Assessing the Economic Impact of the Forest Sector in Ontario

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UNIVERSITY OF TORONTO

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Ontario

About the study

This economic impact assessment was conducted by the Forest Economy and Decision Support Systems Lab at the Institute of Forestry and Conservation. The Institute stems from a long history of forestry education within the University of Toronto. It is composed of a unified body of interdisciplinary, diverse, dedicated, and innovative natural, engineering, and social scientists.

The study measured the economic impact of the forest sector in Ontario, including operations related to forestry and logging, wood products manufacturing, and pulp and paper manufacturing, as well as its contribution to regional economies for the year 2019. Most of the data that forms the basis of the study is publicly available from Statistics Canada. The methodological approach draws extensively on a previous analysis conducted by the BC Council of Forest Industries.[1]

Acknowledgment

This report was prepared by staff from the University of Toronto:

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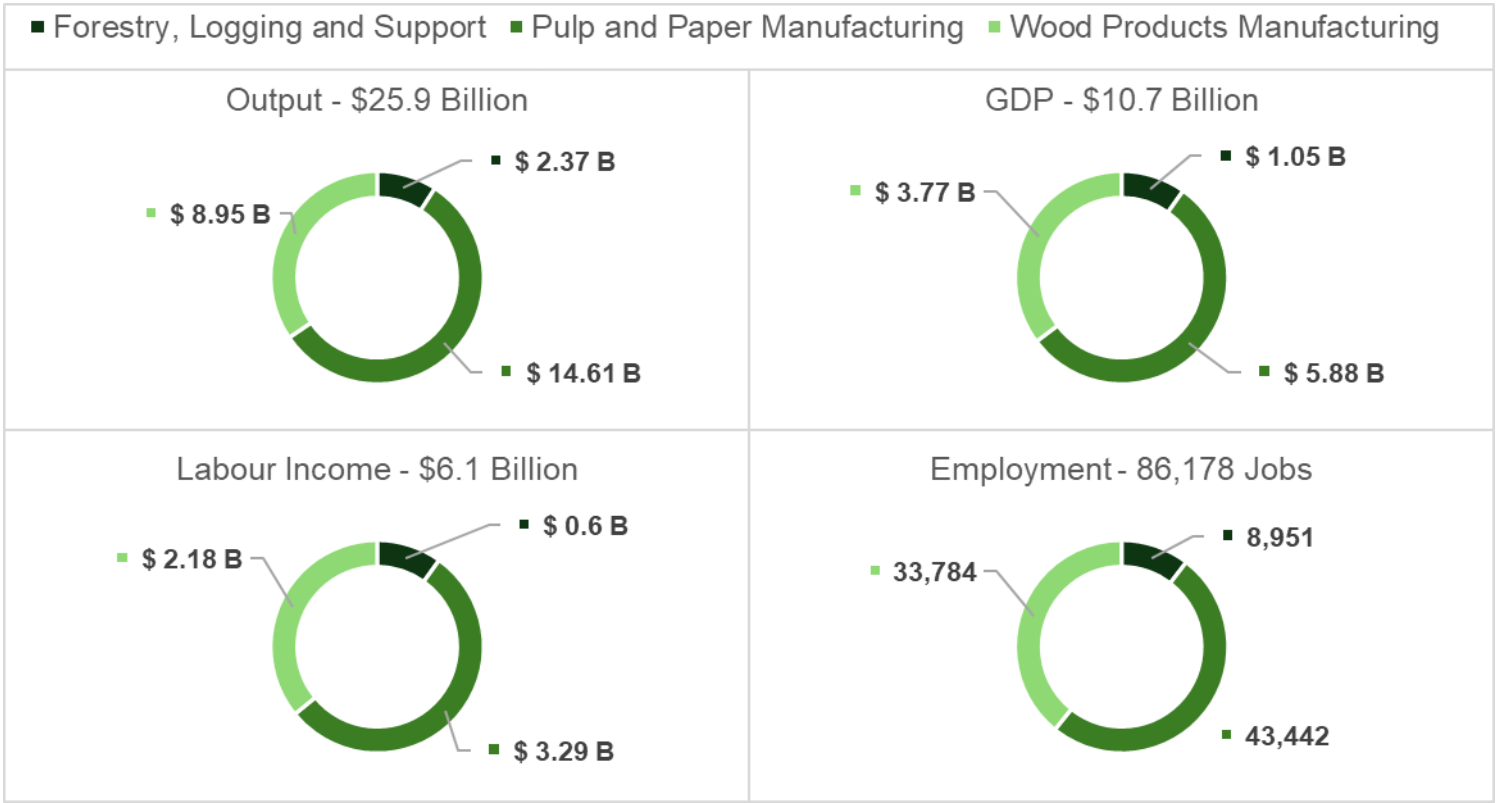
Any omissions or discrepancies are solely the responsibility of the authors.

[1] The Economic Impact of British Columbia's Forest Sector

Report Summary

In Ontario, the forest sector covering forestry, pulp and paper manufacturing, and wood products manufacturing, generated wider economic impacts in all regions of the province through its supply chain, which affects many sectors.

These province-wide economic footprints are not necessarily reported, so it can be difficult for the overall economic impact of the sector to be understood. To quantify the total contribution of the forest sector to the province's economy, we undertook an economic impact assessment using an Input-Output model based mainly on Statistics Canada's supply and use table. This is an established macroeconomic model that captures the relationships between different industries within an economy.



The results of this exercise show that in 2019, the forest sector contributed the following:

- The forest sector contributed to Ontario's welfare economy by $10.7 billion in gross domestic product. This breaks down as $1.0 billion from forestry, logging,

and related support activities, $3.8 billion from wood products manufacturing and $5.9 billion from pulp and paper manufacturing.

- In terms of income, the forest sector provided approximately $6.1 billion in total labour income. This figure includes wages, salaries, and employer social contributions, including pension plan payments.
- The province's workforce consisted of approximately 86,200 jobs tied to the forest sector, with 20,000 (23%) of those concentrated in the north (Northeast and Northwest regions).
- Government revenues derived from the forest sector, including taxes on products and production, corporate and personal income taxes and stumpage, totalled $3.3 billion, of which $1.3 billion flowed to the provincial government, $1.9 billion to the federal government, and $99 million to municipal governments.

Table of Contents

Introduction

Ontario's forests cover 71 million hectares, accounting for 66% of the province's land area and 17% of the national forest cover.[2] These forests have long been essential to the livelihoods of many Ontarians, particularly Indigenous communities. In 2019, the forest sector contributed 0.68% to the province's gross domestic product. While this percentage may seem modest, the sector's true economic footprint extends beyond direct forestry activities.

Because many forestry inputs are locally sourced, the forest sector creates spinoff effects, driving demand for goods and services and generating tax revenues that fund essential public services such as healthcare, education, and infrastructure.

Moreover, only about half of the wood that could be sustainably harvested in Ontario over the last decade has been utilized (Figure 1).

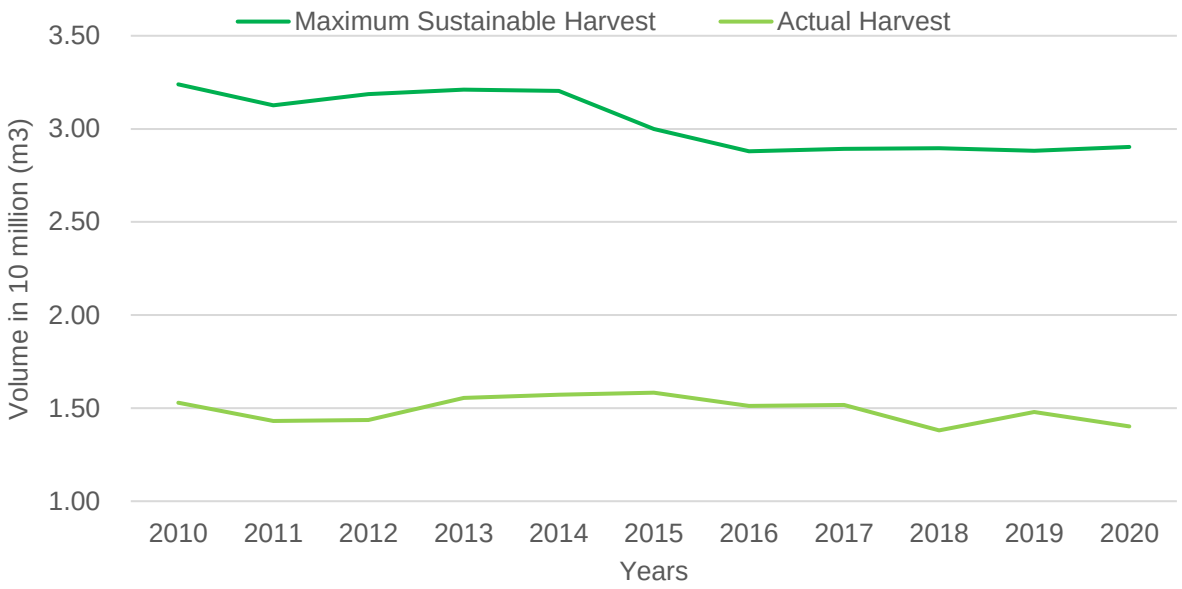


Figure 1: Actual harvest volume versus the maximum sustainable harvest volume in Ontario

Source: National Forestry Database of Canada (Ontario's Forest Facts[3])

With rising global and local demand for sustainably sourced forest products, the province has the potential to become a world leader in harvesting and manufacturing forest products, from its sustainably managed Crown forests.

