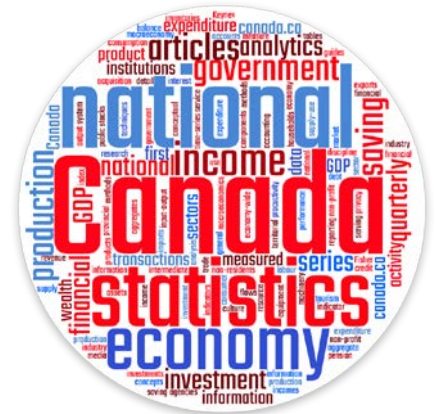


## Latest Developments in the Canadian Economic Accounts

# Integrating the production, distribution and consumption of cannabis in the Canadian national economic accounts

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# Integrating the production, distribution and consumption of cannabis in the Canadian national economic accounts

## Background

On April 13, 2017 the Government of Canada tabled legislation in the House of Commons to legalize, regulate and restrict access to cannabis for non-medical purposes. Bill C-45 was approved by Parliament and given royal assent on June 1, 2018. The drug's new status came into effect on October 17, 2018.

Statistics Canada is responsible for compiling and disseminating Canada's key macroeconomic indicators such as gross domestic product, household spending, investment, exports, imports, government revenue and expenditure, and industrial output. When compiling these indicators, Statistics Canada follows the recommendations for macroeconomic accounting laid out in the international manual *System of National Accounts 2008 (2008 SNA)*. This ensures that Canada's statistics on economic activity are consistent and comparable with estimates produced in other countries such as the United States, whose measure of gross domestic product is calculated by the Bureau of Economic Analysis. This work is analogous to a business accountant following the International Financial Reporting Standard when producing financial statements for a business.

The 2008 SNA recommends countries include both legal and illegal activities when measuring gross domestic product. Over the last 60 years, Statistics Canada has not implemented this recommendation for several reasons. First, given the difficulty in measuring illegal activity it was judged that credible measures could not be developed and therefore, adding illegal activity might have derogated from, instead of enhancing the measure of gross domestic product. Second, illegal economic activities were presumed to be small and to have little impact on the business cycle so excluding them would not greatly affect the understanding of economic trends. Third, the United States does not include illegal activities in its estimate of gross domestic product and therefore by excluding them from the Canadian measure the latter is more comparable to the former.

With the approval of Bill C-45, a significant portion of cannabis production and consumption is moving from the illegal to the legal market. This now-legal activity is "in scope" for inclusion in Canada's estimates of gross domestic product just like other legal economic activities. The change in legal status makes it much easier for Statistics Canada to gather credible data to measure the size of the market. When the government indicated its intention to legalize cannabis use for non-medical purposes, companies began applying for licences and setting up operations to produce and distribute cannabis. Substantial investments in greenhouse operations and processing plants have been made. Crops have been planted and harvested, inventories have been accumulated and distribution networks are being established. This activity has been legal and is already included in Canada's current estimates of gross domestic product. Companies were authorized to begin selling this newly legal, although regulated product to consumers in the fourth quarter of 2018. The value added associated with the production of these goods prior to the fourth quarter and any new legal production, distribution and sales occurring in the fourth quarter are or will be included in Canada's estimates of gross domestic product.

This shift of non-medical cannabis from illegal to legal status has the potential to introduce a time series break in Canada's estimates of gross domestic product. To avoid this break Statistics Canada has decided to integrate both the legal and illegal production of cannabis into its official estimates of gross domestic product. Moreover the agency has decided to revise historical estimates of gross domestic product to include estimates of the production and consumption of illegal cannabis. These updates, for both the current and previous periods, will be made with the release of the fourth quarter 2018 estimates of gross domestic product.

This paper outlines how the Canadian national economic accounts will be adjusted to incorporate both the illegal and the now-legal production and consumption of non-medical cannabis for the period 1961 forward.

## Integrating cannabis into the national economic accounts

Over the last year Statistics Canada has been updating the statistical system to be able to measure the economic and social activities related to the production, distribution and consumption of cannabis. This work included developing measures of illegal cannabis output, gross value added and household expenditure on cannabis. These data now need to be integrated into the official national economic accounts measures.

