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CUSTOM REPORT

Healthy Growth

Estimating the Economic Footprint of the Fast Growing Consumer Health Products Industry

Presented to:
Consumer Health Products Canada

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Executive Summary

Consumer health products are items that we use every day to maintain health and manage minor ailments. These products include over-the-counter drugs such as pain relievers and allergy medications, and natural health products such as vitamins and supplements. The consumer health products industry, which includes wholesalers and retailers selling consumer health products and manufacturers involved in their production, has seen substantial growth over the last decade and has developed into a notable contributor to the overall economy. The goal of this report is to estimate the industry's current economic footprint and measure its contribution to the Canadian economy.

Compared to overall sales growth, Canada's domestic and international sales of consumer health products have increased rapidly over the last decade. From 2004 to 2014, total retail sales across the country grew at an average annual pace of 3.8 per cent while consumer health products sales increased by 4.2 per cent per year.

In 2014, after a decade of phenomenal growth, domestic retail sales of consumer health products were valued at $5.6 billion, while exports were estimated at $1.5 billion. Between 2004 and 2014, exports of these products nearly doubled—an increase of almost three-and-a-half times the growth in overall exports. The relative performance of the sector is even more impressive compared to Canada's total non-energy exports, which have managed almost no growth over the last decade.

Combined international and domestic sales of consumer health products are estimated at $7.1 billion in 2014, and the industry directly created $2.7 billion in GDP through manufacturing activities and wholesale and retail sales. However, the impact of the industry extends beyond its direct impacts to support many other industries by purchasing products and services for its production process. The industry directly employs 30,300 employees in manufacturing and the wholesale and retail trade sectors, and supports an additional 14,500 employees through its supply chain. These employees also contribute to the economy as they spend their income. Combining these three impacts provides us with an estimate of the total economic footprint of the consumer health products industry in Canada, which is valued at $5.8 billion in GDP and supports almost 57,000 jobs.

The industry generates income for the following stakeholders:

- $3.2 billion in household income;
- $848 million in corporate profits;
- $518 million in personal income taxes;
- $288 million in corporate income taxes; and
- $606 million in sales taxes.

1. Introduction

This research explores the impact that the consumer health products industry has on Canada's economy. The industry encompasses the items individuals use for self-administered health care such as over-the-counter medicines and natural health products. Sales of these products over the last decade have grown faster than overall retail spending and represented just over one per cent of all retail spending in the country in 2014.

This report quantifies the impact of spending on and exports of consumer health products on the Canadian economy. The first part of this study estimates the size of the industry and its direct impact on the economy and then, using standard econometric techniques, estimates the complete economic footprint of the industry, which is the total of its direct, indirect and induced economic impacts. The scope of this study is to focus on only the impacts associated with consumption and exports. As such, it does not attempt to quantify factors such as the benefits accruing to the economy through the industry's role in helping to maintain a healthy population or reducing the burden on healthcare systems. For example, the study does not attempt to estimate the impact of reduced employee absenteeism due to one's ability to self-treat minor ailments using consumer health products.

Section 2 of this report provides a general discussion of the consumer health products industry and our estimate of its direct impact on the economy. In Section 3 the methodology used to quantify the economic footprint of the industry is discussed. Section 4 contains the results of our footprint analysis. Section 5 summarizes the findings.