[2] Sustainable Growth: Ontario's Forest Sector Strategy
[3] https://public.tableau.com/views/OntariosForestFacts/Harvest?%3AshowVizHome=no

This study quantified the total economic impacts of Ontario's forest sector and its regional economies in 2019. The analysis is based on Statistics Canada's Interprovincial Input-Output multipliers,[4] which allowed the estimation of direct, indirect, and induced effects attributed to the sector using four key economic indicators:

1. Employment
2. Output
3. Gross Domestic Product
4. Labour income

These metrics are reported at both the provincial and regional levels, with data segmented across eleven Economic Development Regions. Additionally, the study evaluated tax and government revenues generated by the forest sector, with estimates for provincial, federal, and municipal levels of government.

The remainder of this report is structured as follows:

- Section 1 – Province-Wide Economic Impacts
- Section 2 – Economic Impacts by Regions
- Section 3 – Government Revenues
- Section 4 – Capital Formation

The main body of the report presents an overview of the methodology, while more detailed descriptions can be found in the Appendix.

[4] https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3610011301

1. Province-Wide Economic Impacts

1.1 The Forest Sector

For this analysis, we chose Statistics Canada's Input-Output Industry Classification (IOIC)[5] to categorize the forest sector, which is made up of seven distinct sub-sectors. Below is a description of each sub-sector along with its associated IOIC code.

- Forestry and Logging (BS113000): Consists of businesses primarily focused on timber cultivation and harvesting. It includes growing and selling timber, managing forest nurseries, and conducting logging activities.
- Support Activities for Forestry (BS115300): Companies providing services that assist forestry and logging operations. This includes activities such as timber cruising and tree planting.
- Sawmills and Wood Preservation (BS321100): These facilities mainly produce dimension lumber, shakes, and shingles, and include operations focused on wood treatment processes.
- Veneer, Plywood, and Engineered Wood Product Manufacturing (BS321200): Facilities producing hardwood, softwood veneer and plywood. It also includes firms that manufacture engineered wood products like oriented strand boards, laminated veneer lumber, finger-jointed lumber, and mass timber.
- Other Wood Product Manufacturing (BS321900): Companies that manufacture millwork items such as softwood flooring and moulding, as well as those producing wooden boxes, prefabricated buildings, pallets, and wood pellets.
- Pulp, Paper, and Paperboard Mills (BS322100): This covers establishments that produce pulp through mechanical or chemical processes, in addition to paper mills.
- Converted Paper Product Manufacturing (BS322200): Firms manufacturing paper products by processing purchased paper and paperboard.

Estimates are available for all the sub-sectors mentioned above. However, for clarity and presentation purposes, we have grouped these sub-sectors into three categories (Table 1).

Table 1: Forest sub-sectors grouped into three categories

Forestry, Logging and Support	Wood Products Manufacturing	Pulp and Paper Manufacturing
• Forestry and Logging • Support Activities for Forestry	• Sawmills and Wood Preservation • Veneer, Plywood, and Engineered Wood Product Manufacturing • Other Wood Product Manufacturing	• Pulp, Paper, and Paperboard Mills • Converted Paper Product Manufacturing

[5] https://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVD&TVD=137240

1.2 Economic Metrics

The Input-Output (IO) impact study relies on a large set of data to assess how additional spending in the forest sector generates economic value across all other industries within the province. Four economic measures have been considered to assess the economic contribution.

- Output: This metric represents the total value of goods and services produced by the sector. Essentially, it reflects the sector's sales revenue. When aggregated across the supply chain, it involves some double counting, as the value of intermediate goods can be accounted for more than once in the calculations. For example, a paper mill that sells paper for $400/m^3 relies on an intermediate product (pulp) purchased for $200/m^3 from a pulp mill. The combined output of the pulp and paper facilities would be $600/m^3, even though the value of the pulp is already accounted for in the output of the pulp mill.
- Gross Domestic Product at basic prices (GDP): GDP prevents double counting by including only the value added at each stage of the supply chain. Value added at any production stage is computed by subtracting the value of intermediate inputs from the final product's value. In the previous example, the value added of the paper mill is $200/m³ ($400/m³ minus $200/m³). Adding the value added from each stage in the supply chain yields the sector's contribution to GDP.
- Labour Income: Part of the value added generated through production is used to pay various factors of production, broadly categorized into labour and capital. Labour income or compensation refers to the share of the value added attributed to labour, including wages, salaries, and social contributions like pension plans and employment insurance.
- Employment: This metric represents the total number of jobs embedding two main categories, employee jobs and self-employed jobs. It accounts for full-time, part-time, temporary, and self-employed positions, without considering the number of hours worked per employee.

For each of these measures listed above, three types of supply chain impacts are estimated. This includes:

- Direct ("Direct spending"): Refers to the economic results directly attributed to the forest sector, such as working in forest management units, logging, or manufacturing.
- Indirect ("Supply chain impact"): This measures the economic impacts on the suppliers of the forest sector (e.g., the energy sector).
- Induced ("Expenditure of employees"): From the initial spending in the forest sector, increased spending and economic output raise household incomes, boosting their consumption of goods and services.

Another key aspect of the IO model is the magnitude of ripple effects attributed to a sector. These effects are typically represented by multipliers, which are simple indicators that help us understand how one job created in the forest sector can generate positive spinoff effects in other industries. There are two popular multipliers:

Type I (simple multiplier) = (direct + indirect impacts) / direct impact

Type II (total multiplier) = (direct + indirect + induced impacts) / direct impact

The type I employment multiplier reflects the indirect effect on jobs outside the forest sector resulting from the creation of one direct job in the forest sector. For example, if one new job in a paper mill leads to an additional transportation job, the type I multiplier would be 2. The same concept applies to the type II multiplier, but it also accounts for the induced impact.

1.3 Results by Sub-sector

After outlining the sub-sectors of the forest industry and the metrics and concepts relevant to the IO analysis, this section summarizes the total economic impacts for each metric and sub-sector. It also includes the type I and type II job multipliers derived from the results.

Table 2: Output of Ontario's Forest Sector, 2019 $CAD Billions

Sector	Direct	Indirect	Induced	Total Impact
Forestry, Logging and Support	1.48	0.52	0.38	2.37
Pulp and Paper Manufacturing	9.27	3.24	2.10	14.61
Wood Products Manufacturing	5.55	1.89	1.51	8.95
Total Forest Sector	16.30	5.65	3.98	25.93

Table 3: GDP of Ontario's Forest Sector, 2019 $CAD Billions

Sector	Direct	Indirect	Induced	Total Impact
Forestry, Logging and Support	0.60	0.23	0.22	1.05
Pulp and Paper Manufacturing	2.94	1.69	1.25	5.88
Wood Products Manufacturing	1.90	0.97	0.90	3.77
Total Forest Sector	5.44	2.89	2.37	10.70

Table 4: Labour Compensation of Ontario's Forest Sector, 2019 $CAD Billions

Sector	Direct	Indirect	Induced	Total Impact
Forestry, Logging and Support	0.37	0.13	0.10	0.60
Pulp and Paper Manufacturing	1.75	0.96	0.58	3.29
Wood Products Manufacturing	1.18	0.58	0.42	2.18
Total Forest Sector	3.30	1.67	1.10	6.07

Table 5: Employment of Ontario's Forest Sector, number of jobs for the year 2019

Sector	Direct	Indirect	Induced	Total Impact
Forestry, Logging and Support	5,117	1,885	1,950	8,951
Pulp and Paper Manufacturing	18,704	13,840	10,900	43,445
Wood Products Manufacturing	17,249	8,704	7,831	33,784
Total Forest Sector	41,070	24,428	20,681	86,180

Table 6: Type I and Type II Employment Multipliers for the year 2019

Sector	Type I	Type II
Forestry, Logging and Support	1.37	1.75
Pulp and Paper Manufacturing	1.74	2.32
Wood Products Manufacturing	1.50	1.96
Total Forest Sector	1.59	2.10

1.4 Indirect Spinoff Effect

The forest sector was a major contributor to employment in 2019. It directly employed 41,070 workers and sparked wider economic activity. This influence extended through interconnected industries, leading to an additional 24,428 jobs indirectly supported by forestry operations (refer to Table 5). To illustrate the breadth of forestry's impact on employment creation, Figure 2 spotlights the top eight industries (as per IOIC codes) most significantly associated with these indirect job gains. The transportation, energy, and building industries are the most impacted by the forest sector spinoff effect in terms of indirect employment, with more than 39% of jobs created.

