



New data sources and methods for economic statistics

High Level Seminar on the Future of Economic Statistics
for the Arab region

Riyadh, Saudi Arabia

January 2020

Introduction



- The environment in which statistical agencies operate is changing.
- New opportunities to access and interrogate big data are becoming available, increasing the potential to provide new insights into matters of importance.
- Expectations of decision makers are growing and there is demand for statistics that are difficult to obtain using traditional methods
- Resources are relatively more limited and it is becoming increasingly important to make the most efficient use of available resources
- National Statistical Offices (NSOs) are being challenged to deliver the best possible statistical program in more efficient and innovative ways.

- **Scanner data for the CPI**
- **Digital economy: Private short-term accommodation**
- **Crowdsourcing**
- **Wastewater analysis**
- **Supply and use tables Balancing**

Use of scanner data in the Consumer Price Index (CPI)

Scanner data

Introduction



- Barcode scanner technology has enabled retailers to capture detailed information on transactions at the point of sale.
- Scanner data is high in volume and contains information about individual transactions or summaries, date, quantities and values of products sold, and product descriptions.
- As such it is a rich data source to NSOs that can potentially be used to enhance their statistics, reduce provider burden, and reduce associated costs of physically collecting data.

Scanner data Advantages



- Reduced response burden: No collection burden on this retailer's outlets.
- Better quality CPI data: Two weeks of data being used instead of a single day price.
- Potential use of the universe of all consumer products.

Scanner data

The Statistics Canada (StatCan) experience



- Statistics Canada is modernizing CPI to:
 - Ensure more timely and responsive statistics
 - Develop and release more granular statistics
 - Ensure cost effective products and service delivery
- 2015: Scanner data received from one major Canadian grocery retailer
 - Weekly files: very large size (storage and # of data points)
- 2017 & 2018: Two additional Canadian grocery retailers

Scanner data

The Statistics Canada (StatCan) experience



- Incremental implementation strategy
- Long term: Full implementation
 - A micro-data processing system to use with large volumes and varieties of administrative data
 - Full use of all scanner data
- Short term: Simple implementation
 - One-for-one approach
 - Replace prices collected in the field with scanner data, in a “1-for-1” way
 - One retailer (added 2 more retailers in July 2019)
 - Food and non-food products sold in grocery stores

Measuring the Digital Economy: The private short-term accommodation market

Digital economy

Introduction



- The "digital economy" has given households access to many new, free, or low cost products.
- For producers, data has become a new kind of factor of production, and access to open-source software, cloud computing services, and increased opportunities for globalized production have allowed cost savings or tax savings.
- It has also allowed households to make more intensive use of assets that they already own via participation in the sharing economy and to substitute home production for market production.