2. Overview of the Consumer Health Products Industry

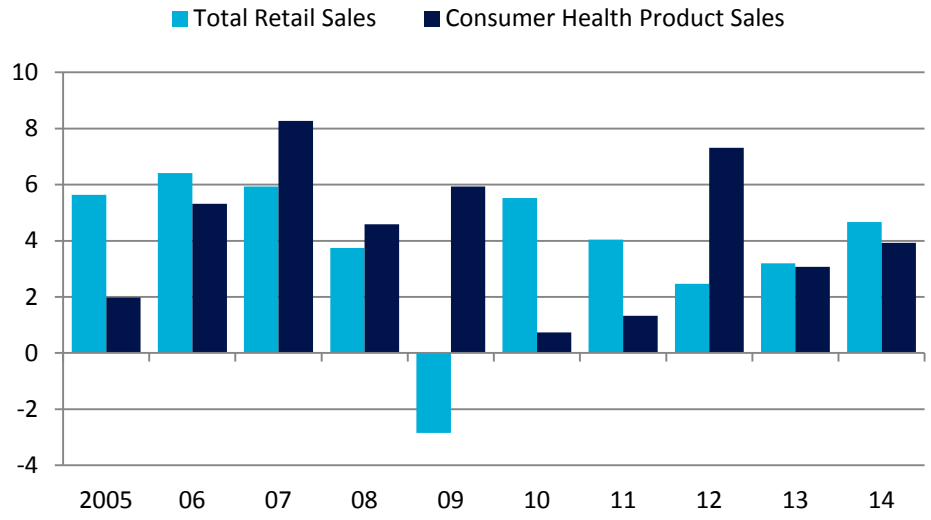
Consumer health products can be broadly categorized as products used by individuals to maintain their health and self-treat minor ailments. This research relies on the definition from Statistics Canada's *Retail Commodity Survey* to define the industry as firms involved in selling and producing over-the-counter drugs, vitamins, herbal remedies and other health supplements. From an economic viewpoint, the industry can be disaggregated into those selling products directly to Canadians and revenues from exporting these products for consumption in other countries. This report discusses each of these revenue segments separately since their growth rates have differed significantly over the last decade.

In 2014, Canadian's spent $5.6 billion on consumer health products. This represents 1.1 per cent of all retail spending in the country. While growth in Canadian spending on these products has slowed in recent years, the long-term trend is positive. (See Chart 1.)

Chart 1

Domestic Sales of Consumer Health Products Post Strong Growth

(percentage change)



Sources: The Conference Board of Canada; Statistics Canada CANSIM 080-0022, accessed May 2015.

Looking at average annual growth over the last decade, sales of consumer health products grew much faster than overall retail sales, averaging annual compound growth of 4.2 per cent per year compared to total annual retail sales growth of 3.8 per cent.

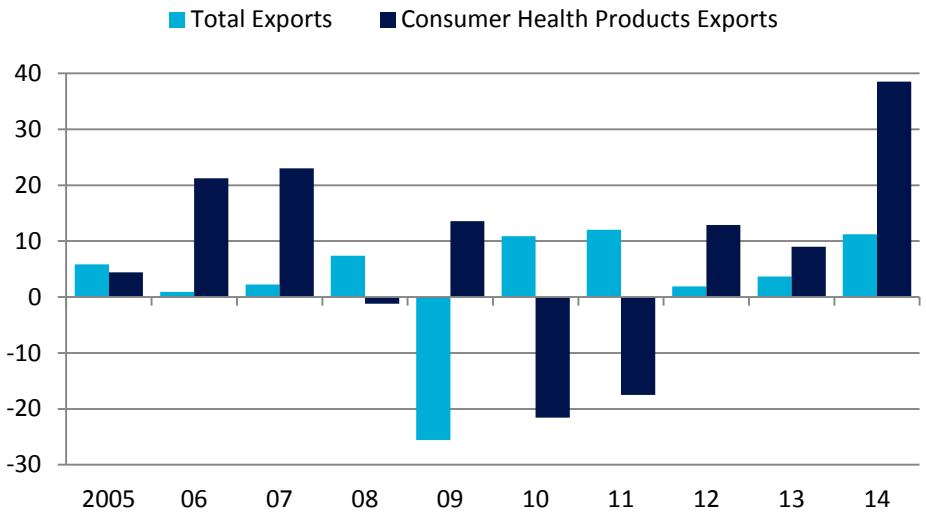
In 2014, the $5.6 billion in retail spending on consumer health products directly contributed $2.1 billion to Canada's gross domestic product (GDP). This represents $300 million in manufacturing and $1.8 billion in wholesale and retail trade value-added output. Gross domestic product is a different concept than revenue; GDP measures value-added—the wages, salaries and profits generated within the industry—which can be roughly thought of as industry sales minus input costs.[1] The GDP estimate in this analysis accounts for the fact that a portion of consumer health product sales are imported and, therefore, do not contribute to domestic economic growth.

[1] Detailed information on how sales revenue translates into GDP is available in Section 3.

Exports of consumer health products were estimated at $1.5 billion in 2014—almost double their 2004 value. Overall export growth in Canada struggled throughout much of last decade as the strong Canadian dollar reduced our international competitiveness. However, the consumer health products industry defied this trend with a 93 per cent increase in exports between 2004 and 2014 compared to the 27 per cent increase in total exports.[2] (See Chart 2.)