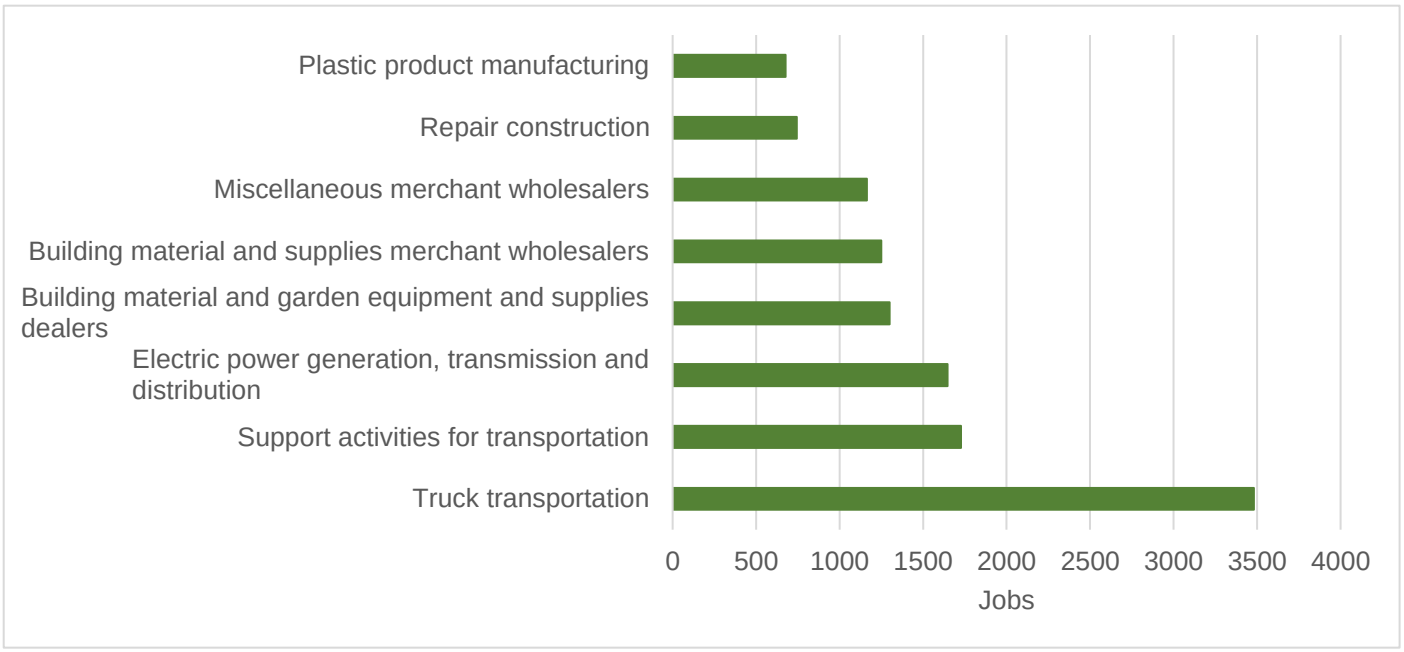


Figure 2: The top eight industries indirectly impacted by the forest sector in terms of jobs created

1.5 Public and Private Sector Contributions

We drew on previous economic impact estimates and analyzed Facility Annual Return data[6] to address the nuances of public versus private contributions to the forest sector. Our analysis of the sources of forest products[7] received at processing facilities revealed that 9% originated from private lands, while 91% came from public, or Crown, lands.

This finding highlights that most forest products involved in transformation and production processes across the supply chain are sourced from public or Crown harvests. These ratios were subsequently applied to the overall economic impacts of the forest sector, as illustrated in Figure 3 and Figure 4.

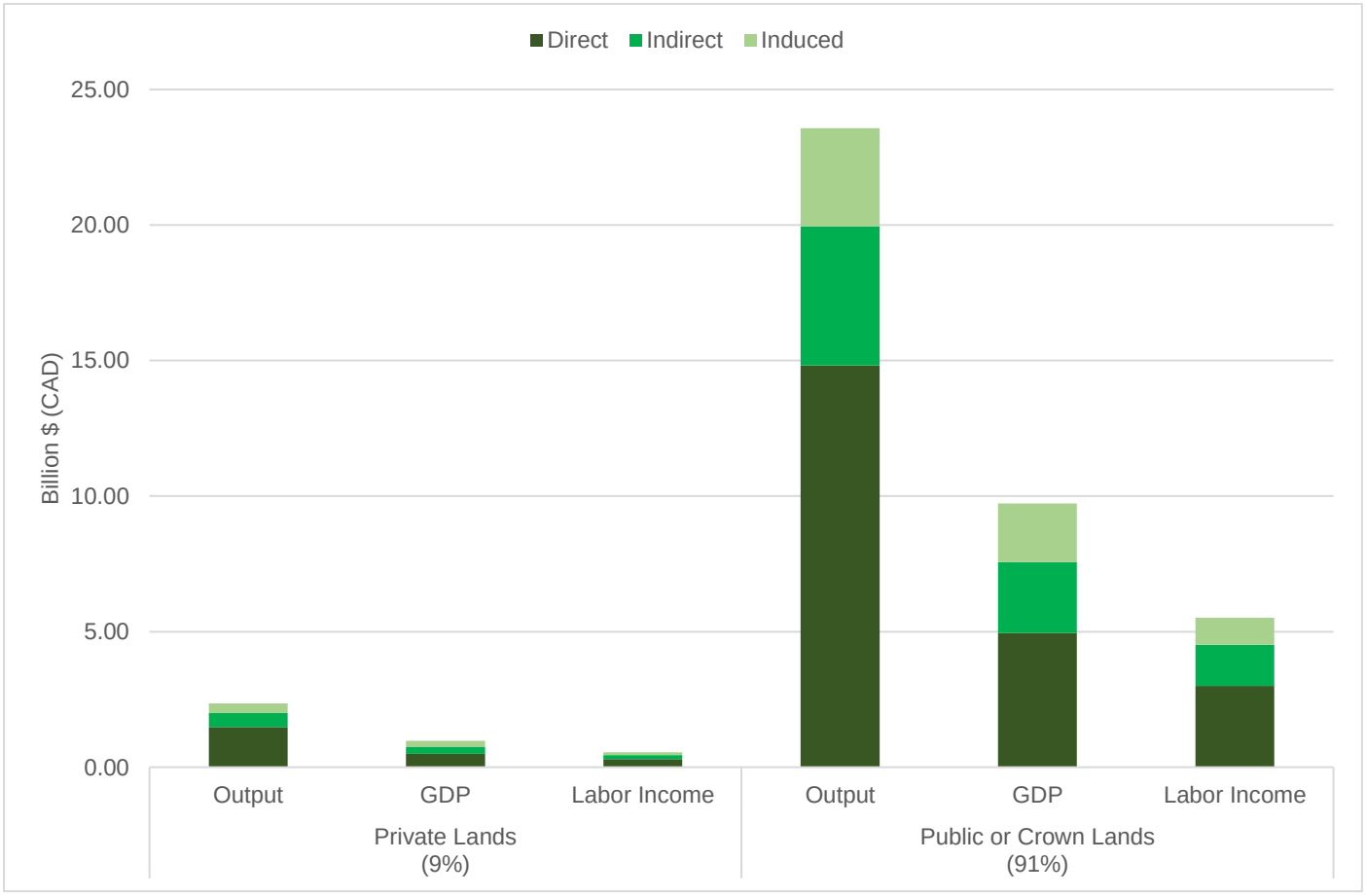


Figure 3: Total economic impacts (Output, GDP, Labour Income) for the year 2019 by source of harvest

[6] Mills that consume less than 1,000 cubic meters of forest resources are not required to report to the ministry. Thus, estimates should be used with caution.
[7] Roundwood, whole-tree chips, and other fibre types.