The national economic accounts are an integrated system of economic statements that measure production, the generation of income, the distribution of income, expenditures and the financing of this activity and resulting impact on wealth. This information is recorded in the following series of accounts:

- Production account
- Generation of income account
- Allocation of primary income account
- Secondary distribution of income account
- Use of disposable income account
- Capital account
- Financial account
- Other change in asset account
- Balance sheet account

These accounts are all related to one another, hence the term system. Each now needs to be adjusted to include cannabis activity for both the period prior to legalization and for the subsequent periods following legalization.

Before the new estimates can be integrated it is necessary to update the classification systems used to construct these accounts so they reflect illegal and legal cannabis activity.

Many Statistics Canada classification systems are being adjusted to include cannabis products, such as those for retail and wholesale trade and agriculture.<sup>1</sup> Within the monthly and quarterly national economic accounts, the key classification systems impacted by the inclusion of illegal cannabis include the industry classification system, the household final consumption expenditure classification system, the classification of tax revenues and the international trade classification systems. While each of these, in concept, already includes the production, consumption and distribution of cannabis, this activity is currently grouped with similar activity for other products. Statistics Canada has expanded these classifications to include detailed classes related specifically to legal and illegal cannabis. Table 1 shows the new classes that were added to articulate more clearly cannabis production, distribution and use across statistical products in the monthly and quarterly national economic accounts.

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1. [The Cannabis Stats Hub](#) (13-610-X) lists the *cannabis-related classification systems* used by Statistics Canada.

**Table 1**  
**National accounts classification system changes to include cannabis**

Classification system	Description
<b>North American Industry Classification System (NAICS)</b>	
111412	Cannabis grown under cover
111995	Cannabis grown in open fields
413410	Cannabis merchant wholesalers
453993	Cannabis stores
<b>North American Product Classification System (NAPCS)</b>	
11513	Other miscellaneous crop products
<b>Canadian export classification</b>	
1211.90.10	Cannabis plants, herbs and seeds, used in pharmacy
1301.90.10	Cannabis resins or oleoresins
1302.19.10	Cannabis oil, extracts and tinctures
<b>Customs tariff (imports)</b>	
1211.90.90.50	Cannabis plants, herbs and seeds, used in pharmacy
1301.90.00.10	Cannabis resins or oleoresins
1302.19.00.10	Cannabis oil, extracts and tinctures
<b>Balance of payments adjustments<sup>1</sup></b>	<ul style="list-style-type: none"> <li>• Exports of illegally produced cannabis (smuggling)</li> <li>• Imports of illegally produced cannabis (smuggling)</li> </ul>
<b>Household final consumption expenditure<sup>1</sup></b>	<ul style="list-style-type: none"> <li>• Legal expenditures on cannabis products for non-medical use</li> <li>• Illegal expenditures on cannabis products for non-medical use</li> <li>• Pharmaceutical products and other medicinal products (excluding cannabis)</li> <li>• Expenditures on cannabis products for medical use</li> </ul>
<b>Tax revenues<sup>1</sup></b>	<ul style="list-style-type: none"> <li>• Federal government excise taxes on cannabis products</li> <li>• Provincial and territorial government excise taxes on cannabis products</li> </ul>

1. Some of these classes are internal to the national economic accounts and are not broken out explicitly in the published tables.

Source: Statistics Canada.

The institutional sector classification did not change. The sectors currently defined in the national economic accounts are shown in Table 2.

**Table 2**  
**Canadian Classification of Institutional Units and Sectors**

Code	Description
S1	Total economy
S11	Non-financial corporations
S12	Financial corporations
S13	General government
S14	Households
S15	Non-profit institutions serving households
S2	Rest of the world

Source: Statistics Canada.

## Key assumptions

Over the course of 2018 Statistics Canada has been compiling estimates of the production and consumption of cannabis, both legally and illegally produced. These estimates have been recorded in a product called the cannabis economic accounts. These statistics will be integrated in the national economic accounts with the release of the fourth quarter 2018 estimates.