Chart 2

Exports of Consumer Health Products are Growing Much Faster than Total Exports
(percentage change)



Sources: The Conference Board of Canada; Industry Canada Trade Data Online.

[2] No direct estimate of the consumer health products industry exists—we explain our methodology for calculating this data in Section 3. The estimate provided here can be considered a conservative estimate of the size and growth of consumer health products exports. Statistics Canada conducted surveys in 2004, 2007 and 2011 of the Functional Foods and Natural Health Products industry. Using this survey data, export revenue for the natural health products and functional foods industry grew by 211 per cent between 2004 and 2011. According to Statistics Canada, exports of natural health products—just one segment of the consumer health products industry—were valued at $1.3 billion in 2011 and accounted for 79 per cent of total exports of functional foods and natural health products. See: Khamphoune, Beau. *Results from the 2011 Functional Foods and Natural Health Product Survey*. Ottawa: Statistics Canada, 2012. p.8 www.statcan.gc.ca/pub/18-001-x/18-001-x2013001-eng.pdf and Cinnamon, Beau. *Results from the 2007 Functional Foods and Natural Health Product Survey*. Ottawa: Statistics Canada, 2009. www.statcan.gc.ca/pub/88f0006x/88f0006x2009001-eng.pdf

Export performance in this industry is even more impressive when compared to growth in non-energy exports. Excluding exports from the mining, oil and gas sector and petroleum and coal product manufacturing, Canadian exports grew by just 5 per cent during the last decade. Our estimates suggest that CHP exports directly contributed $636 million to Canada's economy in 2014, with the largest impacts occurring in manufacturing ($450 million) and wholesale trade ($140 million).

Consumers are becoming increasingly aware of the benefits of maintaining a healthy lifestyle and this has helped push up demand for consumer health products in Canada. This trend is not isolated to Canada, with exports for this industry posting very strong growth over the last decade due to a robust increase in demand and Canada's reputation as a high-quality supplier in the natural health products industry.[3] Overall, the industry's combined domestic and international sales in 2014 are estimated at $7.1 billion, contributing $2.7 billion to the GDP. Of this, $1.9 billion occurred in the retail and wholesale trade sectors and $750 million in manufacturing production.

In addition to its direct impact, the consumer health products industry contributes indirect and induced impacts to the economy. For this study, The Conference Board of Canada used its proprietary national econometric forecasting model in conjunction with Statistics Canada's input-output (IO) model to calculate the industry's full economic footprint, including direct, indirect and induced impacts. The following section provides a detailed description of the methodology used to conduct this analysis, and the results are discussed in Section 4.

3. Methodology

The goal of this report is to estimate the total economic footprint of the consumer health products industry, defined as its direct, indirect and induced impacts. In order to estimate the economic footprint, this research uses economic models to define and describe how activity in one industry can have wider repercussions on the economy. The most obvious impact of any industry is the economic activity directly attributed to it, which is comprised of the wages of those directly employed in the industry and the profits generated. In addition to this direct impact, an industry creates demand for inputs from other industries through the course of its operations, which are referred to as indirect or supply-chain impacts. The final impact—induced impacts—occurs when employees in

[3] Agriculture and Agri-Food Canada, *Opportunities and Challenges Facing the Canadian Functional Foods and Natural Health Products Sector* (Ottawa: Agriculture and Agri-Food Canada, 2014). www.agr.gc.ca/resources/prod/doc/pdf/ffnhp_opportunities_challenges_afpsn_possibilites_defis-eng.pdf

industries that generate direct and indirect impacts spend their wages, further contributing to the economy. We describe each of these impacts in this section.

The first step in the footprint analysis was to determine the size of Canada's consumer health products industry, which is also called its direct impact or GDP. To calculate the industry's GDP, we used its revenues and Statistics Canada's industry input-output model to estimate value-added production in the industry's manufacturing and wholesale and retail trade sectors.