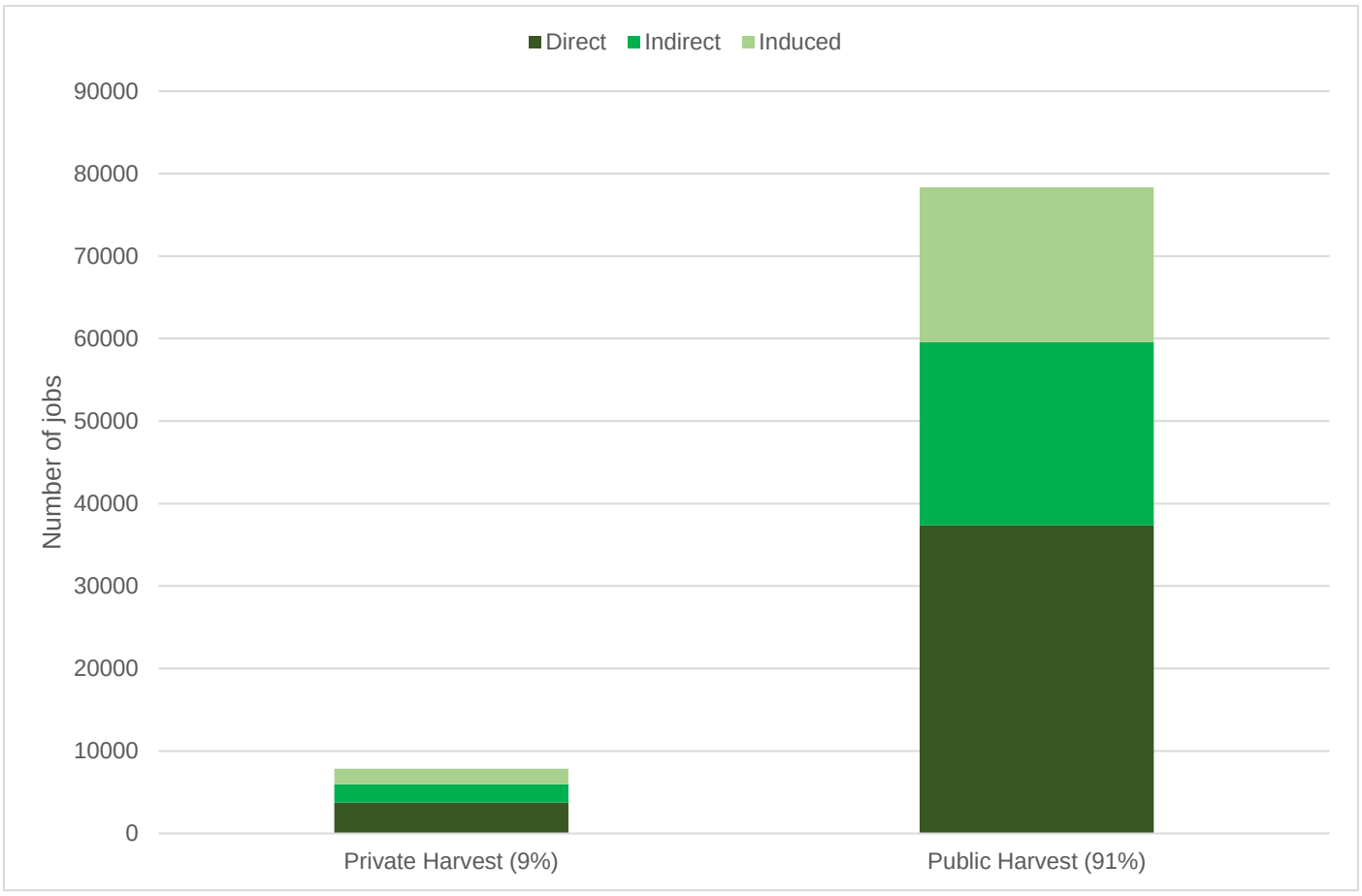


Figure 4: Total number of jobs for the year 2019 by source of harvest

2. Economic Impacts by Region

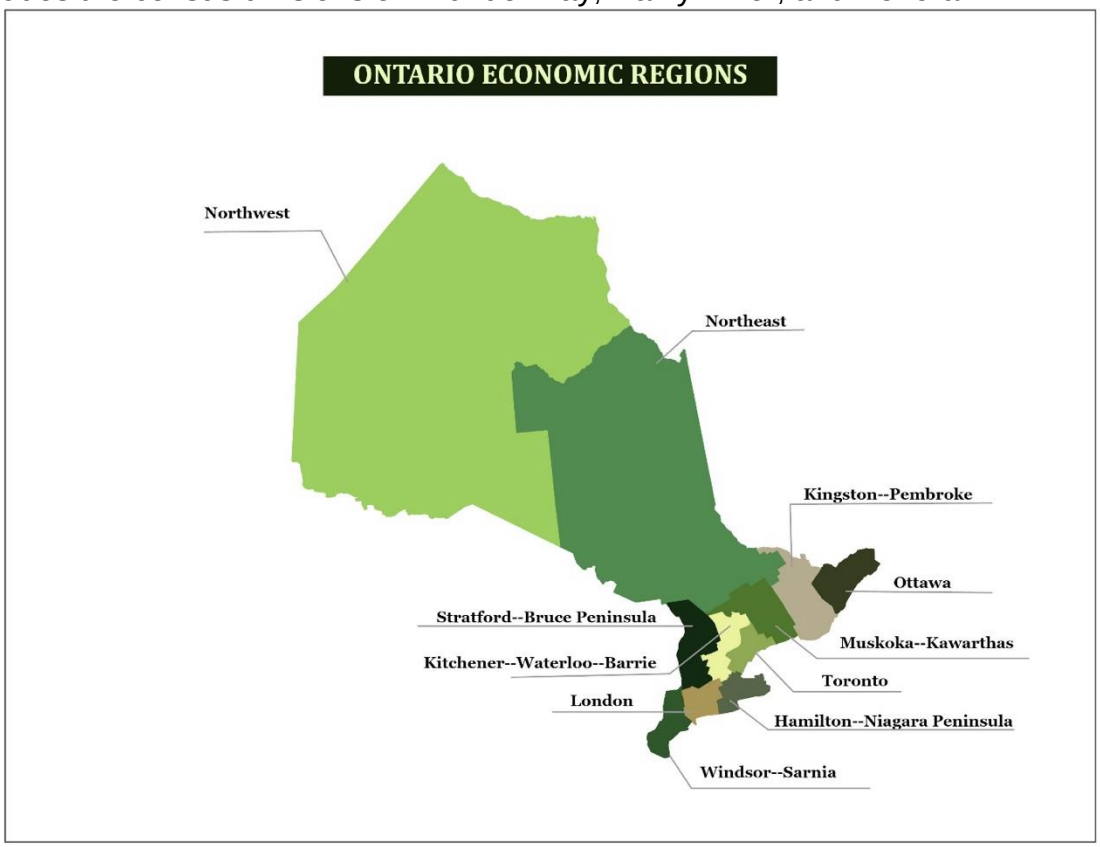
2.1 The Economic Regions of Ontario

Ontario is geographically composed of eleven economic regions, each formed by the spatial aggregation of complete census divisions.[8] They can be seen as units for analysis of any regional economic activity. The forest sector has a disproportionate impact on the economic activity of each economic zone. Below is a snapshot of these regions:

- Ottawa: This region encompasses the Canadian capital and includes several surrounding census divisions such as Stormont, Dundas, Glengarry, Prescott and Russell, and Lanark. The area includes the vibrant urban centre of Ottawa, with strong government, technology, and tourism sectors.[9]
- Kingston/Pembroke: Located in eastern Ontario along major waterways, the region includes the historic city of Kingston, as well as Pembroke. It covers census divisions such as Frontenac, Lennox and Addington, Hastings, and Renfrew. It is known for its strong manufacturing sector that continues to employ many residents alongside education.[10]
- Muskoka/Kawarthas: Known for its natural beauty and recreational areas which attract retirees and seasonal residents, this region stretches across the counties of Northumberland, Peterborough, and Haliburton, enclosing Kawartha Lakes and Muskoka. Its economy is heavily influenced by tourism-related industries but also includes construction and some manufacturing industries.[11]
- Toronto: Ontario's largest economic region and the most populated one, the Toronto area contains the census divisions of Durham, York, Peel, and Toronto itself. This area is Canada's financial and business hub, with major industries ranging from finance to technology and media.[12]
- Kitchener/Waterloo/Barrie: This region comprises four census divisions: Dufferin, Waterloo, Wellington, and Simcoe. It is known for its booming manufacturing sector as a contributor to GDP and employment, particularly automotive manufacturing.[13]
- Hamilton/Niagara/Peninsula: This region has major urban centres like Hamilton and Niagara Falls. Its census divisions include Hamilton, Niagara, Haldimand-Norfolk, and Brant. The region benefits from manufacturing, wholesale and retail trade, finance, and real estate.[14]

[8] Economic Regions - SGC 2001 - 35 - Ontario - Province and territory (statcan.gc.ca) - There is an exception for the census boundaries of Halton which is split between two Economic Regions: Hamilton-Niagara Peninsula and Toronto.
[9] https://www.central1.com/wp-content/uploads/2018/04/Ottawa.pdf
[10] https://www.central1.com/wp-content/uploads/2018/04/Kingston-Pembroke.pdf
[11] https://www.central1.com/wp-content/uploads/2018/04/Muskoka-Kawarthas.pdf
[12] https://www.toronto.ca/business-economy/invest-in-toronto/strong-economy/
[13] https://www.futureautolabourforce.ca/wp-content/uploads/2020/06/Regional-Profile_Kitchener-Waterloo-Barrie.pdf
[14] https://www.central1.com/wp-content/uploads/2018/04/Hamilton-Niagara-Peninsula.pdf

- London: Centred around the mid-sized London city, this region covers Oxford, Elgin, and Middlesex counties and has a diverse economic profile. It is a mix of urban and rural economies, with fast-growing sectors such as agri-food, manufacturing, media, and service sectors.[15]
- Windsor/Sarnia: Located at the southwest corner of Ontario at the border with Michigan State, this region is home to key manufacturing hubs. In addition, agriculture is an important exporting sector. The area covers Chatham-Kent, Essex, and Lambton census divisions.[16]
- Stratford/Bruce/Peninsula: This is a more rural and scenic region that covers the counties of Perth, Huron, Grey, and Bruce. The economy is dominated by agriculture, utilities (e.g., Bruce Energy Centre), and manufacturing, with a relatively small service sector.[17]
- Northeast: Covering a vast area bordered by Québec to the east, it spans census divisions like Nipissing, Sudbury, Cochrane, and Algoma. Marked by socio-spatial dispersion, its economy is heavily driven by mining, forestry, and tourism, with Greater Sudbury serving as the largest urban centre.[18]
- Northwest: Situated in the northwestern corner of Ontario, this region is bounded by Manitoba to the west and Hudson Bay to the north. Like the Northeast, its economy heavily relies on natural resource industries, while also experiencing significant spatial dispersion. The region includes the census divisions of Thunder Bay, Rainy River, and Kenora.[18]



Source: Figure created by Elham Ashrafizadeh using ArcGIS. Regional boundaries are based on a shapefile downloaded from Statistics Canada. Geospatial Boundaries.

[15] https://www.central1.com/wp-content/uploads/2018/04/London.pdf
[16] https://www.central1.com/wp-content/uploads/2018/03/Windsor-Sarnia.pdf
[17] https://www.central1.com/wp-content/uploads/2018/03/Stratford-Bruce-Peninsula.pdf
[18] https://www.northernpolicy.ca/upload/documents/publications/reports-new/conteh_economic-zones-en.pdf

2.2 Regionalization of Province-wide Impacts

We computed a location ratio using labour force data to regionalize the province-wide economic impacts obtained in section 1. This ratio was then applied to distribute the economic impacts proportionally across the eleven economic regions. To obtain these estimates, we adhered to a series of steps:

1. The "Experienced" labour force data by census division, broken down by four-digit North American Industry Classification System (NAICS) codes, was sourced from a custom tabulation by Statistics Canada based on the 2016 census and aggregated to economic regions using GIS mapping. This labour force data offers a more reliable measure that is less affected by short-term fluctuations or seasonal variations compared to publicly available employment data. These estimates were based on the place of work rather than the place of residence, as it was considered more accurate to reflect the economic impact distribution and link more realistically to forest harvesting.
2. To match this newly created labour force data by economic region, which uses NAICS codes, with the province-wide economic impacts that are available by IOIC codes, we had to map the four-digit NAICS codes with IOIC codes. This exercise was done using a concordance table between the two classifications provided by Statistics Canada[19] and resulted in estimates of the labour force across the economic regions by IOIC codes for the three forest sector categories and the total labour force for all industries.
3. We computed the employment ratios by region for the three forest sector groups as well as the total of all industries. The employment ratio is the labour force in a given region as a share of the total experienced labour force in Ontario for each industry considered.
4. We applied these employment ratios to the three types of impacts (direct, indirect, and induced) of the respective sectors obtained in subsection 1.3 under the assumption that industry linkages are the same across the province. This yielded region-specific economic impact estimates by forest sub-sector in absolute terms.
5. Since the interpretation regarding the importance of the forest sector can be misleading if one relies solely on the absolute regionalized impacts, we followed the same steps to regionalize the footprints of all industries (including the forestry-related sectors) for the four economic measures. Then, we divided the absolute impacts obtained in step four by these global regionalized impacts for each economic region. This is believed to effectively reflect the relative contribution of the forest sector to regional economies.