Digital economy

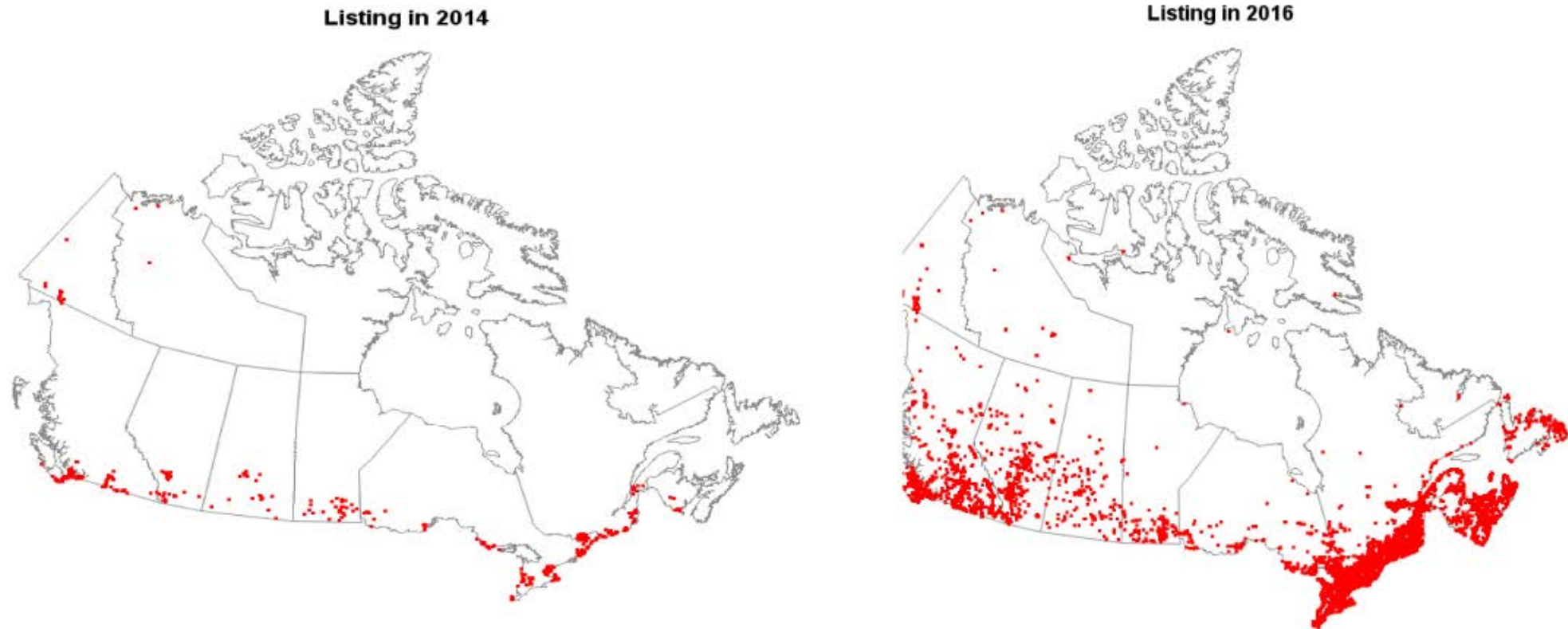
The private short-term accommodation market in Canada



- Private short-term accommodation activities are largely focused around the rental of houses, apartments or rooms within residential properties.
- The market has recently seen tremendous growth.
- Airbnb is estimated to have grown globally from 21,000 guests in 2009 to over 80 million in 2016.

Digital economy

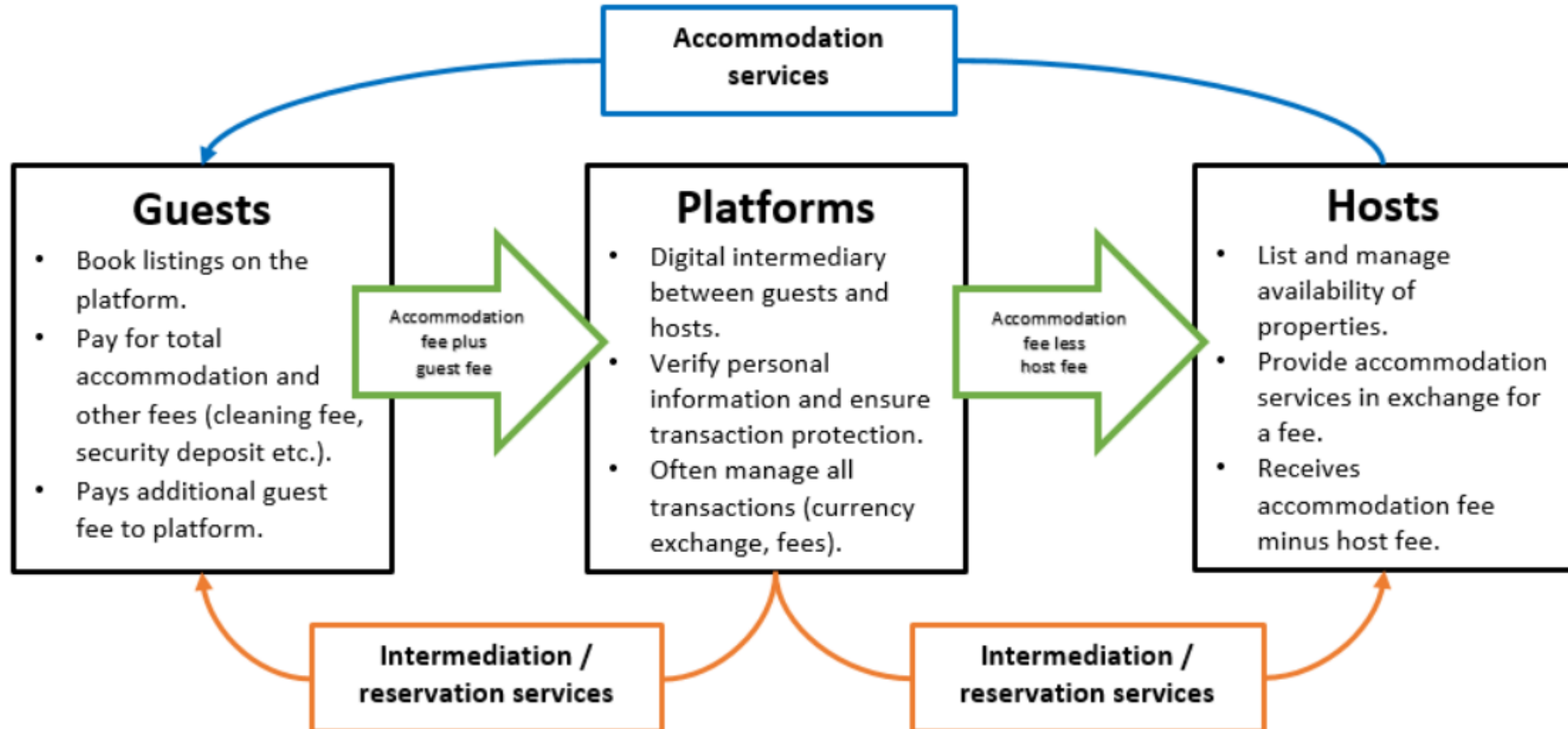
The private short-term accommodation market in Canada