We obtained revenue data for the consumption of consumer health products from Statistics Canada's *Retail Commodity Survey*. Export revenues for the industry are not readily available and required an estimate. We divided the data on total export revenues for the pharmaceutical and medicine manufacturing industry[4] into consumer health products and prescribed medicines by assuming that the share of consumer health products in total drug consumption (where total drugs includes vitamins, health supplements and prescription and non-prescription medicine) was the same as the industry's export share[5]. Combining the total consumption and export revenue provides an estimate of the industry's overall revenue.

Using both the revenue and the Statistics Canada IO model estimates discussed above, it is possible to estimate the direct contribution of the consumer health products industry to Canada's GDP. Using total revenues, we completed two shocks using Statistics Canada's IO model (one for consumption and one for exports) to determine the relationship between industry revenues and GDP.[6] The IO model contains information on the detailed linkages underpinning our economy and is able to estimate, at a very disaggregate level, how sales of a particular commodity translate into economic value-added output.[7] Based on the estimate of direct GDP for the industry, we can also estimate its total economic footprint. A footprint analysis involves identifying the supply chain linkages in the consumer health products industry and quantifying its impacts on key economic indicators such as GDP, employment, income, and government revenues. The footprint

[4] Export revenues are from Industry Canada's Trade Data Online and correspond to NAICS code 3254.

[5] Export revenues were estimated as (consumption of consumer health products/total drug consumption)*pharmaceutical exports.

[6] For a description of Statistics Canada's IO model, refer to Appendix A.

[7] Value-added or net output is the difference between total revenue and the sum of expenses on parts, materials, and services used in the production process. Summing the value-added across all industries in a region will yield the GDP in that region.

analysis in this study evaluates the combined direct, indirect, and induced economic impacts, where:

> **Direct impacts** measure the value added to the economy from the consumer health products industry that can be directly attributed to industry employees, the wages they earned, and revenues generated by firms.
>
> **Indirect impacts** measure the value added that the "direct impact firms" generate within the economy through their demand for intermediate inputs or other support services. For example, the consumer health products industry creates demand for banking and telecommunication services.
>
> **Induced impacts** are derived when employees of the aforementioned industries spend their wages and owners spend their profits. These purchases lead to more employment, higher wages, and increased income and tax revenues, which can be felt across a wide range of industries.

To derive the indirect and induced economic impacts associated with the consumer health products industry, the Conference Board relied on simulation results from Statistics Canada's national IO model and the Board's proprietary national forecasting model. We then used the results of the IO simulations to assess the impact of the industry on a broad range of economic indicators.

While the input-output estimates provide a very detailed account of the supply chain linkages, the Conference Board's national model has the benefit of assessing what the full impacts mean for a range of economic indicators such as income and government tax revenues.[8] We used the Board's national forecasting model to estimate the total economic footprint of the consumer health products industry on the Canadian economy in 2014.

4. Results of the Economic Footprint Analysis

Section 2 examined the direct economic impact of the consumer health products industry. However, the direct impacts are only part of the economic story since they don't account for the demand that the industry creates in other sectors of the economy. Economic activity linked to demand that the industry creates for supply chain inputs are referred to

[8] A description of the Conference Board's national forecasting model is contained in Appendix B.

as indirect impacts and are an important consideration when evaluating the role of an industry in an economy. Furthermore, additional economic benefits accrue when employees in the direct and supply chain industries spend their wages and salaries. These are referred to as induced economic impacts. Evaluating the total economic footprint of an industry involves combining the total direct, indirect, and induced impacts. In this section we expand the analysis to calculate the total economic footprint of the consumer health products industry on Canada's economy. Through this analysis, we determine the economic multipliers that describe how GDP and employment would respond to a potential increase in sales.

Our research suggests that the economic footprint of the industry accounted for $5.8 billion in GDP in 2014. (See Table 1.)

Table 1

Economic Footprint of the Consumer Health Products Industry: Key Indicators
(2014, $ millions)

GDP at market prices	5,776
Direct GDP of the consumer health products industry	2,706
Indirect (supply chain)	1,587
Induced	1,483
Employment	56,878
Wages and salaries	2,649
Other labour income*	542
Corporate profits	848
Personal income taxes	518
Corporate income taxes	288
Sales taxes	606
Federal government balance (national accounts balance)	1,255
Provincial government balance (national accounts balance)	765

*includes supplementary labour income and labour income of the unincorporated sector
Sources: The Conference Board of Canada; Statistics Canada Canadian Input-Output Model.