[19] Industry, product, and final demand classifications (statcan.gc.ca)

The analysis illustrates that the forest sector impacts all regions disproportionately, with Toronto experiencing the highest economic impact (Figure 5). However, in relative terms, the forest sector holds greater importance in northern Ontario, particularly in the Northwest region, followed by the Northeast region (Figure 6).

Similarly, job creation varies across regions. The Northeast and Northwest see greater impacts from forestry, logging, and support activities, while Toronto leads in job creation within the pulp and paper manufacturing and wood manufacturing sectors. Pulp and paper manufacturing and wood products manufacturing have a larger impact on job creation, generating a significant number of indirect and induced positions compared to forestry, logging, and support activities, which have a more limited ripple effect (Figure 7). The employment potential of the forest sector is most prominent in the Northeast and Northwest regions, while it contributes minimally to job creation in Toronto compared to other sectors (Figure 8).

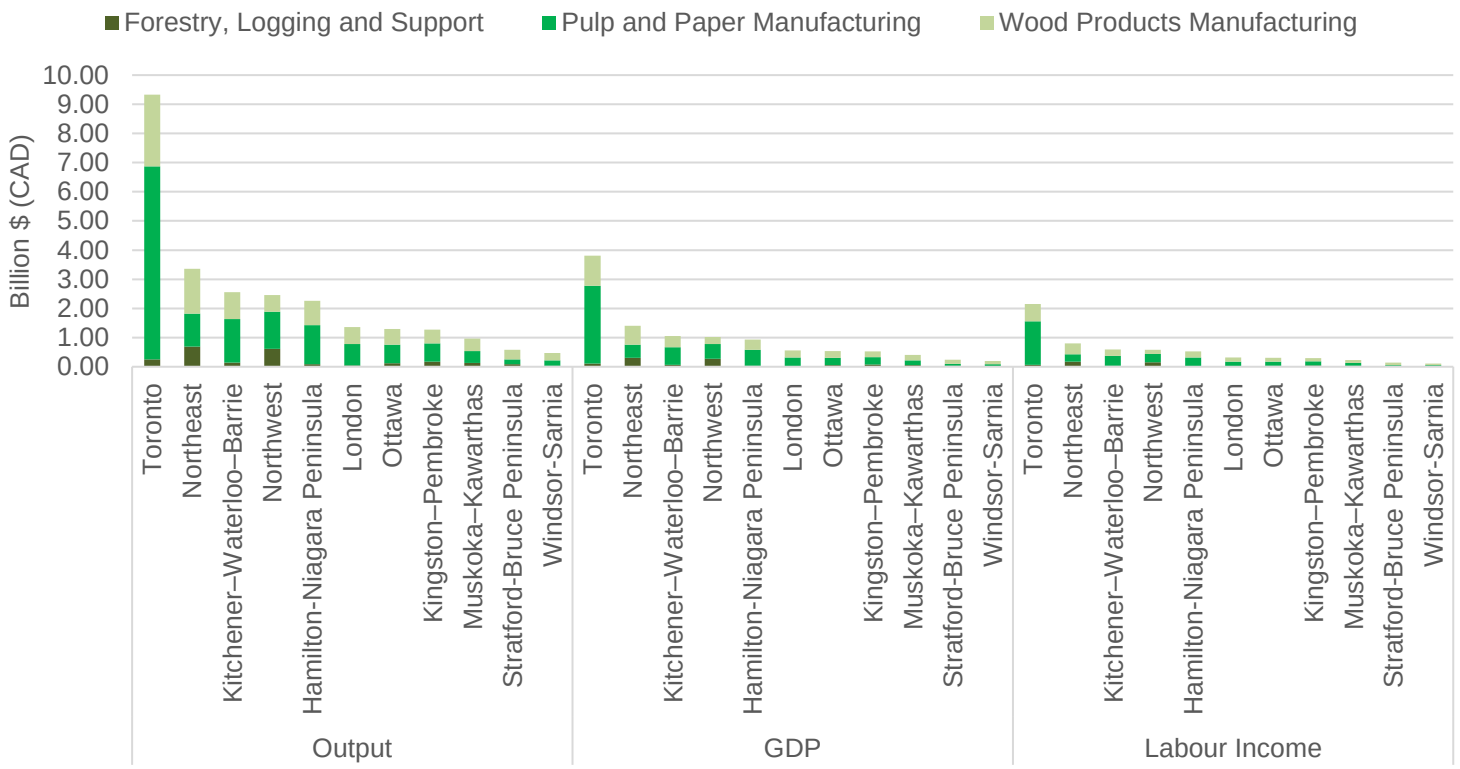


Figure 5: Total economic impacts (Output, GDP, Labour Income) for the year 2019 by economic region

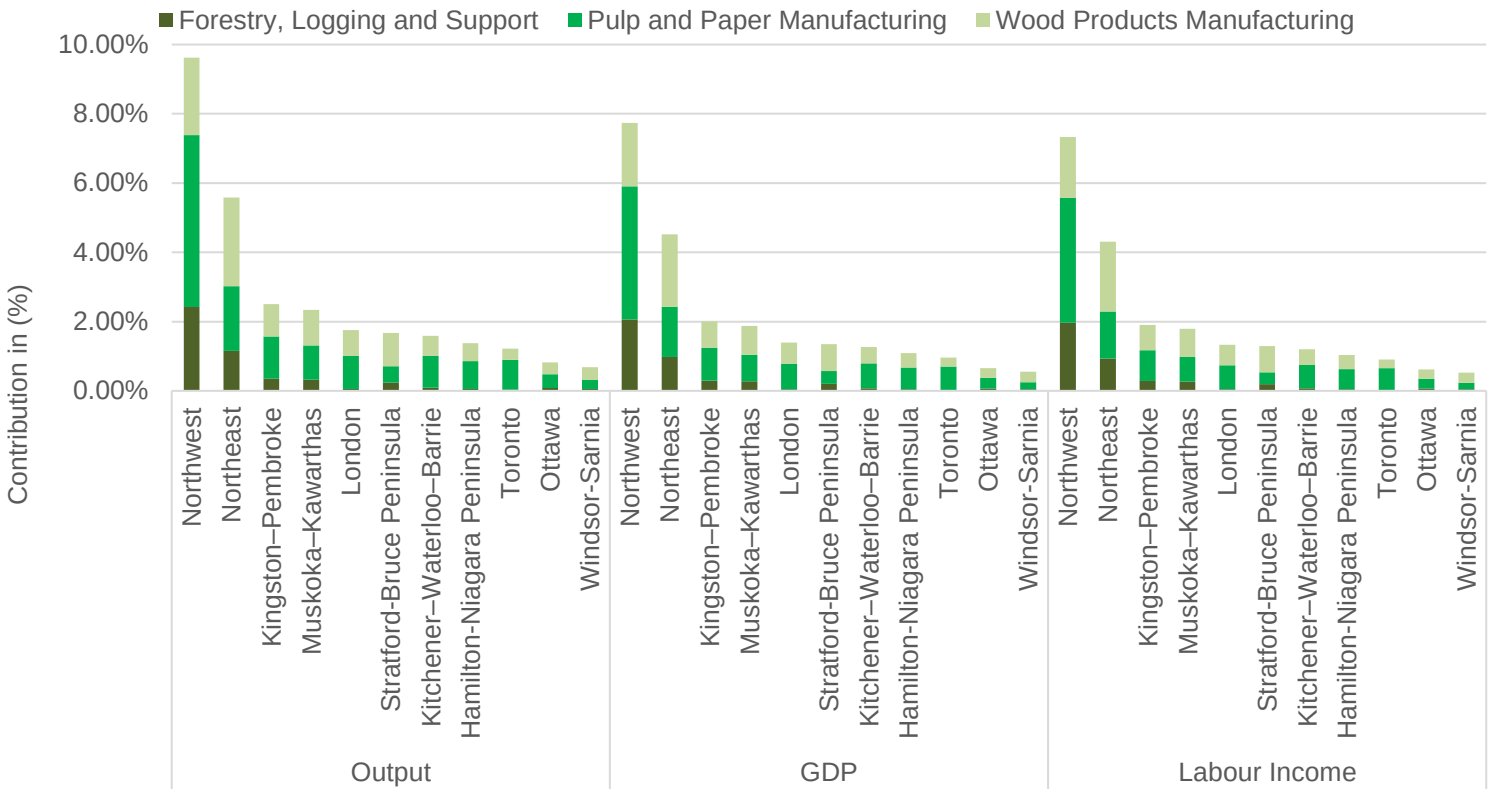


Figure 6: Relative economic impacts (Output, GDP, Labour Income) for the year 2019 by economic region