For purposes of this integration a number of assumptions or models were developed. Models were required due to the general lack of reliable source data to calculate precise estimates of illegal activities. The first assumption concerned which sector or sectors produce illegal cannabis. The 2008 SNA distinguishes five domestic sectors and a non-resident sector. As noted, the domestic sectors are households (including unincorporated businesses), financial corporations, non-financial corporations, general governments and non-profit institutions serving households. It is highly unlikely that financial corporations, general governments or non-profit institutions serving households engage in the production of illegal cannabis to any significant extent. Accordingly it is assumed there is no illegal production of cannabis in these sectors of the economy.

The fact that customs authorities seize cannabis that is illegally imported into Canada is evidence that some of the cannabis consumed in Canada originates outside the country. These imports represent the portion of illegal cannabis produced by the non-resident sector. The remaining supply of illegal cannabis originates from the household and/or non-financial corporations sectors.

The national economic accounts define a non-financial corporation as “a legal or social entity ... whose existence is recognized by law or society independently of the persons, or other entities, that may own or control it” (2008 SNA, paragraph 4.6). If such a corporation produces illegal cannabis it would likely be concealing this activity behind its legitimate business operations. In effect, it would be using its legal business activities to launder its illegal activities.

For example, suppose that an enterprise in the tomato-growing industry has a greenhouse it uses to grow tomatoes for sale. In addition to growing tomatoes the enterprise illegally uses some of its greenhouse space to grow cannabis, concealed from the authorities. The enterprise then sells the cannabis and records the transactions as sales of tomatoes. If we assume activity of this general kind is taking place then the integration of cannabis into the national economic accounts is more a reallocation of already-measured activity, recorded in corporate financial reports, than the addition of previously unrecorded production into the accounts. Production would simply be reallocated from the tomato industry to the cannabis industry.

While laundered corporate cannabis production activity is probably taking place, obtaining information or modelling it is not feasible. Illegal production cannot be split between the household sector and the non-financial corporation sector. The specific industries in the non-financial corporation sector that are concealing illegal cannabis production (such as, conceivably, the greenhouse industry, the tobacco industry, the dry cleaning industry and the used car retailing industry, for example) cannot be identified. Even if they could, the portion of their activities that is related to the illegal production of cannabis cannot be quantified. Accordingly for the purposes of integrating cannabis into the national economic accounts the assumption is made that all illegal cannabis production is attributable to unincorporated businesses in the household sector.

This simplifying assumption has important implications. First, since many of these illegal household producers may be operating businesses that are entirely unreported to the authorities, rather than concealing their activities behind other legitimate and reported business operations, they are also largely hidden from the statistical system. The implication is that the value added of this currently unrecorded industry is missing from and must be included in Canada's current level of gross value added.

The second set of assumptions relates to how the household sector produces cannabis, since what needs to be added to gross domestic product is the value of the sector's output less the value of the purchased inputs used to produce the cannabis. It is assumed households used three categories of intermediate inputs to produce cannabis: rent (space to grow the cannabis), utilities (such as water and electricity) and miscellaneous household items (such as fertilizer and durable goods to construct the structures in which to grow the plants). It is also assumed these households were paying the market price for these inputs.

These assumptions are the building blocks that are used to perform the calculations necessary to integrate illegal cannabis production into the national economic accounts. The “puts and takes” on the estimates contained in the national economic accounts are illustrated in a set of tables. These show the existing national economic accounts estimates and the overall adjustments required to integrate the estimates of illegal cannabis.

## Integrating cannabis into the national economic accounts: the impact on production-based gross domestic product

Production-based gross domestic product (often referred to as gross value added) is measured by taking the value of an industry’s or sector’s output and subtracting the value of its intermediate consumption. The estimated value of domestically produced cannabis (both legal and illegal) in 2017 was \$6.22 billion. This can be broken down between the value sold for medical use (\$0.51 billion)<sup>2</sup> and the value sold for non-medical use (\$5.71 billion). It is assumed that in 2017 all of the production of cannabis for medical use is legal production and all of the production of cannabis for non-medical use is illegal production.

