely advantageous for the SMEs that dominate Canada's ICT sector. Any retrenchment in the patent protection afforded to ICT companies could deal a heavy blow. Scherer (2002) infers that the incentive effect of patent protection for the commercialization of innovations made under government grants or contracts (about half of Canadian tech start-ups take advantage of government funding of some kind; PWC 2015) is the strongest amongst relatively small firms and recent market entrants.⁵

Perhaps there is no more iconic and powerful example of the importance of patents to SMEs than that of Toronto software firm, Infrastructures for Information Inc. (i4i). i4i was growing increasingly successful selling software based on a powerful invention for XML word processing. Microsoft arranged to visit i4i several times and examine its technology, suggesting it might want to license it. That never happened. What did happen is that Microsoft simply appropriated the i4i technology, incorporated it into MS Word, and stole i4i's business. Eventually i4i sued Microsoft in the US. Microsoft used every possible delay and procedure to fight the claim, which eventually ended up in the US Supreme Court. i4i won a record damages award of approximately US\$350 million.

One of the authors was involved in i4i from the beginning, even in the drafting of its patent and observed the terrible strain and sense of loss Microsoft's actions meant for the founder of i4i. Without a patent to secure long-sought victory, loss would have been total.

Outputs and incentives

So how do we measure Canada's progress on innovation? Common metrics include patent applications and patent grants (whereas the most common measure of innovative inputs is R&D spending), and both these indicators show a clear upward trend beginning in the early 1990s, shortly after Canada began tightening its IPR laws (Savine 2015).

“ Without a patent to secure long-sought victory, loss would have been total.”

A 2014 brief by the C.D. Howe Institute (CDHI Brief) indexes Canadian patenting activity involving at least one Canadian in the patent application (Brydon et al. 2014). The index demonstrates that the average share of patent applications in Canada made by Canadians has increased somewhat following 1990, and increased dramatically in the computer and electronic manufacturing sectors (and impressively in the mining and oil and gas extraction sectors). Chart 9 shows patent activity in recent years.

CHART 9 Total number of patents, foreign and domestic, filed by Canadians, 2005–2014



Source: Innovation, Science and Economic Development Canada 2016b.

Chart 10 shows the rates of R&D spending as a percentage of GDP.

CHART 10 Canadian R&D spending as a percentage of GDP, 2005–2014



Source: World Bank 2016.

A 2015 Centre for Digital Entrepreneurship and Economic Performance report concludes that, while private sector R&D spending has experienced a recent decline after years of rising, the recent dip in patenting rates has not been as pronounced, suggesting R&D is becoming more efficient (Savine 2015). This might have to do with SMEs taking over the research function increasingly from larger firms, since SMEs typically are leaner and have much smaller overheads.

Also, a recent study shows how much more energetically Canadians are reaching into other jurisdictions to benefit from their patents (Penner and Beardwood 2016). As this trend develops, balance of trade will shift further.

Efficiency gains translate to more discoveries per dollar – a strong incentive to invest more dollars. So why is Canada lagging in R&D investment? According to a report by the Conference Board of Canada (2016), the recent drop in private sector R&D spending arises from the decline in Canada’s manufacturing industry, which undertakes far more R&D than the mining, oil and gas, construction, and service sectors combined. (Cue Ontario’s perverse economic policies.)

The CDHI Brief concludes that the recent dip in domestic patent applications could also be evidence of Canadian firms “struggling with the commercialization aspect of the innovation process.” This is not a surprising conclusion. Want of commercialization capacity is widely seen to be one of the great weaknesses of the Canadian innovation scene. But commercialization does not need to be domestic. For obvious reasons, it is often more attractive to commercialize inventions in the US first, to take advantage of the larger, richer market. Often this entails filing for a US patent then partnering with a US firm with marketing and manufacturing capacity. This is just the reality of shifting business models and a globalizing economy. In her 2015 book *Small Market Economies: Test Tubes for Intellectual Property Issues*, Susy Frankel points out that:

[SMEs operating in small market economies] do not have control of international distribution chains. Sometimes small and medium enterprises do not even control local distribution. It is not in their business model to do so, because they enter agreements for development, manufacture and worldwide distribution with larger entities that do those things. This business model seems to be relatively new. (100)

To Frankel, many firms in small market economies make the decision not to patent locally simply because it is the international market that matters for licensing innovation to manufacturers and distributors, and the cost of initially filing for a local patent may not be worth incurring.

That said, currently Canada is supporting the development of many technology firms. The rents they acquire from licensing south of the border aid capital formation and investment in Canada and help perpetuate and grow its start-up economy.

Perhaps a good strategy for Canada to bolster its patenting activity would be to make it more attractive to patent in Canada by reducing administrative costs and hurdles, and offering robust protection for Canadian firms, as well as focus on making SMEs fluent in the Canadian IPR regime so that they may apply for patents or copyrights earlier on in the innovation process. Perhaps one of the more effective strategies to encourage Canadian patenting would be to give start-ups reduced fees, or no fees, for their first patents, as recommended in the first part of this study.

“Efficiency gains translate to more discoveries per dollar.”

Although little empirical work thus far parses the effects of stronger international IP laws compared to domestic ones, it might be worth considering what could happen to Canada's technology sectors if Canadian start-ups better understood IP. Increasing patent activity in Canada could be conducive to SMEs growing within Canada rather than being bought up in their infancy by international tech giants. A recent Massachusetts Institute of Technology study demonstrates that

start-ups that apply for patents are 35 times more likely to grow than those that do not (Fazio et al. 2016), suggesting that acquiring early patents may help domestic tech companies and potentially generate commercialization capacity within Canada. Accordingly, a program designed specifically for this purpose would benefit Canada, with such a burgeoning SME population. Perhaps outreach to increase awareness of IPRs and their uses would help. We also believe that a concessionary rate for first patent filings and examinations would help, and perhaps starting patent agents could be persuaded to participate in first filings on a fee-reduced basis. SMEs, and everyone else, would benefit from continued strengthening of Canadian examination capability. Finally, such programmes should ensure exposure to the benefits of patenting in potential international markets under the PCT.

While Canada has experienced a recent dip in its R&D and patenting activity, it experienced growth in these indicators over the last 30 years, a period roughly commensurate to the time it has been strengthening its IP laws. A Conference Board of Canada (2013) report, for instance, demonstrates that, relative to its size, Canada has increased its share of patents amongst OECD countries by 50 percent in the last three decades (Khan 2015).