Impacts of the consumer health products industry can be felt across a wide range of economic indicators. The economic output it creates supports a total of 56,878 jobs across the country, boosting household income (wages and other) by $3.2 billion. Businesses also benefit, with $848 million in corporate profits attributable to the economic activity that this industry sustains.

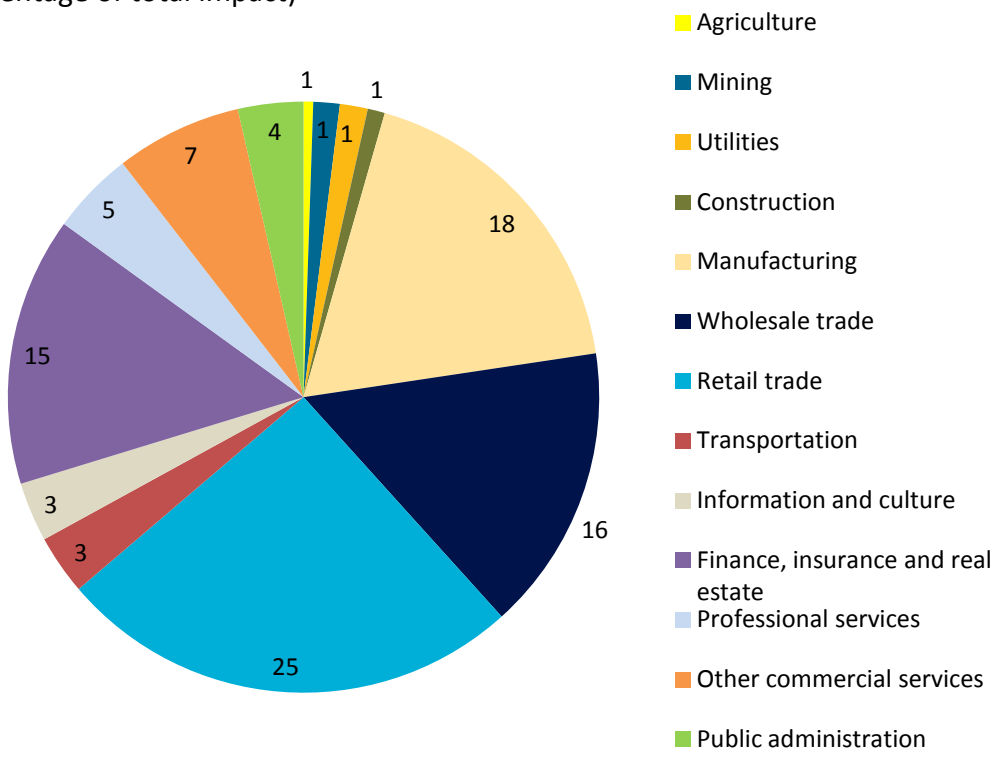
Income earned by industry employees is a notable source of government tax revenue. In 2014, the federal and provincial governments collected $518 million in personal income taxes and $288 million in corporate taxes thanks to the economic activity supported by Canada's consumer health products industry. These products also accounted for a total of $606 million in collected sales taxes.[9] In addition, government balances improve beyond the increase from these three sources of tax revenue because of other taxes (e.g., non-sales taxes on products, and the social insurance contributions of industry employees) and reduced employment insurance payments. The combination of all these factors improved the federal government balance by $1.3 billion and increased the collective provincial government balances by $765 million.

A wide variety of economic sectors benefit from the impact of the consumer health products industry. (See Chart 3.)

[9] Consumer health products are subject to sales taxes in most Canadian jurisdictions, however British Columbia does not charge its provincial sales tax on over-the-counter drugs, or on vitamins and supplements. See B.C. Government Bulletin PST 207 available at: http://www.sbr.gov.bc.ca/documents_library/bulletins/pst_207.pdf

Chart 3

Economic Footprint of the Consumer Health Products Industry
(percentage of total impact)



Sources: The Conference Board of Canada; Statistics Canada Canadian Input-Output Model.