The \$0.51 billion of cannabis produced and ultimately consumed for medical purposes is already recorded in the Canadian accounts since this production is being carried out by legitimate businesses from which Statistics Canada and Health Canada collect information related to production, inputs and investment. Therefore, this amount does not require an addition to total economy-wide output. Rather, there will be a reallocation of output from the “other agriculture products” industry to the “cannabis grown under cover” industry.

The remaining \$5.71 billion in output represents the value not currently recorded in the national economic accounts. This output is split between two industries: the “cannabis grown under cover” industry and the “cannabis stores” industry. The estimated output of the former is \$3.84 billion while the estimated output of the latter is \$1.87 billion.

In order to produce the \$5.71 billion in illegal cannabis sales these industries required labour, capital and intermediate product inputs. For the purposes of integrating illegal cannabis into the national economic accounts Statistics Canada assumed that illegal cannabis producers used four main intermediate inputs, namely: rent (to pay for space), water, electricity and household gardening materials such as fertilizers. In order to derive an estimate of value added, the value of these intermediate inputs must be subtracted from the value of output. In 2017 the estimated value of intermediate inputs in the “cannabis grown under cover” industry was \$1.55 billion while the estimate of intermediate consumption in the “cannabis stores” industry was \$0.41 billion. The resulting combined estimate of value added of \$3.75 billion (output less intermediate consumption) is the value that will be added to Canada’s estimate of gross domestic product. The calculations are shown in Table 3.

**Table 3**  
**Adjustments to gross value added due to the illegal cannabis industry**

	Output in the illegal cannabis industry	Intermediate consumption in the illegal cannabis industry	Gross value added in the illegal cannabis industry	Previously published estimate of gross domestic product	Revised estimate of gross domestic product	Percentage revision to gross domestic product
	billions of dollars					%
2017	5.71	1.96	3.75	2,138	2,141	0.18
2016	6.32	2.17	4.15	2,024	2,028	0.21
2015	6.62	2.27	4.35	1,986	1,990	0.22
2014	6.76	2.33	4.43	1,990	1,995	0.22
2013	6.74	2.31	4.43	1,898	1,902	0.23
2012	6.28	2.18	4.10	1,823	1,827	0.22

Source: Statistics Canada.

In addition to the production account just discussed, other elements within the national economic accounts framework also need to be adjusted to record the income resulting from this production as well as the expenditures on this production.

2. This value includes \$30 million of own account medical production, which is assumed to be completely captured.

## Integrating cannabis into the national economic accounts: the impact on income-based gross domestic product

When goods are produced, income flows to the factors of production. Within the national economic accounts framework incomes can flow to labour and capital or can be appropriated by governments through taxation on production. The portion of income accruing to the labour input is called “compensation of employees”. The portion accruing to the capital input is called gross operating surplus. The portion appropriated by governments is referred to as other taxes on production.

When it is not possible to distinguish between the income accruing to labour and the income accruing to capital, both are recorded together in an aggregate income category called “mixed income”. Estimates of mixed income are generally found in the household (unincorporated business) sector where it is difficult to split the income between the portion accruing to the household’s labour input and the portion accruing to its capital input.

Since it is assumed that all of the illegal cannabis in Canada is produced by the household sector, all of the income flowing to this sector is classified as mixed income. Likewise, because the activity is hidden from the authorities there are no other taxes on production. This means the entire value added from the production process is mixed income.

The adjustments to income-based gross domestic product resulting from the inclusion of illegal cannabis are shown in Table 4.

**Table 4**  
**Adjustments to income-based gross domestic product due to the illegal cannabis industry**

	Gross mixed income in the illegal cannabis production	Previously published estimate of gross mixed income	Revised estimate of gross mixed income including cannabis production	Previously published estimate of gross domestic product	Revised estimate of gross domestic product	Percentage revision to gross domestic product
	billions of dollars					%
2017	3.75	250.57	254.32	2,138	2,141	0.18
2016	4.15	240.32	244.47	2,024	2,028	0.21
2015	4.35	230.76	235.11	1,986	1,990	0.22
2014	4.43	222.46	226.89	1,990	1,995	0.22
2013	4.43	216.36	220.79	1,898	1,902	0.23
2012	4.10	209.19	213.29	1,823	1,827	0.22

Source: Statistics Canada.