As mentioned above, Grootendorst and Di Matteo (2007) quantified the effects of Canada extending drug patent terms in 1987, 1993, and 2001 (as part of the USFTA, NAFTA, and TRIPS respectively), and found these reforms to be associated with an estimated \$4.4 billion increase in pharma R&D spending in the period 1988–2002.

Canada is, however, still behind in R&D spending and patenting activity relative to its OECD counterparts, and it is behind in the IPR protection it offers as well. Given the breadth of empirical studies

showing the link between IPR protection and innovative performance, it is clear how Canada must address the problem.

The most promising avenue for Canada to stimulate domestic innovation is to support the technology SMEs driving growth. To harmonize Canada's IPR laws with those of the US would be at the very least a strong signal that Canada is prepared to participate in the global knowledge economy, and welcome FDI from innovative firms (with its attendant technology transfer and productivity spillovers). If Canada offers robust IPRs and makes it more attractive for firms to patent domestically – as well as works on making smaller Canadian firms more patent literate by promoting the use of the patent system both domestically and abroad – this could lead to a host of positive outcomes for both smaller innovative firms, and the Canadian economy.

Take-aways

- Canada is in a surplus in trade in copyright goods and services and has only a relatively small deficit in patented ones. Any attempt to manipulate IP policy as though Canada were essentially an IP-importing, less-developed country would be a complete mistake.
- Trade balance is fluid, reflecting consumer choice and comparative advantage, and should not affect IP policy.
- Any negative trade balance initiated by strengthening IPRs is only temporary and will be overcome by increases in domestic innovation.
- Stronger IPRs encourage foreign direct investment, resulting in technology diffusion and productivity improvements.
- Pharmaceutical R&D devolves to smaller firms, as does high-tech innovation, and smaller firms benefit disproportionately from stronger IPRs.
- Canada's patent-protected outputs have grown over the last 30 years, coincident with the strengthening of Canada's patent regime.

The Recent Development of Intellectual Property Laws in Canada

A review of the history of Canadian IP policy reveals that its development largely moved in tandem with trade policy, and has changed only in response to international treaty obligations. It has generally strengthened over recent years, but in a reactive rather than proactive manner (and slowly reactive at that). Hence the current government's plan for a new IP policy in response to Canada's innovation economy needs is refreshing.

The driver for that IP policy should be innovation in Canada. It should not be about reducing drug prices, addressing trade imbalances, increasing the public domain, or redressing perceived injustices of property rights. It should be made for Canada, not made in Canada.

IP legislation has been largely a recent project. Since 1989, and beginning with Canada's accession to the *Patent Cooperation Treaty*, the *Patent Act* (Canada) has undergone major amendments, im-

proving support for innovation, the most important of which were driven by Canada's commitments in NAFTA and TRIPS. The overall effect of the *Patent Act's* recent revisions has been a harmonization of Canadian patent law with international standards and treaties, a strengthening of patent-holder rights and better means of enforcement of patent law (particularly with respect to pharmaceutical patents), and a reduction in the administrative burdens to patent applicants.

Between 1921 and 1988, the *Copyright Act* remained largely unchanged. Reform began in 1988 with the introduction of the *Copyright Amendment Act* (Canada), the purpose of which was to bring Canada into an increasingly digital era. This goal was met in two phases – the first being the *Copyright Amendment Act* of 1988 and the second being 1997's *An Act to Amend the Copyright Act*. The passing of the 2012 *Copyright Modernization Act* was the third phase of a decades long and ongoing technology-driven overhaul of Canada's copyright system.

“ Between 1921 and 1988 the *Copyright Act* remained largely unchanged.”

Copyright reform in Canada over the last decades has been characterized by expansion in the scope of works and technologies covered by copyrights, stronger rights for copyright holders, and stronger enforcement and penalties for copyright infringement. More recently, expansion of fair dealing has joined the process.

Major amendments to the *Trade-Marks Act* (Canada) occurred in the 1990s, giving effect to Canada's commitments under NAFTA and the World Trade Organization (WTO). These reforms were primarily to bring Canada's trademark regime more in line with its trading partners, and generally expand trademark protection and protection of geographic indications. Unlike the *Patent Act* and the *Copyright Act* however, the *Trade-marks Act* does not seem to have been subject to the same routine overhauls that have characterized these former acts' recent histories. That changed with the release of the 2014 budget.

The passing of the 2014 budget signalled a sea change in the federal government's approach to trademark reform. *The Budget Implementation Act 2014* (Canada) introduced a sweeping package of amendments to Canada's trademark regime as part of the government's Economic Action Plan. Additionally, two more bills that included provisions to amend the *Trade-Marks Act* were passed – the *Combating Counterfeit Products Act* (CCPA) and the *Budget Implementation Act (2015)* (Canada) respectively – in the same period. The language used by the Canadian Intellectual Property Office (CIPO) and in these acts themselves this time around was ambitious and assertive. The purpose of this new round of reforms is the “strengthening,” “streamlining,” and “modernization” of Canada's trademark regime.

A quick review of the major episodes in the recent evolution of Canadian IP laws reveals just how driven the process has been by treaty – and how slowly Canada implements its treaties.