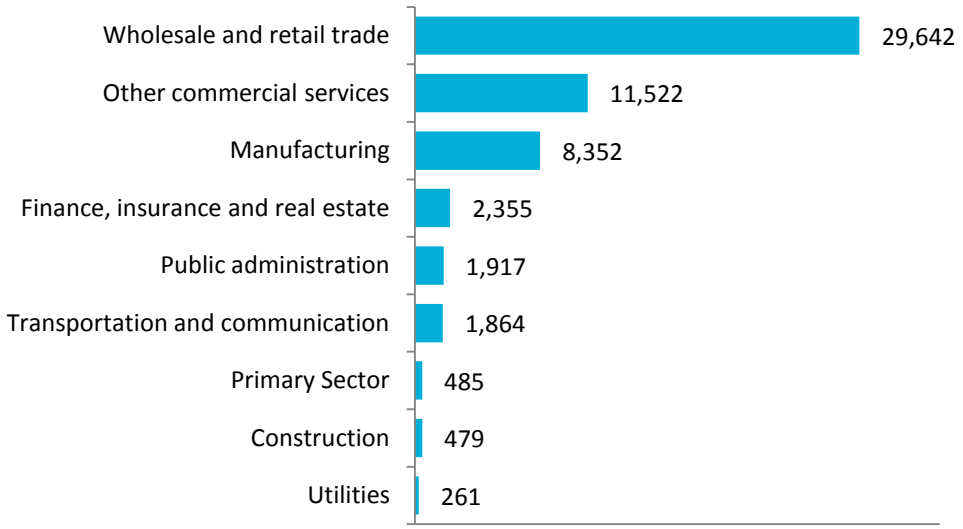
The largest impacts occur in the industries that consumer health products directly impact: retail trade, wholesale trade and manufacturing. The retail and wholesale sectors capture much of the direct consumption impact (domestic sales), while the manufacturing industry benefits from a large share of the export impact (foreign sales). In total, the economic activity generated by the consumer health products industry lifted real output by $1.2 billion in retail trade, by $760 million in wholesale trade, and by $880 million in manufacturing.[10] The largest supply chain impacts occur in the finance, insurance and real estate industry, and the professional and technical services industry since the consumer health products sector generates notable demand for banking, leasing, legal and accounting services.

[10] These industry GDP statistics are measured in basic prices at 2007$ and reflect inflation-adjusted estimates. The most often quoted GDP statistics refer to expenditure-based GDP measured at market prices; basic prices GDP is lower than market prices GDP and is calculated as market prices minus taxes and subsidies on products.

Employment gains are distributed in a similar pattern to the GDP impacts. (See Chart 4.)

Chart 4

Employment Impacts of the Consumer Health Products Industry
(direct, indirect and induced jobs by industry)



Sources: The Conference Board of Canada; Statistics Canada Canadian Input-Output Model.

In 2014, Canada's consumer health products industry supported almost 30,000 jobs in the wholesale and retail trade sector plus nearly 12,000 more jobs in other commercial services (e.g., professional and technical) and an additional 8,000 jobs in manufacturing. Direct impacts accounted for slightly more than half of the total jobs created, while supply chain and induced impacts supported the remaining jobs..

Increases in GDP and direct, indirect and induced employment can be expressed as multiplier impacts, which detail the total economic response to an increase in industry demand or the total footprint relative to the direct impact. Table 2 shows the multipliers for the consumer health products sector for each of its demand segments, as well as the overall industry multiplier.

Table 2
Consumer Health Products Industry Multipliers

	GDP	Employment
Consumption		
Impact/$1,000,000 in demand	$786,531	8.2
Total impact/direct impact	2.01	1.8
Exports		
Impact/$1,000,000 in demand	$939,296	7.7
Total impact/direct impact	2.14	2.5
Total industry		
Impact/$1,000,000 in demand	$818,696	8.1
Total impact/direct impact	2.04	1.9

Sources: The Conference Board of Canada; Statistics Canada Canadian Input-Output Model.

In Table 2, the first row for each segment shows the economic response to an increase in demand for consumer health products. On the consumption side, a $1 million increase in demand would generate a total GDP impact of $786,531 and support 8.2 jobs. The second row expresses the total impact as a share of the direct industry impact. The GDP impacts associated with consumption show that for every $100 in direct GDP generated by the industry, an additional $101 in GDP is created through its indirect and induced impacts. Similarly, every 100 jobs that the consumer health products industry creates support an additional 80 jobs across the country.