- This growth has raised many public policy questions
 - What is the impact of these activities on housing and rental markets?
 - How should these markets be regulated and taxed?
 - Do they pose concerns for public safety?

Digital economy

The private short-term accommodation market in Canada



Source: Statistics Canada.

Digital economy

The private short-term accommodation market in Canada



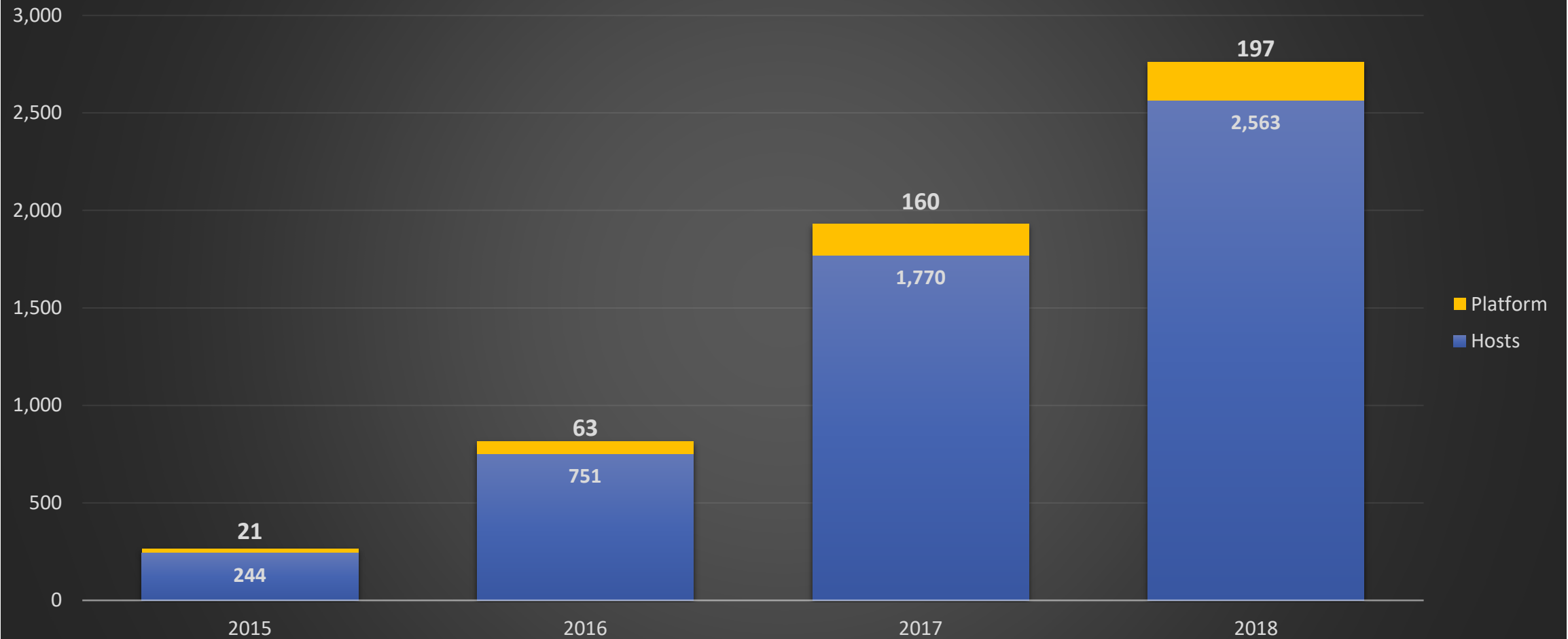
- To measure emerging platform-enabled household activities, StatCan sought alternative measurement methods to help understand the overall impact of this market on the Canadian economy.
- StatCan acquired data from a third-party market research firm (AirDNA) that specializes in providing data analytics for private short-term accommodation rental platforms.