Milestones in Canadian Intellectual Property Policy

- 1987: *An Act to Amend the Patent Act* moves Canada from a “first to invent” to a “first to file” patent system, and limits compulsory licensing of pharmaceuticals.
- 1988: *Copyright Amendment Act* brings computer programmes into the *Copyright Act*.
- 1988: *Canada-United States Free Trade Implementation Act* brings broadcasting provisions into the *Copyright Act*.
- 1990: *Patent Cooperation Treaty* (1970) is implemented in Canada, creating a simplified procedure for multiple international patent filings and examinations.
- 1993: *Patent Act Amendment Act* repeals compulsory licensing of pharmaceuticals provisions and creates the PMPRB.
- 1993: *North American Free Trade Agreement* improves patent procedure and availability criteria; brings the *Copyright Act* into compliance with the *Berne Convention*; and abolishes the registered user system for trademarks.
- 1994: *WTO Implementation Act* creates a 50-year copyright term (from the author’s death), implementing the *World Trade Organization Agreement*.
- 1997: *An Act to Amend the Copyright Act* facilitates broadcasting by amendment to the *Copyright Act*, creates new statutory remedies for infringement in that act.
- 2005: Following adverse outcomes of a WTO tribunal, *Trade-Related Aspects of Intellectual Property Rights Treaty* (TRIPS) (1994) is fully implemented in Canada, the working provision and the provision for stockpiling pharmaceuticals before patent expiry is repealed, and patent terms of 20 years are introduced.
- 2000: *Patent Law Treaty* signed – still not ratified, although the *Budget Implementation Act* (2014) has passed through Parliament; it will improve the patent prosecution process. The TPP will encourage its coming into force.
- 2012: *Copyright Modernization Act* comes into force, finally implementing the *WIPO Copyright Treaty* and the *WIPO Performances and Phonograms Treaty*, creating notice and notice, expansions of permitted copying, protections for technological protection measures, and provisions clarifying liability of ISPs.
- 2014: *An Act to Implement Certain Provisions of the Budget and Other Measures* updates Canada’s trademark laws, implementing three treaties: the *Singapore Treaty* (2006), *Madrid Protocol* (1989), and the *Nice System of Classifications* (1957) – but is not yet in force.
- 2014: *Combating Counterfeit Products Act* strengthens trademark enforcement and border enforcement against counterfeit goods, but is not yet in force.
- 2017: *Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired or Otherwise Print Disabled* (2013) is ratified, creating new exceptions to copyright for the visually impaired.
- Future: *Trans-Pacific Partnership* (TPP) (2016) and *Comprehensive Economic and Trade Agreement* (CETA) (2016); *The Canada-European Union Comprehensive Economic and Trade Agreement Implementation Act* has already passed through Parliament, revising drug pricing regulation and creating a PTR limited to two years.

Conclusions

Some maintain that Canada's modest imbalance of trade in patent related goods argues in favour of weakening Canada's IPRs. This is so that foreigners do not disproportionately benefit from stronger IPRs at Canadians' expense. It is also so that input costs for Canadian innovation – paying for IP protected production inputs – are reduced so that, allegedly, innovation may be increased. As demonstrated in this paper, however, the premise is wrong – Canada is in a surplus trade position in copyright goods and services, and only a minor deficit of about 20 percent of exports in patent ones. In any event, trade balance is fluid and reflects consumer choice and comparative advantage in other sectors. It is a terrible basis for IP policy.

An extensive body of research demonstrates that advanced economies benefit more from strong IPRs than developing ones, largely, it seems, as a consequence of stronger adjudication and enforcement institutions. As an advanced OECD country with good education and strong institutions, Canada is in a position to benefit much more than most from a policy of strong IPRs. Research also indicates that

“Canada is in a position to benefit much more than most from a policy of strong IPRs.”

SMEs benefit more from strong IPRs than larger firms – and Canada's innovation economy is predominantly, almost exclusively, populated by SMEs. This is particularly true in the ICT sector, but also characterizes biomedical innovation. Interestingly, too, recent declines in pharmaceutical R&D expenditures in Canada seem in large part to be because of the devolution of the research function to Canadian SMEs.

Stronger IPRs lead not only to enhanced domestic innovation, but also to foreign direct investment and its attendant technology transfers. These, in turn, lead to increases in local

innovation and productivity as licensing arrangements and inter-firm R&D and other alliances are formed, and new technologies diffuse through the economy. Research in developed economies, such as England, has demonstrated the strong impact of technology transfers on local technology development and use.

Canada's innovative outputs have increased over its 30 years of strengthening patent laws. As indicated by so much other data and so many studies, innovation is shown to be highly congruent with strong patent laws. The recent history of IP laws in Canada demonstrates their continual change and adaptation, primarily in response to treaties. Thanks to this process Canada's economy fares better, but is still not the equal of its OECD counterparts and needs to improve, in no small part by continuing to strengthen its IPRs.

The recent history of Canada's IPRs shows, as it should, a gradual increase in their strength and scope. This has been wholly in response to treaties and WTO disputes (in the case, for instance, of pharmaceutical stockpiling and research exemptions). Canada now proposes a renewed IPR strategy. This is an opportunity to become proactive in establishing further, stronger IPRs, in the best interests of Canada.

Recommendations

Readers will recall the following 4 recommendations from the first paper:

Recommendation 1: The nature of copyright protection is such that there is no justification to limit the term of protection. Copyright protection does nothing to reduce the store of common prop-

erty. Copyright doesn't even create a monopoly, and there is no reason it should be singled out from other types of property for expiry. Therefore, our recommendation is to:

End term limits for copyright. Using the rule of reciprocal treatment under the Berne Convention, let citizens of other signatory nations enjoy copyright for the length of the terms, if any, of their own nation. This would be a bold move, consistent with Canada's treaty obligations and showing leadership in IP. In the more conservative but less desirable alternative, adopt the already widely-used term of 70 years plus the life of the author, gaining Canadian creators the like benefit in European markets.⁷

Recommendation 2: Out of step with all OECD countries and with the plain wording of Canada's Patent Act, the SCC ruled that so-called "higher life forms" could not be patented. The life form in question was the oncomouse, a mouse whose DNA had been edited by Harvard College researchers to make the mouse especially oncogenic. Such inventions are entirely worthy of protection. The decision was a blow to Canada's life sciences industry. Moreover, the reasoning of the decision – that patents over higher life forms were not contemplated by the 19th century legislature that adopted the *Patent Act* – brings into doubt all future, unknown classes of patent. Accordingly, it is our recommendation to:

Legislate patent protection for higher life forms, reversing the *Harvard College* decision of the SCC and bringing life sciences patenting in line with the rest of the OECD. In reversing the damage done by the *Harvard College* decision, there should also be a legislative adoption of interpretative principles for the *Patent Act* that make it clear that anything under the sun⁸ (or indeed, elsewhere in the universe) made by man and that meets the standards of the *Patent Act*, is patentable, subject only to express, legislated exceptions.

Recommendation 3: Small- and medium-sized businesses drive much of Canada's innovation economy. They tend to be insufficiently grounded in the possibilities of IP to help to grow their businesses. Accordingly, we recommend to:

Facilitate patenting by SMEs, perhaps by reducing or waiving fees for first patents, and further publicize the value of IP protection.

Recommendation 4: Canada is lucky to have agreements to open trade in the Pacific Rim and to Europe, the TPP and CETA respectively. Still, the IP requirements of these agreements will benefit Canada. Accordingly, it is our recommendation to:

Implement the TPP and finalize implementation of CETA, subject to other signatory nations doing so, and continue to further support freer trade in IPR-protected goods.