For the export segment, the GDP multiplier is higher relative to the consumption results while the employment multiplier is lower. Exports have a larger impact on GDP than an increase in consumer demand because some of the products purchased by Canadians are imported. Although, some products are imported through the supply chain to generate exports this is much lower than the total imports brought in to support domestic consumption. Exports have a lower impact on employment than GDP since much of the direct impact occurs in the manufacturing industry where productivity—the output produced by each worker—is higher compared to the retail and wholesale trade sector. By comparison, retail and wholesale trade accounts for most of the direct impact from the domestic consumer health products industry. Higher productivity means that fewer workers are required to produce each unit of output. On the other hand, compared to consumption, the export segment has a much larger relative supply chain impact, so the export multipliers that express the total impact (jobs) as a share of the direct impact (jobs directly created) are higher.

The total industry multipliers are a weighted average of the consumption and export results and show that every $1 million in demand for consumer health products generates a GDP impact of $818,696. Moreover, every 100 jobs created by this industry supports an additional 90 jobs.

5. Research Summary

This research examined the total economic footprint of Canada's consumer health products industry in 2014. Over the last decade, consumption of these products has been growing faster than overall retail spending, and the industry's exports have grown substantially faster than Canada's overall non-energy exports despite a challenging environment caused by a significant appreciation of the Canadian dollar during that time period.

Results from our analysis show that total sales of consumer health products were valued at $7.1 billion last year. The industry is comprised of manufacturers, wholesalers and retailers that directly contributed $2.7 billion to Canadian GDP in 2014. After accounting for the entire supply chain and the impact of those employed in the industry, the total economic footprint of the industry accounted for $5.8 billion in GDP and supported close to 57,000 jobs. Income gains supported by the consumer health products industry are widely distributed throughout the economy, generating household income of $3.2 billion and corporate profits of $848 million. The industry also generated net income for the federal government in the order of $1.3 billion and provincial government net income of $765 million.

Appendix A: Input-Output Models

Input-output (IO) models are economic models that describe how goods and services flow through an economy. They have two key elements—geography and commodities—that represent particular goods or services. The IO model encompasses information about which industries produce these commodities and how they are used—either as inputs into other industries, consumed domestically, or exported. The geography element tracks where production takes place and the trade of various commodities across provincial and international boundaries.

One application of IO models is calculating the economic impacts associated with different types of economic activity. Because the model describes how supply chains work, we are able to "shock" the IO model and observe how the impact feeds through the economy. "Shocks" are inputs into the model, which can take different forms. For example, for this research, sales revenue for consumption and exports in the consumer health products industry were identified and the corresponding commodity output was increased by an amount equal to domestic sales and total exports. Through the IO model, we can trace how the increase in demand for these commodities translates into GDP and employment.

The IO model used in this analysis is produced and maintained by Statistics Canada, which annually updates the IO tables used in the model as part of the Canadian System of National Accounts (CSNA). The CSNA is a system of integrated statistical accounts with four main components: input-output accounts (national and provincial), income and expenditure accounts (national and provincial), balance of payments, and financial and wealth accounts. The IO tables cover all economic activities conducted in the market economies of each province and territory, encompassing persons, businesses, government and non-governmental (non-profit) organizations, and entities outside its jurisdiction that give rise to imports or exports (interprovincial or international).

To compile the IO accounts, Statistics Canada obtains source data every year for each province and territory from all relevant surveys and administrative sources such as tax records, professional and industry organizations, and non-government institutions. In the process of preparing statistical estimates, data from various sources are analyzed by subject-matter experts, and used to compile estimates that are consistent with all other estimates in the system and to provide a valid and coherent statistical picture of the subject matter. Consistency is a key feature of the statistics produced by the IO accounts.

As a result, Statistics Canada's IO model is the most comprehensive description of how economic activity flows through the Canadian economy. It describes the flows for more than 700 different commodities and 300 different industries across all provinces and territories. The model solutions include both "open" results, which summarize the direct and indirect impacts of a shock, and "closed" results, which summarize the combined direct, indirect, and induced impacts. Key outputs from the model that can be used to describe the results of a shock include employment, GDP, labour income, gross output,

and international trade. The results described here used Statistics Canada's 2010 IO model, the most current available at the time of the analysis.

Key Assumptions

Although IO models can be useful tools for understanding the economic impacts associated with particular projects, it is also important to note that a number of assumptions are embedded in the results. The following section discusses some of these major assumptions.