Digital economy

The private short-term accommodation market in Canada



Total revenue of the private short-term accommodation market in Canada, 2015 to 2018



Croudsourcing

Crowdsourcing



- Crowdsourcing is an innovative new way to collect information.
- It relies on the public, who are considered experts within their local environments, to provide data on a voluntary basis on a given subject.
- Crowdsourcing surveys allow data to be benchmarked and validated with other sources of complementary data to ensure that the results are of good quality.
- This valuable information can provide data for new and exciting projects, in a timely and less costly manner.

Crowdsourcing

Cannabis in Canada



- In 2018 Canada legalized the use of cannabis for non-medical purposes
- To measure the impact on the Canadian economy, the production, sale and use pre-legalization as well as post-legalization needed to be measured
- To prepare the national statistical system to capture the associated economic and social implications of the legalization of cannabis, StatCan had to resort to non-traditional methods

Croudsourcing

Cannabis in Canada



- StatCan created a Cannabis Stats Hub (www.statcan.gc.ca/pub/13-610-x/13-610-x2018001-eng.htm)
- Data collection started in January 2018
- In one month **17,139** useable responses were received

Cannabis statistics are available on the following topics:

Health	Justice	Economy	Prices
Canadian's use of cannabis by age, sex, province and territory	Cannabis offences along with estimates of drug impaired driving	Household spending on cannabis, as well as production and distribution, for both medical and non-medical use	Consumer price of cannabis by province and territory

Please help us improve our estimates by telling us what you paid for your latest purchase of cannabis.

[StatsCannabis](#)
(opens in a new window)

Crowdsourcing Cannabis in Canada



Statistics Canada needs your help collecting cannabis prices

Tell us about your last purchase of dried cannabis – submissions are anonymous!

[Your data is protected](#)