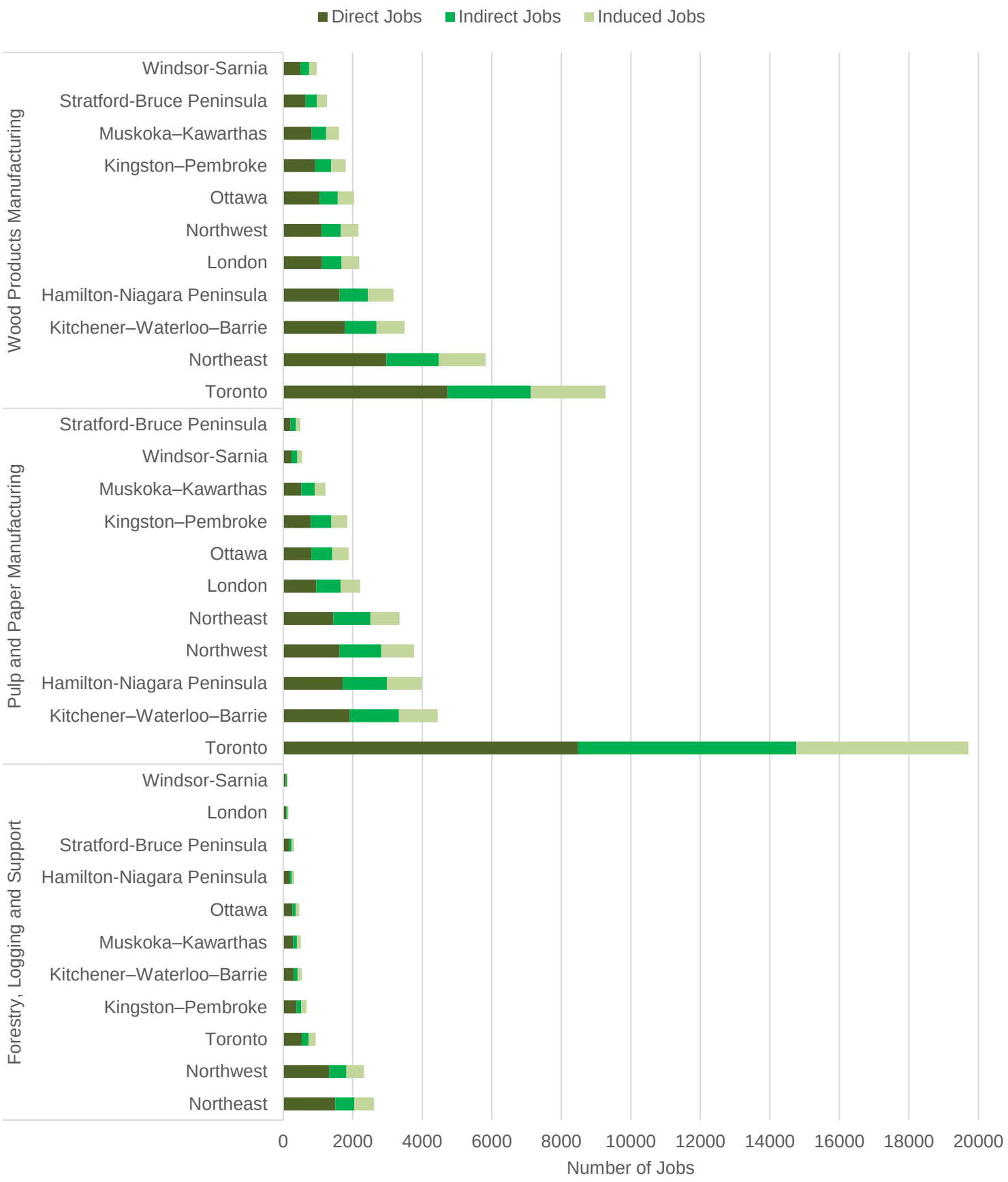


Figure 7: Total number of jobs for the year 2019 by economic region

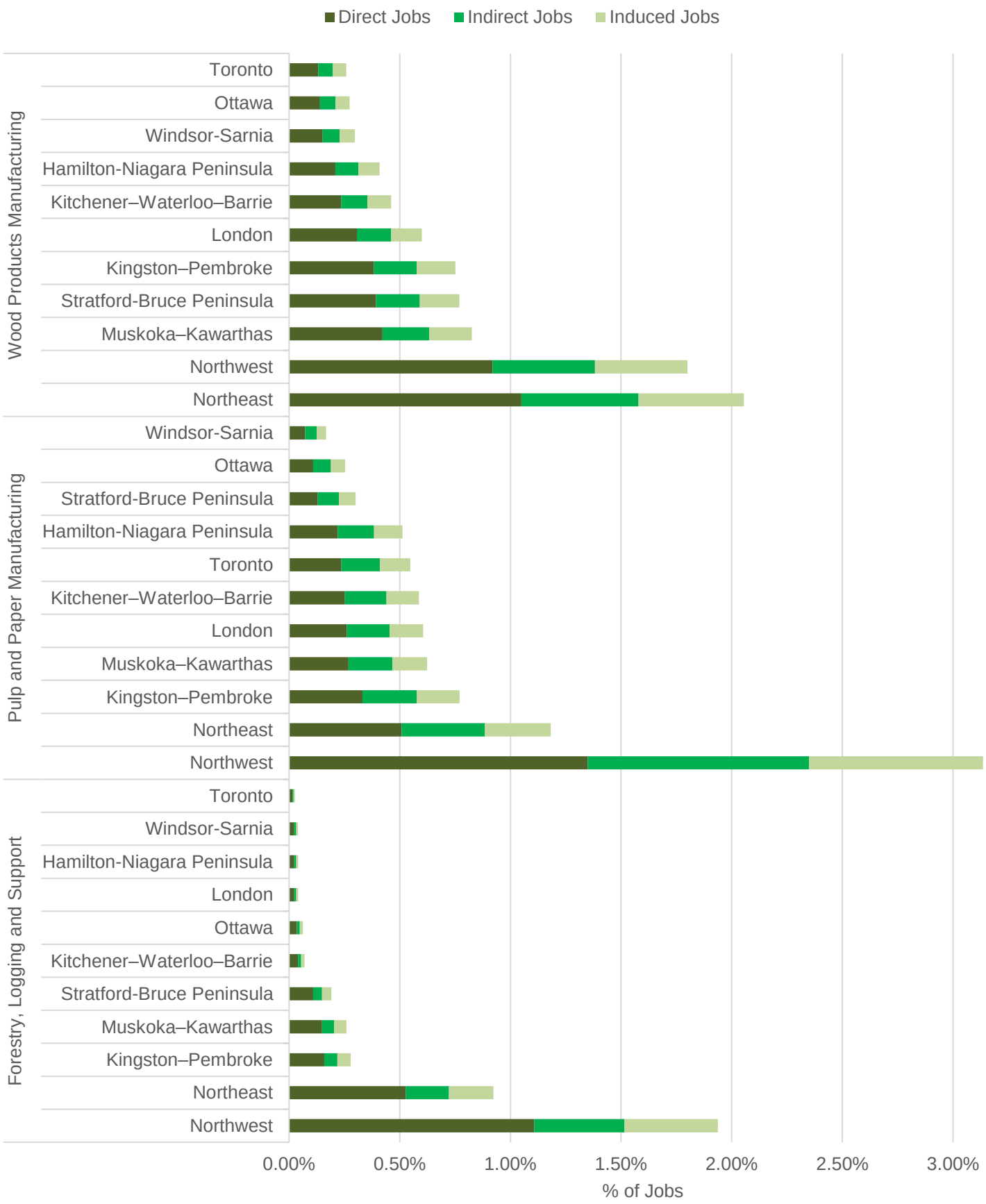


Figure 8: Relative job creation potential for the year 2019 by economic region

3. Government Revenues

3.1 Tax Revenues

Like any other sector of the economy, the forest industry generates income for those involved in value creation, such as labour and capital. These income streams are subject to taxation to fund government services. Additionally, taxes are collected from various other product manufacturing and sales activities. This section provides a brief overview of the main sources of government revenue attributed to the forest sector. Below is a breakdown of the primary government revenues from the forest sector, with estimates provided for each source in subsection 3.2.

- Taxes on Products: This revenue comes from the sale of goods produced or used by the forest sector, including fuel taxes, carbon taxes, goods and services taxes, and provincial sales tax.
- Taxes on Production: Production-related taxes that are not directly tied to sales but to the exploitation or manufacturing process itself, such as property taxes and licensing fees.
- Personal Income Tax (PIT): The PIT estimate relies on labour income impact and Statistics Canada's primary household income and tax figures dataset.[20] In 2019, PIT accounted for 18.9% of primary household income in Ontario. We derived the corresponding PIT impact by applying this percentage to labour income estimates. To allocate it between federal and provincial governments, Statistics Canada's data on household income tax collected by each level of government was used, showing that in 2019, 63% of PIT went to the federal government, while the provincial share was 37%.
- Corporate Income Tax (CIT): The value added by the forest sector is distributed between labour and capital. Gross Operating Surplus (GOS), which represents capital's share after deducting labour income, was used to estimate the CIT. Since the GOS includes both corporate income and depreciation, it was adjusted using additional data from Statistics Canada. Ratios of the forest sectors between GOS and taxable income (all Canada) were calculated using 2019 data[21] and then applied to the CIT estimates for the corresponding forest sectors (in Ontario). The effective federal and provincial CIT shares were then applied appropriately to determine the tax paid by the sector at both levels of government.[20]

[20] Household sector, current accounts, provincial and territorial, annual
[21] For this purpose, we used the national GOS surplus and the taxations statistics tables for the forest sectors Supply and use tables, detail level, provincial and territorial and Financial and taxation statistics for enterprises, by industry type, inactive respectively *(note that this last has been discontinued)*.

3.2 Government Revenues Estimates

In addition to tax revenues outlined above, Crown timber stumpage represents another revenue stream, as companies are required to pay fees for the use of publicly owned forest resources. As noted in subsection 1.5, almost 91% of these resources are harvested from the public lands.

Since stumpage cannot be estimated with the IO model, we relied on figures provided by the ministry for the fiscal year 2019-20.[22] During this period, the provincial government of Ontario collected $40,48 million in stumpage fees, of which $8.68 million was distributed to First Nations and Métis communities under the revenue-sharing program. This leaves an amount of $31,80 million in net stumpage revenues for the provincial government.