Fixed Production Patterns

The tables that underlay the IO model are based on the supply chain relationship in the Canadian economy at a fixed point in time—in this particular case 2010. As such, the model results do not account for how factors such as changes in relative prices for different inputs, productivity, and technology can impact supply chains over time. As well, trade flows do not incorporate external factors, such as changes in exchange rates, the emergence of new trading partners, or changes in trade policy.

This assumption is also pertinent in the discussion of induced effects. The model assumes fixed consumption and savings patterns for consumers over time. In reality, spending and saving patterns are influenced by a variety of factors including economic circumstances and demographics. As a result, the further ahead in time you look using an IO model, the less likely it is that future economic activity will be accurately reflected.

Lack of Supply Constraints

Another key assumption embedded in the IO results is that there are no supply constraints on the economy. This means that the model results assume that all of the inputs needed to conduct the shock are readily available, and that any increase in production will not be competing with others for resources. In reality, if a project is of significant size it may lead to higher prices and/or wages as new production draws resources away from other activities.

This is particularly pertinent in the discussion of the induced effects. The induced effects assume that the people employed as a result of the direct and indirect effects would otherwise be unemployed, but at least some of them would likely find other employment, though their pay may be less. Thus, including the induced effects likely overstates the total economic effects; however, not including them certainly understates the total economic effects.

Appendix B: The Conference Board's National Forecasting Model

The national forecasting model, known as the Medium-Term Forecasting Model (MTFM), is a quarterly model of the Canadian economy. The model was originally designed for forecasting and simulations over the short to medium term. More recently, the notion of potential output was incorporated in the model allowing MTFM to be used for long-term analysis.

MTFM differs from many other quarterly macroeconomic models in its emphasis on factors that are important for forecasting the medium-term prospects for the economy. These factors include a detailed consideration of population and its age structure, a disaggregated modelling of prices, employment and investment expenditures. The government sector is also treated in great detail in MTFM and reflects the most recent institutional environment.

There are about 900 endogenous variables in the model, of which nearly 400 have stochastic equations. The endogenous variables refer to many of the variables in the National Income and Expenditure Accounts as well as related indicators for productivity, wages, prices, financial markets, international capital flows and exchange rates. Over 600 of these variables form a single simultaneous block in the model, reflecting the significant interdependence of its various sectors. The most important of the 1,000 exogenous variables in the model are foreign economic indicators and variables relating to government expenditures and revenues and demographic characteristics of the population.

Of the final demand categories, government expenditures are determined exogenously. Real disposable income, population and real interest rates largely determine consumer spending on goods and services. Business investment is determined by the user cost of capital, corporate profits net of taxes, and overall economic activity. Real interest rates, income and demographic factors affect investment in residential construction. Imports are largely driven by consumer spending, investment in machinery and equipment, and relative prices. Exports are driven by relative prices and U.S. demand.

The level of detail available in MTFM's final demand breakdown (roughly 50 categories) is key in determining production by industry through a detailed input-output block. MTFM incorporates Statistic Canada's most recent estimates of the industrial structure of the Canadian economy (2005 is currently available). The input-output block produces an industrial breakdown of more than 60 industries.

Employment is modeled as a function of industrial output, labour productivity and wages. In turn, wages are a function of employment, inflationary expectations and lagged productivity.

In order to forecast prices, it is necessary to project potential output. In other words, it is essential to forecast the supply side. The behavioural equation for supply capacity takes the form of a Cobb-Douglas production function. Potential output depends on the factor inputs—capital, labour and productivity in which each factor input is, in turn, also determined endogenously. The labour input is a function of the natural rate of employment and the labour force. Capital stock is determined simply as the capital stock at the end of the last period plus new investment less depreciation.

Final demand prices, including consumer spending deflators, investment and exports are influenced by specific industry prices but also by the key price. The key price, represented in MTFM as the consumer price index, is driven largely by the economy's performance relative to potential: the output gap. The price block also contains a detailed bottom-up, stage-of-processing price model. In this block, raw material prices feed industry prices, which in turn feed final demand deflators and other associated prices. The small size and openness of the Canadian economy is such that many prices are determined on world markets and the prices of imported commodities feed into the price block at each of the three stages of processing.

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