I PAID A TOTAL AMOUNT OF

\$ Total Amount

FOR

Quantity

IN

City

FROM

Source

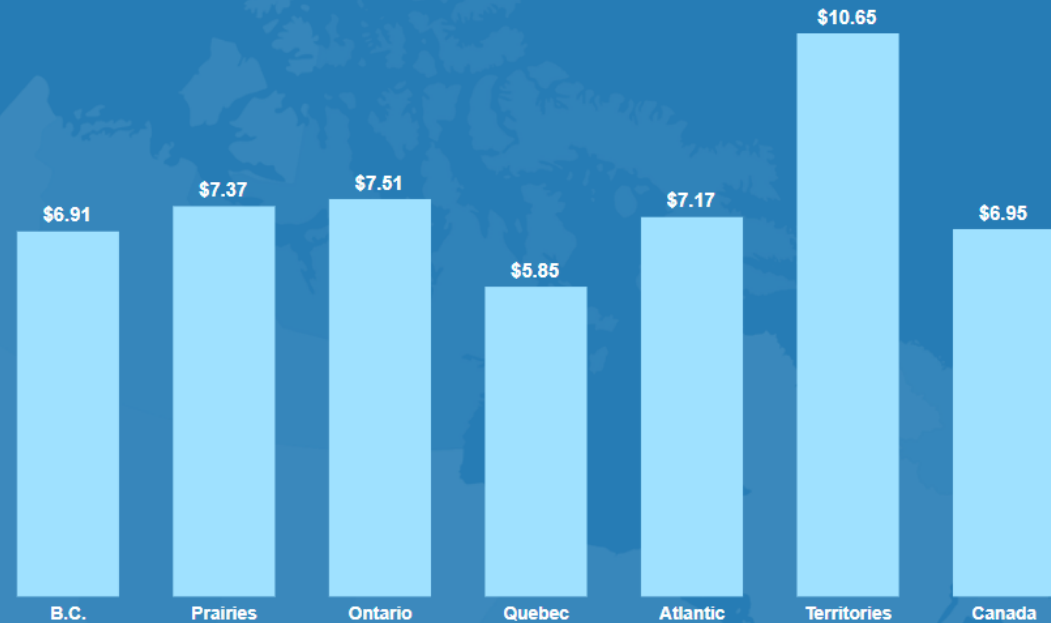
TO

Primary Reason

Submit

Cannabis prices in Canada

(Cannabis for medical and non-medical purposes, per gram)