## Integrating cannabis into the national economic accounts: the impact on expenditure-based gross domestic product

In 2017, it is estimated that Canadian households spent \$5.53 billion on cannabis. In addition, it is estimated that Canada exported \$1.09 billion of illegal cannabis to the rest of the world and imported \$0.32 billion of illegal cannabis from the rest of the world. In order to fully incorporate illegal cannabis into the national economic accounts the components of expenditure-based gross domestic product such as household final consumption expenditure, exports and imports must be adjusted.

The adjustment to household spending is not straightforward. It does not simply involve adding \$5.53 billion to a new cannabis expenditure category. First, a portion of cannabis spending has been legal for several years and these expenditures are already included in the accounts. Legal expenditures on cannabis for medical use are currently recorded in expenditure category “pharmaceutical products and other medicinal products (excluding cannabis)” (see Table 1). The estimated value of household final consumption expenditure on cannabis for medical use in 2017 was \$0.59 billion. The first adjustment is therefore to move expenditures from category “pharmaceutical products and other medicinal products (excluding cannabis)” to the new expenditure category “expenditures on cannabis products for medical use”.



The estimated value of Canadian expenditures on illegal cannabis in 2017 is \$4.94 billion. This will be added to a new expenditure category, “illegal expenditures on cannabis products for non-medical use”.

The next set of adjustments relate to household spending on rent, water, hydro and gardening products in their illegal cannabis production processes. It is assumed these households do not steal these goods but rather pay the market price. This means these expenditures are currently recorded in the national economic accounts but incorrectly allocated to household final consumption expenditure. The households were not using the additional products for household consumption as is currently assumed, but rather were using them as intermediate inputs in the production of illegal cannabis. Accordingly these expenditures must be removed from household final consumption expenditure and recorded instead as intermediate consumption in the production account.

Finally, as noted earlier some of the cannabis consumed by households is imported illegally from abroad and some produced in Canada is exported abroad. Adjustments are therefore required to imports and exports of goods.

The adjustments made to expenditure-based gross domestic product resulting from the inclusion of illegal cannabis are show in Table 5.

**Table 5**  
**Adjustments to expenditure-based gross domestic product due to the illegal cannabis industry**

	Household expenditure on cannabis for medical use	Household expenditure on cannabis for non-medical use	Rent, water, hydro and gardening supplies related to cannabis production			Gross value added in the illegal cannabis industry	Previously published estimate of gross domestic product	Revised estimate of gross domestic product	Percentage revision to gross domestic product
			Imports of illegal cannabis	Exports of illegal cannabis	Imports of illegal cannabis				
billions of dollars									
									%
2017	0	4.94	-1.96	-0.32	1.09	3.75	2,138	2,141	0.18
2016	0	5.46	-2.17	-0.35	1.21	4.15	2,024	2,028	0.21
2015	0	5.72	-2.27	-0.37	1.27	4.35	1,986	1,990	0.22
2014	0	5.84	-2.33	-0.38	1.30	4.43	1,990	1,995	0.22
2013	0	5.83	-2.31	-0.38	1.29	4.43	1,898	1,902	0.23
2012	0	5.51	-2.18	-0.36	1.13	4.10	1,823	1,827	0.22

Source: Statistics Canada.