These recommendations are further sustained by the conclusions of this paper. To these we add, based on the research presented in this, the second paper:

Recommendation 5: One of the worries that seems to animate opposition to stronger IP rules in Canada is the existence of trade deficits in IP protected goods and services. As demonstrated herein, such deficits are non-existent, in the case of copyright goods and services, and minor, with respect to patents. In any event, **trade balances ought to have no impact on IP policy**. Accordingly, we recommend that:

A trade deficit in IP-related goods is not a sound basis on which to weaken IP protection. Indeed, research makes it very clear that it is a basis to strengthen IP protection.

About the Authors



Richard Owens

Richard Owens is a Munk Senior Fellow with the Macdonald-Laurier Institute. He is a lawyer who has specialized in business and commercial law, regulation of financial institutions, intellectual property and technology. He has served financial services providers, technology companies, drug companies and others in Internet, technology, intellectual property strategy and patent law, M&A, outsourcing, strategic alliance and joint ventures, licensing and other areas. He has been repeatedly recognized as among Canada's best lawyers in technology law and attained the highest rating on Martindale Hubbell. He conducted his practice with three of Canada's leading law firms. Richard is past chair of the board of directors of

the University of Toronto Innovations Foundation, and member of the advisory committee to the Office of the Privacy Commissioner of Canada. He is a member of the board of the Center for Innovation Law and Policy at the University of Toronto Faculty of Law, and served as a director of the International Technology Law Association. He is on the boards or advisory boards of other companies and not-for profit enterprises and chairs the board of an international women's health organization. Richard is an adjunct professor, teaching courses on the law of information technology and electronic commerce, innovation law and policy, intellectual property, digital content and the creative economy, and the law and policy of biotechnology, all at the University of Toronto Faculty of Law, where he has taught for approximately twenty-five years and also served as the Executive Director of the Centre for Innovation Law and Policy. Richard has written and published widely on intellectual property law, the law of information technology, privacy, and the regulation of financial institutions.

Michael Robichaud

Michael Robichaud is a researcher for the Macdonald-Laurier Institute. He is currently working towards completing a combined J.D/Masters of Public Policy degree at the University of Toronto following a joint honours degree in history and political science at McGill University. He has previously worked as a researcher at the Centre for the Study of Democratic Citizenship in Montreal, QC.

The authors would like to acknowledge the contributions of Adrienne Blanchard and Barry Sookman who acted as advisers, reviewed drafts of these papers, and contributed some sections.

References

- Alberta (Education) v. Canadian Copyright Licensing Agency* (Access Copyright, 2012 SCC 37, [2012] 2 S.C.R. 345.
- Allison, John R., Mark A. Lemley, Kimberly A. Moore, and R. Derek Trunkey. 2004. "Valuable Patents." *Georgetown Law Journal* 92: 435. Available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=426020.
- Allred, Brent B., and Walter G. Park. 2007. "Patent Rights and Innovative Activity: Evidence from national and firm-level data." *Journal of International Business Studies* 38: 878–900. Available at <http://auapps.american.edu/wgp/www/AllredPark%20Jibs07.pdf>.
- An Act to Amend the Copyright Act*, S.C. 1993, c.15.
- An Act to Amend the Patent Act and to Provide for Certain Matters in Relation Thereto*, S.C. 1987, c. 33.
- Baldwin, John, and Peter Hanel. 2000. *Multinationals and the Canadian Innovation Process*. Analytical Studies Branch Research Paper Series, no. 151. Available at <http://www5.statcan.gc.ca/olc-cel/olc.action?ObjId=11F0019M2000151&ObjType=46&lang=en>.
- Balsillie, Jim. 2017. "Empty Talk on Innovation Is Killing Canada's Economic Prosperity." *Globe and Mail*, March 17. Available at <http://www.theglobeandmail.com/report-on-business/rob-commentary/empty-talk-on-innovation-is-killing-canadas-economic-prosperity/article34339612/>.
- Bereskin, Dan, Cynthia Rowden, and Scott MacKendrick. 2014. "Amendments to the Canadian Trademarks Act – 20 Points You Need to Know (The bill is just too big for a top 10 list!)." Bereskin and Parr, June 19. Available at <http://www.bereskinparr.com/Doc/id419>.
- Brydon, Robbie, Nicholas Chesterley, Benjamin Dachis, and Aaron Jacons. 2014. "Measuring Innovation in Canada: The tale told by patent applications." C.D. Howe Institute *E-Brief*, November 28. Available at https://www.cdhowe.org/sites/default/files/attachments/research_papers/mixed/e-brief_191.pdf.
- Canada-United States Free Trade Implementation Act*, S.C. 1988, c. 65. Available at <http://lois-laws.justice.gc.ca/eng/acts/C-10.6/>.
- Canadian Heritage. 2013. *The Economic Impact of the Copyright-Based Industries on the Canadian Economy*. Government of Canada.
- Canadian Institutes of Health Research. 2011. *Summary of Pharmaceutical Survey Findings on R&D Spending and Investments by Rx&D Members – 2010*. Government of Canada. Available at <http://www.cihr-irsc.gc.ca/e/45304.html>.
- Canadian Intellectual Property Office. 2015. "Amendments to the *Patent Act*: Questions and Answers." Government of Canada.
- Cashin, Patrick, and Scott Foster. 2016. "CETA and Canadian IP Law: Possible changes ahead?" Gowling WLG, March 3. Available at <http://www.lexology.com/library/detail.aspx?g=fbc5b53-2abc-4295-8ff3-c49a21bf0ee1>.