Source: Crowdsourced data, January 25, 2018 – January 2, 2020

Show data table

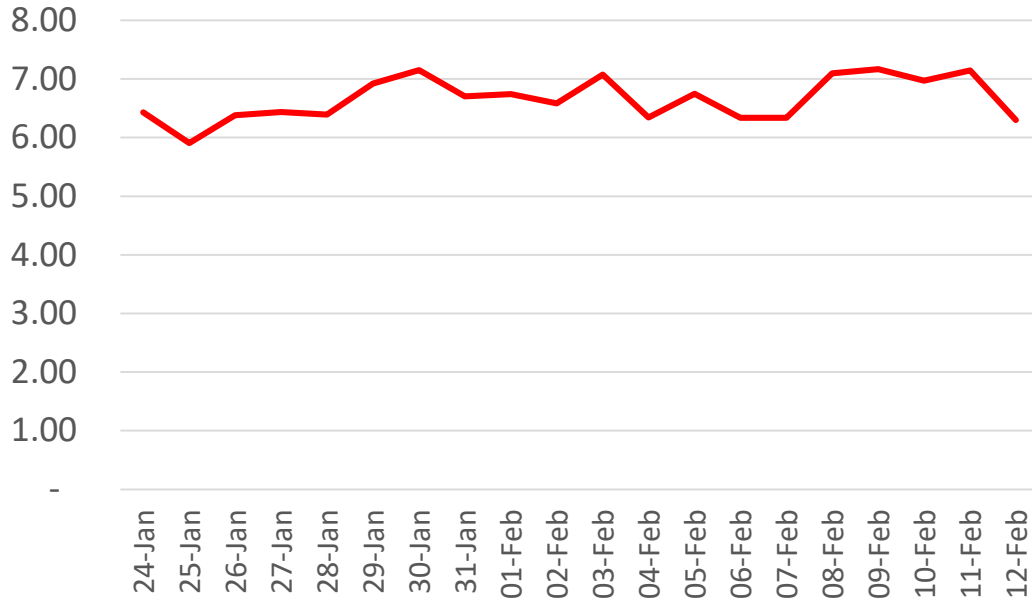
Download submitted data

Visit the Cannabis Stats Hub for more stats

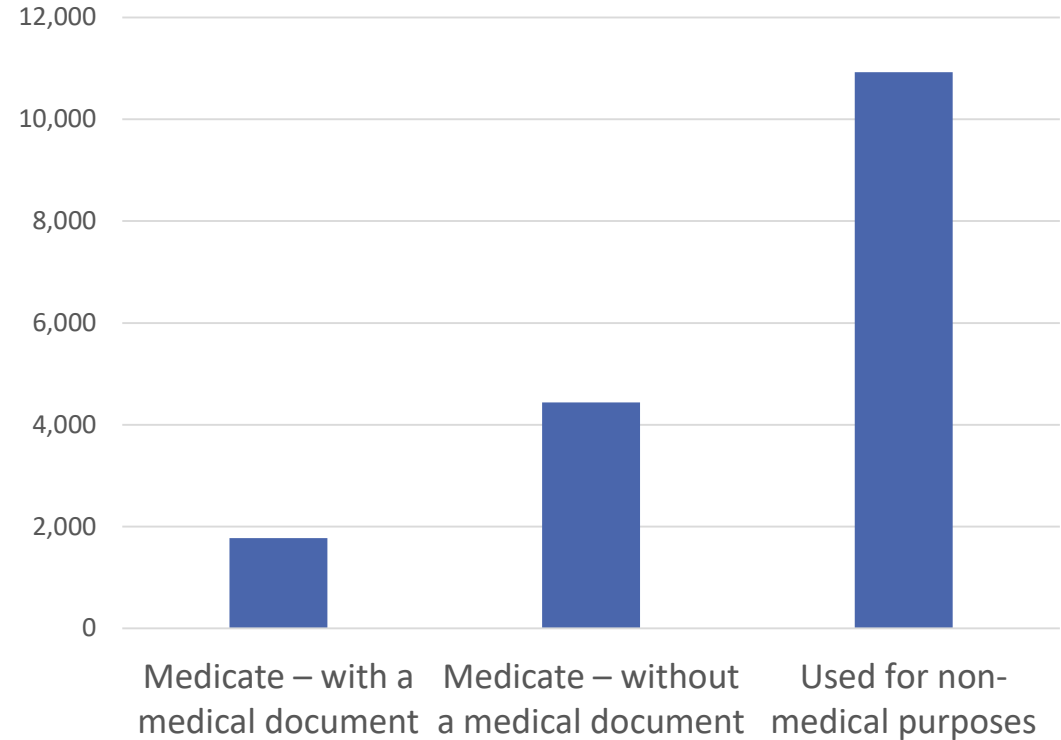
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Stable reported average price