Table 7: Government revenues from the forest sector for the year 2019 ($CAD Million)

Federal Government		**1,934.91**
Taxes on Products	18.76	
Taxes on Production	1.48	
Corporate Income Tax	1,192.38	
Personal Income Tax	722.29	
Provincial Government		**1,268.09**
Taxes on Products	31.01	
Taxes on Production	26.64	
Corporate Income Tax	754.30	
Personal Income Tax	424.34	
Stumpage[22]	31,80	
Municipal Government		**98.93**
Taxes on Products	0.63	
Taxes on Production	98.30	
Total	**3,301.93**	

[22] Covering the period from April 1, 2019, to March 31, 2020, it is the most consistent fiscal year with the 2019 IO model year used in the report.

4. Capital Formation

In addition to its operational activities, the forest industry supports the provincial economy through substantial capital expenditures. Between 2012 and 2022, the forest sector invested approximately $7.62 billion in capital and repair expenditures. Of this total, capital expenditures, which encompass spending on construction, machinery, and equipment, accounted for over $3.13 billion. Repair expenditures, including maintenance-related expenses, were just under $4.49 billion during this period (Figure 9).

The data indicates consistently high spending on repairs, suggesting a focus on maintaining existing infrastructure rather than investing in new capital. In some years, repair and capital expenditures are closely aligned; however, a strong trend of high repair expenditures persists throughout the decade. A notable exception occurred in 2017 when capital investments were prioritized.

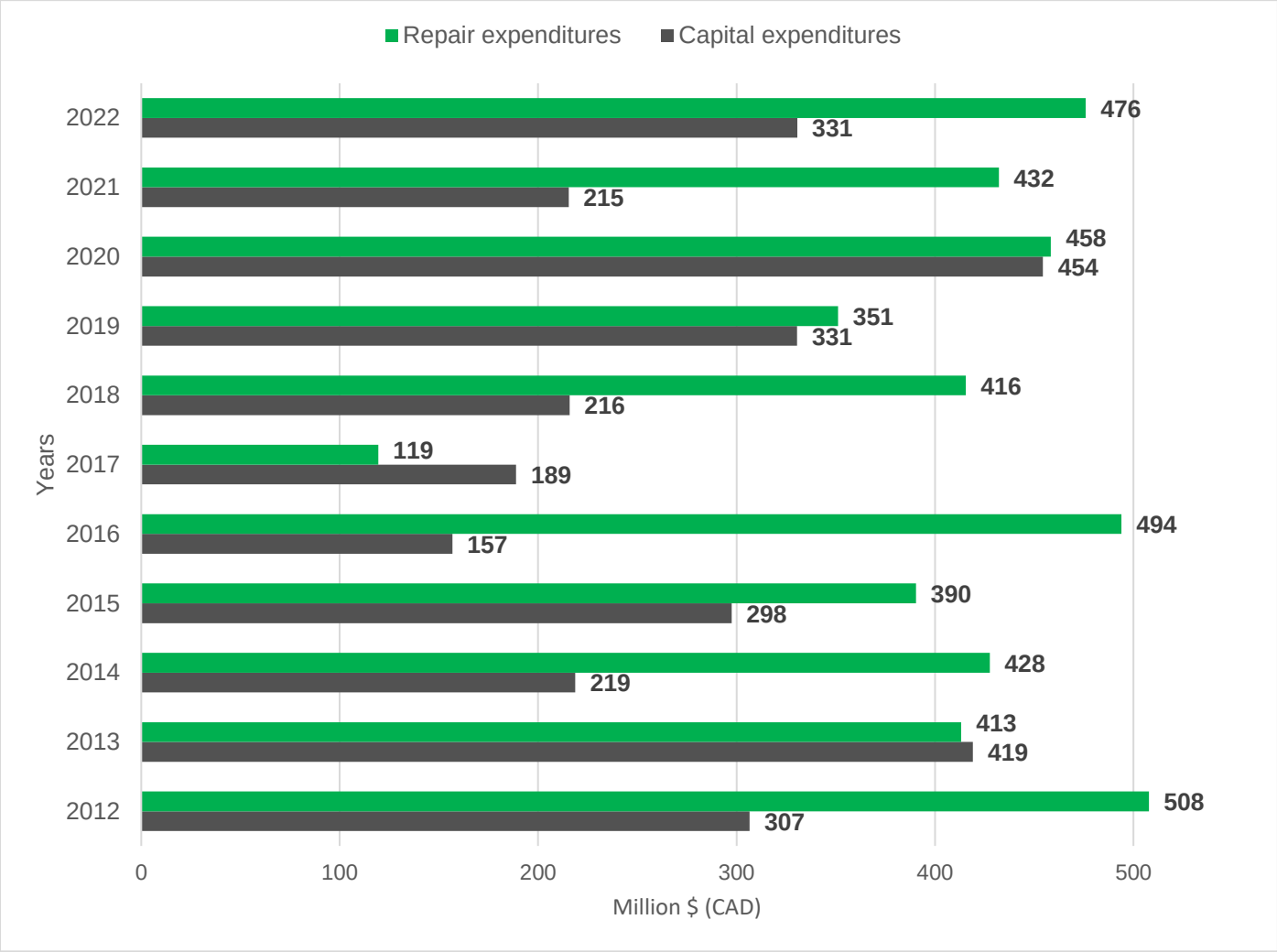


Figure 9: Capital and repair expenditures for the forest sector in Ontario between 2012 and 2022

Source: Statistics Canada. Table 34-10-0035-01. All units are in millions unless stated otherwise

Appendix

A.1 Methodology

This section provides further details on the methodological aspects of the study, including the data sources used and the limitations associated with the estimation procedure.

One of the most widely used methods for economic impact assessments involves the application of IO models, which are grounded in IO multipliers. These multipliers serve as key coefficients to evaluate the economic impacts of a sector in a specific context and are derived from supply and use tables.[23] Generally, these are symmetric accounting matrices of an economy, capturing the flow of goods and services between its industries. The application of these multipliers for economic impact analysis relies on the understanding that direct spending in a sector triggers indirect and induced effects. Indirect effects arise from inter-industry purchasing linkages within the value chain, while induced effects occur as employees spend their incomes on goods and services.

IO analysis, although widely used and effective for illustrating economic interlinkages at a given point in time, has several recognized limitations:

- Static Inter-industry Coefficients: The model assumes constant technological coefficients, ignoring factors like economies of scale, technological advancements, externalities, and responses to price changes. As a result, its accuracy diminishes when analyzing long-term impacts, particularly in industries where technological advancement or efficiency improvements significantly alter input requirements.
- Lack of Supply Constraint Consideration: It does not account for supply constraints related to production factors or assess whether resources are used in their most valuable capacity. This absence of opportunity cost considerations for labour and capital limits the analysis, making it more accurate during times of economic slack and less reliable in a full-employment scenario.
- Heavy Data Requirements: The analysis depends heavily on highly detailed information to capture the intricate relationships among industries within an economy. In practice, gathering such data can be challenging and resource-intensive, especially for complex economies with numerous interlinked sectors, which may not fully reflect real-world economic conditions.

[23] Chapter 4 Supply and use accounts (statcan.gc.ca)

Delinking the Forest Sector Supply Chain

The economic impact estimates were generated by applying Statistics Canada's 2019 Interprovincial IO multipliers to the output levels of various forest sub-sectors. As reflected in Ontario's supply and use tables, these values comprised the intermediate and primary inputs for the forestry sector industries, measured at basic prices. We relied on the provincial symmetric IO table[24] to adjust the multipliers for indirect effects, thereby avoiding double-counting instances where the forest sector makes intra-sector purchases. Specifically, the intermediate consumption of forestry products (primarily produced within the sector) was set to zero.

Due to the complexity of adjusting induced multipliers, the induced economic impact of forestry sector industries was not delinked and should be interpreted cautiously, as it is more likely to be inflated.

A.2 Data

*Table 8: Economic indicators for Toronto region, 2019 $CAD Millions**

Sector		Direct	Indirect	Induced	Total Impact
Output	Forestry, Logging & Support	154	54	39	247
	Pulp & Paper Manufacturing	4,206	1,471	952	6,630
	Wood Products Manufacturing	1,524	519	414	2,457
	Total	5,884	2,044	1,405	9,334
GDP	Forestry, Logging & Support	62	24	23	109
	Pulp & Paper Manufacturing	1,333	768	565	2,666
	Wood Products Manufacturing	523	266	247	1,036
	Total	1,918	1,058	835	3,811
Labour Income	Forestry, Logging & Support	38	14	11	62
	Pulp & Paper Manufacturing	795	434	264	1,493
	Wood Products Manufacturing	324	159	115	598
	Total	1,157	607	389	2,153
Employment	Forestry, Logging & Support	533	196	203	932
	Pulp & Paper Manufacturing	8,487	6,279	4,946	19,712
	Wood Products Manufacturing	4,736	2,390	2,150	9,276
	Total	13,755	8,865	7,299	29,919

*Except for employment which represents the number of jobs created.

[24] The Daily — Provincial symmetric input-output tables, 2019

*Table 9: Economic indicators for Kitchener–Waterloo–Barrie region, 2019 $CAD Millions**

Sector		Direct	Indirect	Induced	Total Impact
Output	Forestry, Logging & Support	87	31	22	140
	Pulp & Paper Manufacturing	949	332	215	1,496
	Wood Products Manufacturing	573	195	156	925
	Total	1,610	558	393	2,561
GDP	Forestry, Logging & Support	35	13	13	62
	Pulp & Paper Manufacturing	301	173	127	602
	Wood Products Manufacturing	197	100	93	390
	Total	533	287	233	1,053
Labour Income	Forestry, Logging & Support	22	8	6	35
	Pulp & Paper Manufacturing	179	98	59	337
	Wood Products Manufacturing	122	60	43	225
	Total	323	165	109	597
Employment	Forestry, Logging & Support	302	111	115	529
	Pulp & Paper Manufacturing	1,915	1,417	1,116	4,448
	Wood Products Manufacturing	1,782	899	809	3,490
	Total	3,999	2,427	2,040	8,467

*Except for employment which represents the number of jobs created.