- Castaldo, Joe. 2016. “Jim Balsillie on How Canada Is Doing Innovation Wrong – and How to Fix It.” *Canadian Business*, October 7. Available at <http://www.canadianbusiness.com/leadership/jim-balsillie-interview/>.
- Combating Counterfeit Products Act*, S.C. 2014, c. 32. Available at http://laws-lois.justice.gc.ca/eng/AnnualStatutes/2014_32/.
- Conference Board of Canada. 2013. “Innovation.” *How Canada Performs*. Available at <http://www.conferenceboard.ca/hcp/details/innovation.aspx>.
- . 2016. “Business Enterprise R&D.” *How Canada Performs*. Available at <http://www.conferenceboard.ca/hcp/provincial/innovation/berd.aspx>.
- Copyright Amendment Act*, S.C. 1988. c. 10.
- Copyright Modernization Act*, S.C. 2012, c.20. Available at http://laws-lois.justice.gc.ca/eng/annualstatutes/2012_20/page-1.html.
- Cowan, Edgar. 2015. “Canada’s Creative Industries Can Lead the Economic Charge.” *Globe and Mail*, July 3. Available at <http://www.theglobeandmail.com/report-on-business/rob-commentary/canadas-creative-industries-can-lead-the-economic-charge/article25236146/>.
- Criminal Code*, R.S.C., 1985, c. C-46.
- Diamond v. Chakrabarty*, 447 U.S. 303 (1980).
- Easterly, William, and Ross Levine. 2001. “It’s Not Factor Accumulation: Stylized Facts and Growth Models.” *The World Bank Economic Review* 15 (2): 177–219. Available at: <https://openknowledge.worldbank.org/bitstream/handle/10986/17440/773550JRN0200100Factor0Accumulation.pdf>.
- Economic Action Plan 2014 Act, No. 1*, S.C. 2014, c. 20.
- Economic Action Plan 2014 Act, No. 2*, S.C. 2014, c. 39.
- Economic Action Plan 2015 Act, No. 1*, S.C. 2015, c. 36.
- El Akkad, Omar. 2015. “As Economy Falters, the Tech Sector Continues to Climb.” *Globe and Mail*, September 13. Available at <http://www.theglobeandmail.com/report-on-business/as-economy-falters-the-tech-sector-continues-to-climb/article26349564/>.
- Falvey, Rod, Neil Foster, and David Greenaway. 2006. “Intellectual Property Rights and Economic Growth.” *Review of Development Economics* 10 (4): 700–719. Available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1467-9361.2006.00343.x/abstract>.
- Fazio, Catherine, Jorge Guzman, Fiona Murray, and Scott Stern. 2016. *A New View of the Skew: A quantitative assessment of the quality of American entrepreneurship*. Innovation Initiative. Available at http://innovation.mit.edu/assets/A-New-View_Final-Report_5.4.16.pdf.
- Feist Publ’ns, Inc. v. Rural Tel. Serv. Co.*, 499 U.S. 340 (1991).
- Frankel, Susy. 2015. *Test Tubes for Global Intellectual Property Issues*. Cambridge: Cambridge University Press.
- Gans, Joshua S., David H. Hsu, and Scott Stern. 2001. “When Does Start-Up Innovation Spur the Gale of Creative Destruction?” Available at http://www.druid.dk/conferences/nw/paper1/stern_gans.pdf.

- Girma, Sourafel, and Katharine Wakelin. 2007. "Local Productivity Spillovers from Foreign Direct Investment in the U. K. Electronics Industry." *Regional Science and Urban Economics* 37 (3): 399–412. Available at https://www.researchgate.net/publication/222607178_Local_Productivity_Spillovers_from_Foreign_Direct_Investment_in_the_UK_Electronics_Industry.
- Gismondi, Olivia. 2015. "Canada: Dramatic changes ahead for the *Trade-Marks Act*." Mondaq, January 16. Available at <http://www.mondaq.com/canada/x/366856/Trademark/Dramatic+Changes+Ahead+For+The+TradeMarks+Act>.
- Global Intellectual Property Center [GIPC]. 2016. *Infinite Possibilities: U.S. Chamber International IP Index*. Global Intellectual Property Center. Available at http://www.theglobalipcenter.com/wp-content/themes/gipc/map-index/assets/pdf/2016/GIPC_Index_2016_Final.pdf.
- Government of Canada. 2016a. "History of Copyright In Canada." Government of Canada. Available at <http://canada.pch.gc.ca/eng/1454685408763>.
- . 2016b. *Trademarks, Legislative Changes and International Treaties*. Government of Canada. Available at http://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/eng/wr03964.html?Open&wt_src=cipo-tm-main&wt_cxt=activity.
- Gravelle, Louise-Pierre. 1996. "TRIPS and its Impact on Canadian Intellectual Property Legislation." Leger Robic Richard. Available at <http://www.robic.ca/admin/pdf/565/204-LPG.pdf>.
- Greenhalgh, Christine, and Mark Rogers. 2010. *Innovation, Intellectual Property, and Economic Growth*. Princeton: Princeton University Press. Available at <http://press.princeton.edu/titles/9221.html>.
- Grootendorst, Paul, and Livio Di Matteo. 2007. "The Effect of Pharmaceutical Patent Term Length on Research and Development and Drug Expenditures in Canada." *Health Policy* 2(3): 63–84. Available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2585454/>.
- Hall, Bronwyn H. 2004. "Exploring the Patent Explosion." *Journal of Technology Transfer*. Available at https://eml.berkeley.edu/~bhhall/papers/BHH_MansfieldJune04.pdf.
- Harvard College v. Canada (Commissioner of Patents)*, [2002] 4 S.C.R. 45, 2002 SCC 76.
- Innovation, Science and Economic Development Canada. 2015. *Pharmaceutical Industry*. Innovation, Science and Economic Development Canada. Available at https://www.ic.gc.ca/eic/site/lsg-pdsv.nsf/eng/h_hn01703.html.
- . 2016a. *Canadian ICT Sector Profile – 2014*. Government of Canada. Available at https://www.ic.gc.ca/eic/site/ict-tic.nsf/eng/h_it07229.html.
- . 2016b. *IP Canada Report 2016*. Government of Canada. Available at [https://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/vwapj/IP_Canada_Report_2016_en.pdf/\\$file/IP_Canada_Report_2016_en.pdf](https://www.ic.gc.ca/eic/site/cipointernet-internetopic.nsf/vwapj/IP_Canada_Report_2016_en.pdf/$file/IP_Canada_Report_2016_en.pdf).
- Intellectual Property Law Improvement Act*, S.C. 1993, YB343- 17/3. Available at <http://publications.gc.ca/site/eng/33579/publication.html>.
- International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations*. WIPO-administered treaty done in Rome in 1961. Available at http://www.wipo.int/treaties/en/text.jsp?file_id=289757.
- Khan, B. Zorina. 2005. *The Democratization of Invention: Patents and copyrights in American economic development, 1790–1920*. Cambridge: Cambridge University Press. Available at <http://search.library.utoronto.ca/details?5650743>.