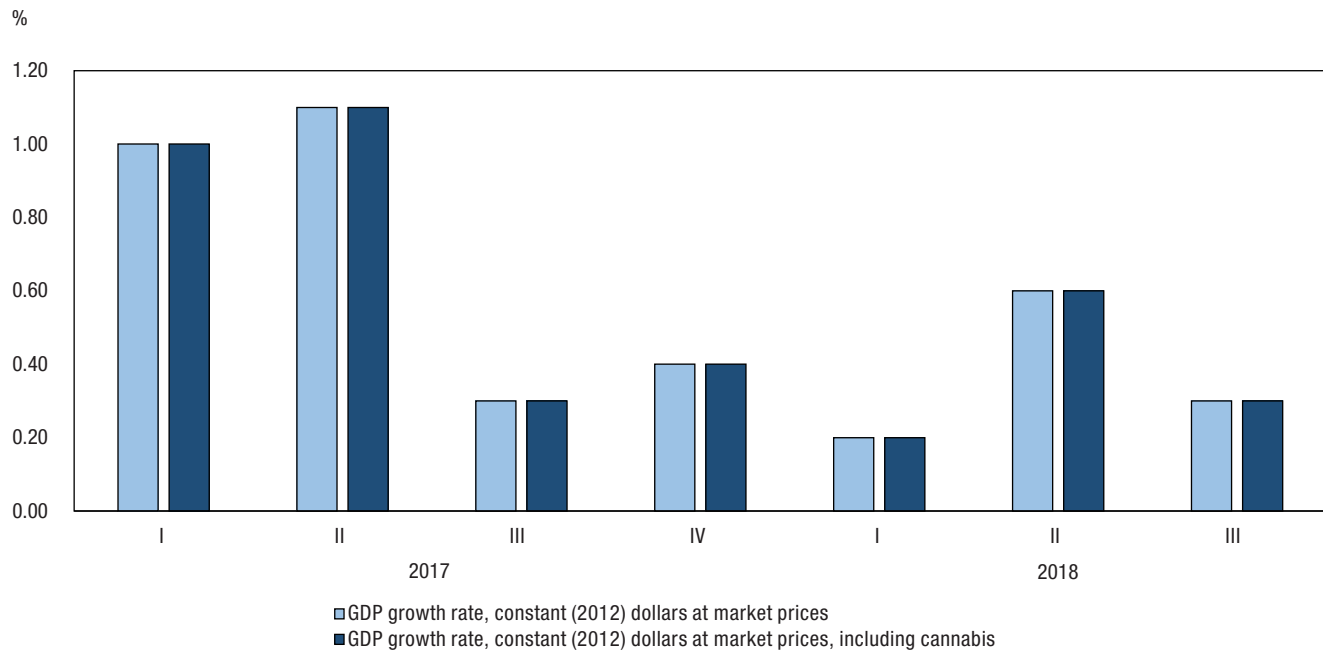
## Gross domestic product historical revision

The preceding sections explain the annual adjustments that will be made to Canada’s gross domestic product estimates resulting from the inclusion of previously unrecorded illegal cannabis production and consumption. Most users rely on the national economic accounts to monitor trends. The need for consistent time series means that Statistics Canada will apply the changes noted in the previous sections to its entire quarterly national economic accounts in order to avoid statistical breaks. This involves developing the necessary monthly and quarterly estimates to make these adjustments through time.

Chart 1 shows Canada’s nominal estimates of gross domestic product as currently published and the series adjusted for the latest information as recorded in the cannabis economic accounts. As is evident, the integration of cannabis into the accounts results in a slight level shift in gross domestic product and has no significant impact on the overall trend and growth rate.

The revision to the growth rate of gross domestic product for 2017 will not be visible at any published level of the growth rate. While the cannabis market in Canada is significant and overall spending on cannabis is in the range of \$5-6 billion, much of this activity is already captured in the national economic accounts, albeit classified differently.

**Chart 1**  
**Difference in gross domestic product growth rates**



Source: Statistics Canada.

### Gross domestic product in the fourth quarter of 2018

The historical revision to include illegal cannabis production and consumption in the national economic accounts will be done with the release of the estimates for the fourth quarter of 2018. As a result, there will be no statistical break in the fourth quarter when cannabis became legal for non-medical purposes. However, there may be a boost in household consumption due to new consumers of the product being drawn into the market, offset to some degree by lower consumption of other products. Furthermore, while total cannabis consumption may be higher, much of the associated production and investment took place in previous quarters as cannabis producers prepared for legalization by building plant and accumulating inventories. If the inventories are drawn down in the fourth quarter, this will tend to offset the boost to consumption. So the net fourth quarter effect on gross domestic product may be small and not noticeable in the estimates, although this remains to be determined.

### Conclusion

The purpose of this paper is to help users of Canada's macroeconomic accounts understand the accounting adjustments that will be made to the estimates in the fourth quarter to integrate the illegal production, distribution and consumption of cannabis. While several adjustments will be made, the expansion of the production boundary to include illegal cannabis production will result in a minimal upward shift in gross domestic product with no material change in growth.