Average price of Cannabis as reported by
Canadians



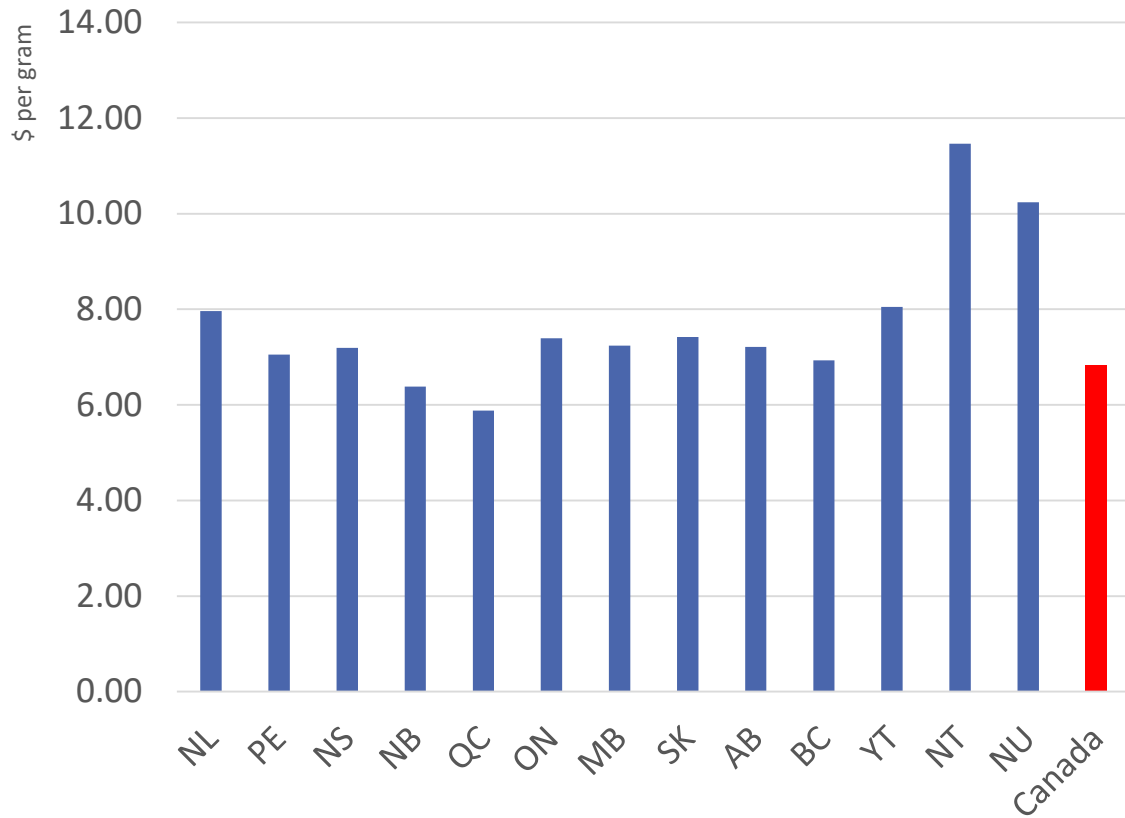
64% used cannabis recreationally



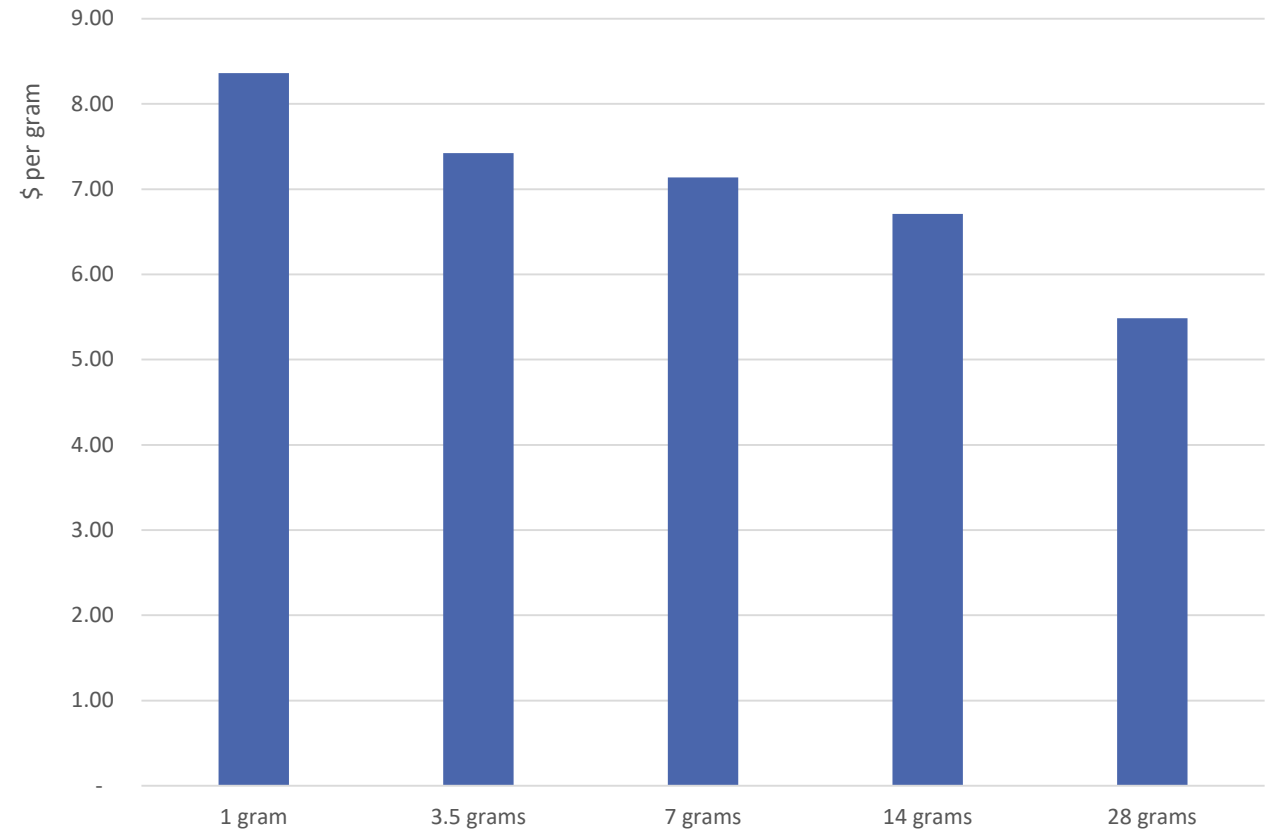
Crowdsourcing Cannabis in Canada



Average price: \$6.83 per gram



Cheaper as you buy more



Crowdsourcing

Cannabis in Canada



- Crowdsourcing worked !
 - It was cost effective, efficient and launched quickly
 - Few outliers
 - Estimates converged
 - Data are downloadable from the crowdsourcing application

Wastewater Analysis to Measure Consumption of Cannabis

Wastewater analysis

Consumption of cannabis



- Accurate measures of total societal use of cannabis and misused drugs are difficult to obtain.
- The stigma associated with use and reluctance to disclose purchases from non-regulated suppliers are two factors that could contribute to some under-reporting on surveys.