- Khan, Sheema. 2015. “The Canadian Innovation Deficit.” *Canada Perspective*. Available at <https://www.shapirocohen.com/the-canadian-innovation-deficit/>.
- KPMG. 2014. “Summary of the 2013 R&D Spending and Investments by Rx&D Members.” KPMG LLP, June 13. Available at http://innovativemedicines.ca/wp-content/uploads/2015/05/2014-06-20_RxD_RD_Report_FINAL_EN.pdf.
- Lai, Benjamin. 2015. “Bill C-31, the Trade Marks Act Amendments and Dealing with Trade-Mark Squatting.” *Intellectual Property Journal* 28 (1): 135–160.
- Lee, Jeong-Yeon, and Edwin Mansfield. 1996. “Intellectual Property Protection and U. S. Foreign Direct Investment.” *The Review of Economics and Statistics* 78 (2): 181–186. Available at https://www.jstor.org/stable/2109919?seq=1#page_scan_tab_contents.
- Lerner, Josh, and Feng Zhu. 2007. “What Is the Impact of Software Patent Shifts? Evidence from *Lotus v. Borland*.” *International Journal of Industrial Organization* 25:511–529. Available at <http://fengzhu.info/softwarepatent.pdf>.
- Lo, Shih-tse. 2011. “Strengthening Intellectual Property Rights: Experience from the 1986 Taiwanese patent reforms.” *International Journal of Industrial Organization* 29 (5): 524–536. Available at <http://www.sciencedirect.com/science/article/pii/S0167718710001347>.
- Lotus Development Corp. v. Borland International Inc.*, 49 F.3d 807 (1st Cir. 1995).
- Ludlow, Gregory. 1996. “Intellectual Property Part I- Summary of Government Activity.” Chapter in *Intellectual Property—Regulatory Complex: Overcoming Barriers to Innovation in Agricultural Genomics*, edited by Marden, Godfrey and Manion. Vancouver: UBC Press.
- Marrakesh Treaty to Facilitate Access to Published Works for Persons Who Are Blind, Visually Impaired or Otherwise Print Disabled*. WIPO, Jul 31, 2013. Available at <http://www.wipo.int/treaties/en/ip/marrakesh/>.
- McCalman, Phillip. 2001. “Reaping What You Sow: An empirical analysis of international patent harmonization.” *Journal of International Economics* 55 (1): 161–186. Available at http://econpapers.repec.org/article/eeeinecon/v_3a55_3ay_3a2001_3ai_3a1_3ap_3a161-186.htm.
- . 2005. “Who Enjoys ‘TRIPs’ Abroad? An empirical analysis of intellectual property rights in the Uruguay Round.” *Canadian Journal of Economics* 38 (2): 574–603. Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=696959.
- McCormack, Stuart. 2010. *Intellectual Property Law of Canada*. New York: Juris Publishing.
- Nice Agreement Concerning the International Classification of Goods and Services for the Purposes of the Registration of Marks*. 15 June 1957. Amended on 28 September 1979 (entered into force September 6, 1982). Available at http://www.wipo.int/treaties/en/text.jsp?file_id=287532.
- North American Free Trade Agreement Between the Government of Canada, the Government of Mexico, and the Government of the United States*, 17, December, 1992. Can TS 1994 no 2 (entered into force 1 January 1994). Available at <http://international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/nafta-alena/fta-ale/background-contexte.aspx?lang=eng>.
- North American Free Trade Agreement Implementation Act*, S.C. 1993, c. 44. Available at <http://laws-lois.justice.gc.ca/eng/acts/N-23.8/>.

- Nunnenkamp, Peter, and Julius Spatz. 2004. "Intellectual Property Rights and Foreign Direct Investment: A disaggregated analysis." *Review of World Economics* 140 (3): 393–414. Available at <http://link.springer.com/article/10.1007/BF02665982>.
- Orlhac, Thierry. 1990. "The New Pharmaceutical Compulsory Licensing Provisions." Leger Robic Richard. Available at <http://www.robic.ca/admin/pdf/514/167E-TO.pdf>.
- Owens, Richard C. 2015. "Debunking Alarmism Over the TPP and IP: Why the Trans-Pacific Partnership is a good deal for Canadian innovators." Macdonald-Laurier Institute *Commentary*, December. Available at: <http://www.macdonaldlaurier.ca/files/pdf/MLICommentaryOwens-12-15-final.pdf>.
- Park, Walter G., and Juan Carlos Ginarte. 1997. "Intellectual Property Rights and Economic Growth." *Contemporary Economic Policy* 15 (3): 51–61. Available at <http://onlinelibrary.wiley.com/doi/10.1111/j.1465-7287.1997.tb00477.x/abstract>.
- Patent Act* (R.S.C., 1985, c. P-4). Available at <http://laws-lois.justice.gc.ca/eng/acts/P-4/>.
- Patent Act Amendment Act*, 1992, S.C. 1993, c. 2.
- Patent Cooperation Treaty*, 19 June 1970, Can. T.S 1990 No .22. Available at <http://www.wipo.int/export/sites/www/pct/en/texts/pdf/pct.pdf>.
- Patent Law Treaty*, 1 June 2000 (entered in to force April 28 2005).
- Patented Medicine Prices Review Board [PMPRB]. 2015. *Annual Report 2015*. Government of Canada. Available at <http://www.pmprb-cepmb.gc.ca/view.asp?ccid=1273&lang=en#a1>.
- Penner, Mark D., and John P. Beardwood. 2016. "Going Global: Canadians increasingly taking advantage of the global IP marketplace." Fasken Martineau, December 8. Available at <http://m.fasken.com/going-global-canadians-increasingly-taking-advantage-of-the-global-ip-marketplace/>.
- Protocol Relating to the Madrid Agreement Concerning the International Registration of Marks*. 27 June 1989. Available at: http://www.wipo.int/wipolex/en/wipo_treaties/text.jsp?file_id=283484.
- Putnam, Jonathan D., and Andrew B. Tepperman. 2011. "Intellectual Property Rights and Economic Progress: A review." Chapter 6 in *Handbook on Law, Innovation and Growth*, edited by Robert E. Litan, pages 112–150. Cheltenham: Edward Elgar. <http://www.e-elgar.com/shop/handbook-on-law-innovation-and-growth>.
- PWC. 2015. *A Nation of Innovators: 2015 Canadian emerging technology companies' survey*. PWC. Available at <http://www.pwc.com/ca/en/emerging-company/connecting-vision-to-reality/publications/pwc-ceo-report-emerging-companies-2015-06-en.pdf>.
- Qian, Yi. 2007. "Do National Patent Laws Stimulate Domestic Innovation in a Global Patenting Environment? A cross-country analysis of pharmaceutical patent protection, 1978–2002." *The Review of Economics and Statistics* 89 (3): 436–453. Available at <http://users.nber.org/~yiqian/rest.89.3.pdf>.
- R. v. Stewart*, [1988] 1 S.C.R. 963.
- Rafiqzaman, Mohammed. 2002. "The Impact of Patent Rights on International Trade: Evidence from Canada." *The Canadian Journal of Economics* 35 (2): 307–330. Available at https://www.jstor.org/stable/3131948?seq=1#page_scan_tab_contents.