*Table 10: Economic indicators for Hamilton-Niagara Peninsula region, 2019 $CAD Millions**

Sector		Direct	Indirect	Induced	Total Impact
Output	Forestry, Logging & Support	53	19	13	84
	Pulp & Paper Manufacturing	849	297	192	1,339
	Wood Products Manufacturing	522	178	142	841
	Total	1,423	493	347	2,264
GDP	Forestry, Logging & Support	21	8	8	37
	Pulp & Paper Manufacturing	269	155	114	538
	Wood Products Manufacturing	179	91	84	354
	Total	469	254	206	930
Labour Income	Forestry, Logging & Support	13	5	4	21
	Pulp & Paper Manufacturing	160	88	53	301
	Wood Products Manufacturing	111	54	39	205
	Total	285	147	96	527
Employment	Forestry, Logging & Support	182	67	69	319
	Pulp & Paper Manufacturing	1,714	1,268	999	3,980
	Wood Products Manufacturing	1,621	818	736	3,175
	Total	3,517	2,153	1,804	7,474

*Except for employment which represents the number of jobs created.

*Table 11: Economic indicators for Northwest region, 2019 $CAD Millions**

Sector		Direct	Indirect	Induced	Total Impact
Output	Forestry, Logging & Support	384	135	97	617
	Pulp & Paper Manufacturing	804	281	182	1,266
	Wood Products Manufacturing	355	121	97	572
	Total	1,542	537	376	2,455
GDP	Forestry, Logging & Support	156	59	58	272
	Pulp & Paper Manufacturing	255	147	108	509
	Wood Products Manufacturing	122	62	57	241
	Total	532	268	223	1,023
Labour Income	Forestry, Logging & Support	95	34	27	156
	Pulp & Paper Manufacturing	152	83	50	285
	Wood Products Manufacturing	76	37	27	139
	Total	322	154	104	580
Employment	Forestry, Logging & Support	1,330	490	507	2,326
	Pulp & Paper Manufacturing	1,621	1,199	945	3,766
	Wood Products Manufacturing	1,103	557	501	2,161
	Total	4,054	2,246	1,953	8,253

*Except for employment which represents the number of jobs created.

*Table 12: Economic indicators for Northeast region, 2019 $CAD Millions**

Sector		Direct	Indirect	Induced	Total Impact
Output	Forestry, Logging & Support	431	152	110	693
	Pulp & Paper Manufacturing	715	250	162	1,126
	Wood Products Manufacturing	957	326	260	1,543
	Total	2,103	728	532	3,362
GDP	Forestry, Logging & Support	175	66	65	306
	Pulp & Paper Manufacturing	226	130	96	453
	Wood Products Manufacturing	328	167	155	650
	Total	729	364	316	1,409
Labour Income	Forestry, Logging & Support	107	38	30	175
	Pulp & Paper Manufacturing	135	74	45	254
	Wood Products Manufacturing	204	100	72	375
	Total	445	211	147	804
Employment	Forestry, Logging & Support	1,495	551	570	2,615
	Pulp & Paper Manufacturing	1,442	1,067	840	3,349
	Wood Products Manufacturing	2,973	1,500	1,350	5,824
	Total	5,910	3,118	2,760	11,787

*Except for employment which represents the number of jobs created.

*Table 13: Economic indicators for London region, 2019 $CAD Millions**

	Sector	Direct	Indirect	Induced	Total Impact
Output	Forestry, Logging & Support	25	9	6	40
	Pulp & Paper Manufacturing	472	165	107	744
	Wood Products Manufacturing	360	122	98	580
	Total	856	296	211	1,364
GDP	Forestry, Logging & Support	10	4	4	18
	Pulp & Paper Manufacturing	150	86	63	299
	Wood Products Manufacturing	123	63	58	244
	Total	283	153	125	561
Labour Income	Forestry, Logging & Support	6	2	2	10
	Pulp & Paper Manufacturing	89	49	30	167
	Wood Products Manufacturing	77	37	27	141
	Total	172	88	58	319
Employment	Forestry, Logging & Support	86	32	33	150
	Pulp & Paper Manufacturing	952	704	555	2,211
	Wood Products Manufacturing	1,118	564	508	2,190
	Total	2,156	1,300	1,095	4,551

*Except for employment which represents the number of jobs created.

*Table 14: Economic indicators for Ottawa region, 2019 $CAD Millions**

	Sector	Direct	Indirect	Induced	Total Impact
Output	Forestry, Logging & Support	76	27	19	123
	Pulp & Paper Manufacturing	402	141	91	633
	Wood Products Manufacturing	335	114	91	540
	Total	813	281	201	1,295
GDP	Forestry, Logging & Support	31	12	12	54
	Pulp & Paper Manufacturing	127	73	54	255
	Wood Products Manufacturing	115	59	54	227
	Total	273	144	120	536
Labour Income	Forestry, Logging & Support	19	7	5	31
	Pulp & Paper Manufacturing	76	41	25	143
	Wood Products Manufacturing	71	35	25	131
	Total	166	83	56	305
Employment	Forestry, Logging & Support	265	97	101	463
	Pulp & Paper Manufacturing	811	600	472	1,883
	Wood Products Manufacturing	1,040	525	472	2,037
	Total	2,115	1,222	1,045	4,382

*Except for employment which represents the number of jobs created.

*Table 15: Economic indicators for Kingston–Pembroke region, 2019 $CAD Millions**

Sector		Direct	Indirect	Induced	Total Impact
Output	Forestry, Logging & Support	110	39	28	177
	Pulp & Paper Manufacturing	394	138	89	620
	Wood Products Manufacturing	295	101	80	476
	Total	799	277	197	1,274
GDP	Forestry, Logging & Support	45	17	17	78
	Pulp & Paper Manufacturing	125	72	53	250
	Wood Products Manufacturing	101	52	48	201
	Total	271	140	117	528
Labour Income	Forestry, Logging & Support	27	10	8	45
	Pulp & Paper Manufacturing	74	41	25	140
	Wood Products Manufacturing	63	31	22	116
	Total	164	81	55	300
Employment	Forestry, Logging & Support	381	140	145	667
	Pulp & Paper Manufacturing	794	588	463	1,845
	Wood Products Manufacturing	918	463	417	1,798
	Total	2,094	1,191	1,025	4,310

*Except for employment which represents the number of jobs created.

*Table 16: Economic indicators for Muskoka–Kawarthas region, 2019 $CAD Millions**

Sector		Direct	Indirect	Induced	Total Impact
Output	Forestry, Logging & Support	83	29	21	134
	Pulp & Paper Manufacturing	259	91	59	408
	Wood Products Manufacturing	264	90	72	426
	Total	606	210	152	967
GDP	Forestry, Logging & Support	34	13	13	59
	Pulp & Paper Manufacturing	82	47	35	164
	Wood Products Manufacturing	90	46	43	179
	Total	206	106	90	403
Labour Income	Forestry, Logging & Support	21	7	6	34
	Pulp & Paper Manufacturing	49	27	16	92
	Wood Products Manufacturing	56	27	20	104
	Total	126	62	42	229
Employment	Forestry, Logging & Support	289	106	110	505
	Pulp & Paper Manufacturing	522	386	304	1,213
	Wood Products Manufacturing	820	414	372	1,607
	Total	1,631	907	787	3,325

*Except for employment which represents the number of jobs created.

*Table 17: Economic indicators for Windsor-Sarnia region, 2019 $CAD Millions**

Sector		Direct	Indirect	Induced	Total Impact
Output	Forestry, Logging & Support	22	8	6	35
	Pulp & Paper Manufacturing	116	41	26	183
	Wood Products Manufacturing	159	54	43	256
	Total	296	102	75	474
GDP	Forestry, Logging & Support	9	3	3	15
	Pulp & Paper Manufacturing	37	21	16	73
	Wood Products Manufacturing	54	28	26	108
	Total	100	52	45	197
Labour Income	Forestry, Logging & Support	5	2	2	9
	Pulp & Paper Manufacturing	22	12	7	41
	Wood Products Manufacturing	34	17	12	62
	Total	61	30	21	112
Employment	Forestry, Logging & Support	76	28	29	132
	Pulp & Paper Manufacturing	234	173	136	543
	Wood Products Manufacturing	493	249	224	966
	Total	803	450	389	1,641

*Except for employment which represents the number of jobs created.

*Table 18: Economic indicators for Stratford-Bruce Peninsula region, 2019 $CAD Millions**

Sector		Direct	Indirect	Induced	Total Impact
Output	Forestry, Logging & Support	52	18	13	83
	Pulp & Paper Manufacturing	105	37	24	166
	Wood Products Manufacturing	207	71	56	334
	Total	364	126	93	583
GDP	Forestry, Logging & Support	21	8	8	37
	Pulp & Paper Manufacturing	33	19	14	67
	Wood Products Manufacturing	71	36	34	141
	Total	125	63	55	244
Labour Income	Forestry, Logging & Support	13	5	4	21
	Pulp & Paper Manufacturing	20	11	7	37
	Wood Products Manufacturing	44	22	16	81
	Total	77	37	26	140
Employment	Forestry, Logging & Support	179	66	68	313
	Pulp & Paper Manufacturing	212	157	124	493
	Wood Products Manufacturing	644	325	293	1,262
	Total	1,035	548	484	2,068

*Except for employment which represents the number of jobs created.