- Savine, Kirill. 2015. *Canada's Innovation Performance: A scorecard*. Deepcentre. Available at <http://deepcentre.com/wordpress/wp-content/uploads/2015/03/DEEP-Centre-Canadas-Innovation-Performance-March-2015.pdf>.
- Scherer, Frederic M. 2002. "The Economics of Human Gene Patents." *Academic Medicine* 77 (12): 1348–1367. Available at https://cyber.law.harvard.edu/cyberlaw2005/sites/cyberlaw2005/images/Economics_of_Gene_Patents.pdf.
- Scherer, Frederic M., and Sandy Weisburst. 1995. "Economic Effects of Strengthening Pharmaceutical Patent Protection in Italy." *International Review of Industrial Property and Copyright Law* 26: 1009–1024.
- Schroeder, Harold. 2007. "Do Patent Terms Impact Domestic R&D Spending in the Pharmaceutical Industry?" *Health Policy* 2 (3): 90–94. Available at <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2585445/>.
- Siwek, Stephen E. 2009. *Copyright Industries in the U.S. Economy: The 2003–2007 report*. International Intellectual Property Alliance. Available at <http://www.ei.com/downloadables/IIPASiwekReport2003-07.pdf>.
- Schwartz, David. 2001. "Patent Act Amendments Imminent." Smart and Biggar. *Security of Information Act*, R.S.C., 1985, c. O-5. Available at <http://laws-lois.justice.gc.ca/eng/acts/O-5/>.
- Singapore Treaty on the Law of Trademarks*. 27 March 2016 (entered into force March 16 2009). Available at <http://www.wipo.int/treaties/en/ip/singapore/>.
- Smith, Pamela J. 2001. "How Do Foreign Patent Rights Affect U.S Exports, Affiliate Sales, and Licences?" *Journal of International Economics* 55: 411–439.
- Statistics Canada. 2005. "Study: Impact of foreign ownership on growth in productivity." *The Daily*, December 5. Available at <http://www.statcan.gc.ca/daily-quotidien/051205/dq051205a-eng.html>.
- Tele-direct (Publications) Inc. v. American Business Information, Inc.*, [1998] 2 FC 22. Available at: <https://www.canlii.org/en/ca/fca/doc/1997/1997canlii6378/1997canlii6378.html>.
- Towse, Ruth. 2013. "The Quest for Evidence on the Economic Effects of Copyright Law." *Cambridge Journal of Economics*. Available at: <http://cje.oxfordjournals.org/content/early/2013/05/12/cje.bet014.abstract>.
- Trade-Marks Act* (R.S.C., 1985, c. T-13). Available at <http://laws-lois.justice.gc.ca/eng/acts/t-13/>.
- Will, George. 2017. "Who Wants to Be a Billionaire (in 1916)?" *National Review*, May 6. Available at http://www.nationalreview.com/article/447386/health-care-living-conditions-poor-americans-beat-those-billionaires-past?utm_source=twitter&utm_medium=social&utm_campaign=will&utm_content=billionaire.
- WIPO Copyright Treaty*. 20 December 1996. Available at http://www.wipo.int/treaties/en/text.jsp?file_id=295166.
- WIPO Performances and Phonograms Treaty 1996*. 20 December 1996 (entered in to force 20 May 2002). Available at <http://global.oup.com/booksites/content/9780198259466/15550008>.
- World Bank. 2016. "Research and Development Expenditure (% of GDP)." World Bank. Available at <http://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?locations=CA>.
- World Trade Organization Agreement Implementation Act*, S.C. 1994, c.47

Endnotes

- 1 See also the previous paper in this series.
- 2 Kind thanks to Denis Caron of Statistics Canada.
- 3 See the discussion below.
- 4 For a further discussion of the error of Mr. Balsillie's ways in respect of the TPP, see Richard Owens, 2015, "Debunking Alarmism Over the TPP and IP: Why the Trans-Pacific Partnership is a good deal for Canadian innovators."
- 5 See also the description of the recent history of Canadian IP laws, below.
- 6 See the third paper in this series, and *Alberta (Education) v. Canadian Copyright Licensing Agency (Access Copyright)* 2012 SCC 37.
- 7 The rule of reciprocal treatment and its application to Europe and other jurisdictions will be discussed in the next paper of this series.
- 8 This would be consistent with the US approach in which "anything under the sun made by man" is, subject to legislated exceptions, patentable: *Diamond v. Chakrabarty*, 447 U.S. 303 (1980).

About the Macdonald-Laurier Institute

What Do We Do?

When you change how people think, you change what they want and how they act. That is why thought leadership is essential in every field. At MLI, we strip away the complexity that makes policy issues unintelligible and present them in a way that leads to action, to better quality policy decisions, to more effective government, and to a more focused pursuit of the national interest of all Canadians. MLI is the only non-partisan, independent national public policy think tank based in Ottawa that focuses on the full range of issues that fall under the jurisdiction of the federal government.

What Is in a Name?

The Macdonald-Laurier Institute exists not merely to burnish the splendid legacy of two towering figures in Canadian history – Sir John A. Macdonald and Sir Wilfrid Laurier – but to renew that legacy. A Tory and a Grit, an English speaker and a French speaker – these two men represent the very best of Canada’s fine political tradition. As prime minister, each championed the values that led to Canada assuming her place as one of the world’s leading democracies. We will continue to vigorously uphold these values, the cornerstones of our nation.



Working for a Better Canada

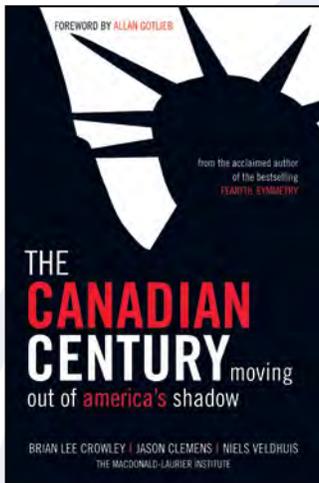
Good policy doesn’t just happen; it requires good ideas, hard work, and being in the right place at the right time. In other words, it requires MLI. We pride ourselves on independence, and accept no funding from the government for our research. If you value our work and if you believe in the possibility of a better Canada, consider making a tax-deductible donation. The Macdonald-Laurier Institute is a registered charity.

Our Issues

The Institute undertakes an impressive programme of thought leadership on public policy. Some of the issues we have tackled recently include:

- Aboriginal people and the management of our natural resources;
- Getting the most out of our petroleum resources;
- Ensuring students have the skills employers need;
- Controlling government debt at all levels;
- The vulnerability of Canada’s critical infrastructure;
- Ottawa’s regulation of foreign investment; and
- How to fix Canadian health care.

Macdonald-Laurier Institute Publications

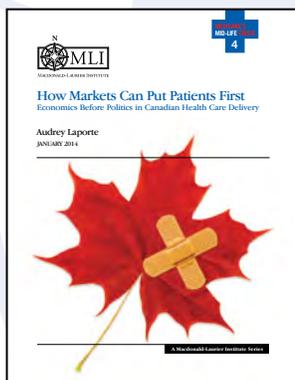


Winner of the Sir Antony Fisher International Memorial Award BEST THINK TANK BOOK IN 2011, as awarded by the Atlas Economic Research Foundation.

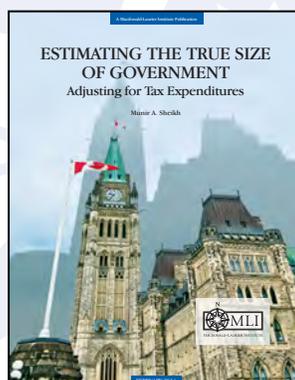
The Canadian Century
By Brian Lee Crowley, Jason Clemens, and Niels Veldhuis

Do you want to be first to hear about new policy initiatives? Get the inside scoop on upcoming events? Visit our website www.MacdonaldLaurier.ca and sign up for our newsletter.

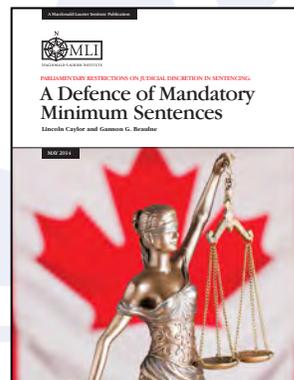
RESEARCH PAPERS



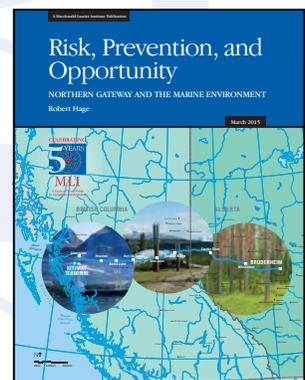
How Markets Can Put Patients First
Audrey Laporte



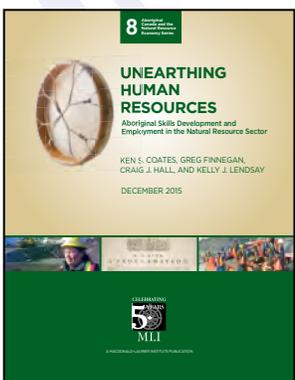
Estimating the True Size of Government
Munir A. Sheikh



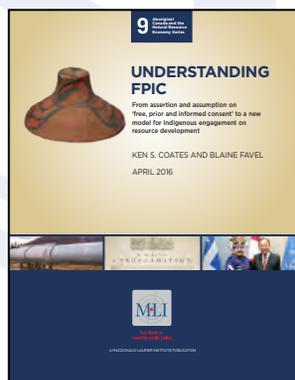
A Defence of Mandatory Minimum Sentences
Lincoln Caylor and Gannon G. Beaulne



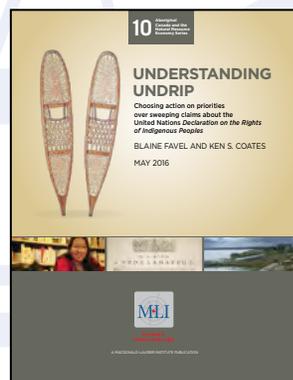
Risk, Prevention and Opportunity
Robert Hage



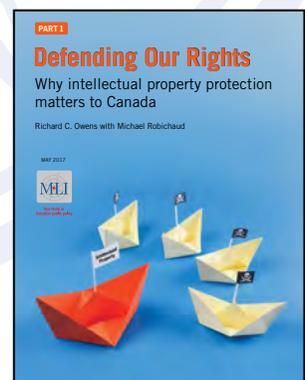
Unearthing Human Resources
Ken S. Coates, Greg Finnegan, Craig J. Hall, and Kelly J. Lendsay



Understanding FPIC
Ken S. Coates and Blaine Favel



Understanding UNDRIP
Blaine Favel and Ken S. Coates



Defending Our Rights
Richard C. Owens and Michael Robichaud



True North in
Canadian public policy

CONTACT US: Macdonald-Laurier Institute
8 York Street, Suite 200
Ottawa, Ontario, Canada K1N 5S6

TELEPHONE: (613) 482-8327

WEBSITE: www.MacdonaldLaurier.ca

**CONNECT
WITH US:**



@MLInstitute



[www.facebook.com/
MacdonaldLaurierInstitute](http://www.facebook.com/MacdonaldLaurierInstitute)



[www.youtube.com/
MLInstitute](http://www.youtube.com/MLInstitute)

What people are saying about the Macdonald- Laurier Institute

In five short years, the institute has established itself as a steady source of high-quality research and thoughtful policy analysis here in our nation's capital. Inspired by Canada's deep-rooted intellectual tradition of ordered liberty – as exemplified by Macdonald and Laurier – the institute is making unique contributions to federal public policy and discourse. Please accept my best wishes for a memorable anniversary celebration and continued success.

THE RIGHT HONOURABLE STEPHEN HARPER

The Macdonald-Laurier Institute is an important source of fact and opinion for so many, including me. Everything they tackle is accomplished in great depth and furthers the public policy debate in Canada. Happy Anniversary, this is but the beginning.

THE RIGHT HONOURABLE PAUL MARTIN

In its mere five years of existence, the Macdonald-Laurier Institute, under the erudite Brian Lee Crowley's vibrant leadership, has, through its various publications and public events, forged a reputation for brilliance and originality in areas of vital concern to Canadians: from all aspects of the economy to health care reform, aboriginal affairs, justice, and national security.

BARBARA KAY, NATIONAL POST COLUMNIST

Intelligent and informed debate contributes to a stronger, healthier and more competitive Canadian society. In five short years the Macdonald-Laurier Institute has emerged as a significant and respected voice in the shaping of public policy. On a wide range of issues important to our country's future, Brian Lee Crowley and his team are making a difference.

JOHN MANLEY, CEO COUNCIL