Wastewater analysis

Consumption of cannabis



- To support the survey-based data, StatCan is exploring the use of a technique called wastewater-based epidemiology to report on the consumption of different types of drugs in large cities.
- When cannabis is consumed the body produces a compound (THC-COOH), which is ultimately excreted.
- Since THC-COOH is only created in the body after cannabis consumption, traces of it in the wastewater indicates cannabis consumption within the service area.

Wastewater analysis

Consumption of cannabis



- In March 2018, StatCan implemented a pilot project to collect and test municipal wastewater samples for traces of cannabis, and a dozen other drugs to examine if the resulting data could be used to make estimates of the extent of drug use in different cities across Canada and change in use over time.
- The pilot test is the largest ever conducted in North America in terms of population covered - 14 wastewater treatment plants serving 8.4 million people (over 20% of the Canadian population).
- Wastewater from each site was sampled at least every 30 minutes for seven consecutive days for a twelve-month period (covering pre- and post-legalization)

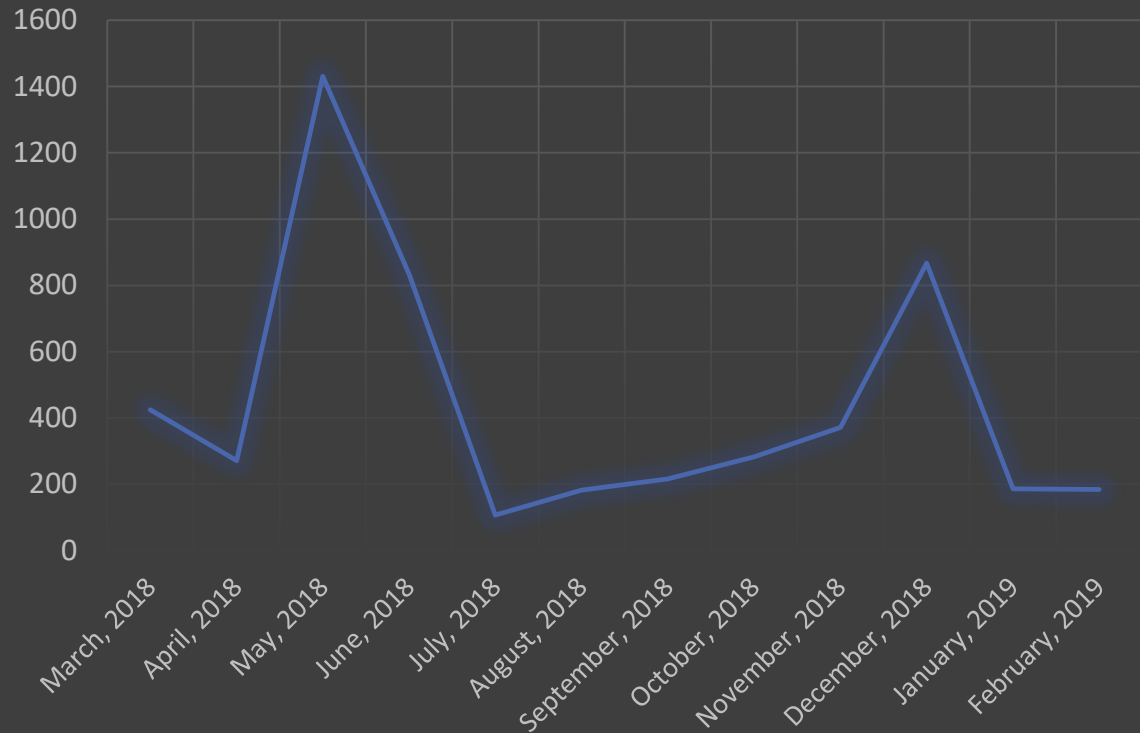
Wastewater analysis

Consumption of cannabis



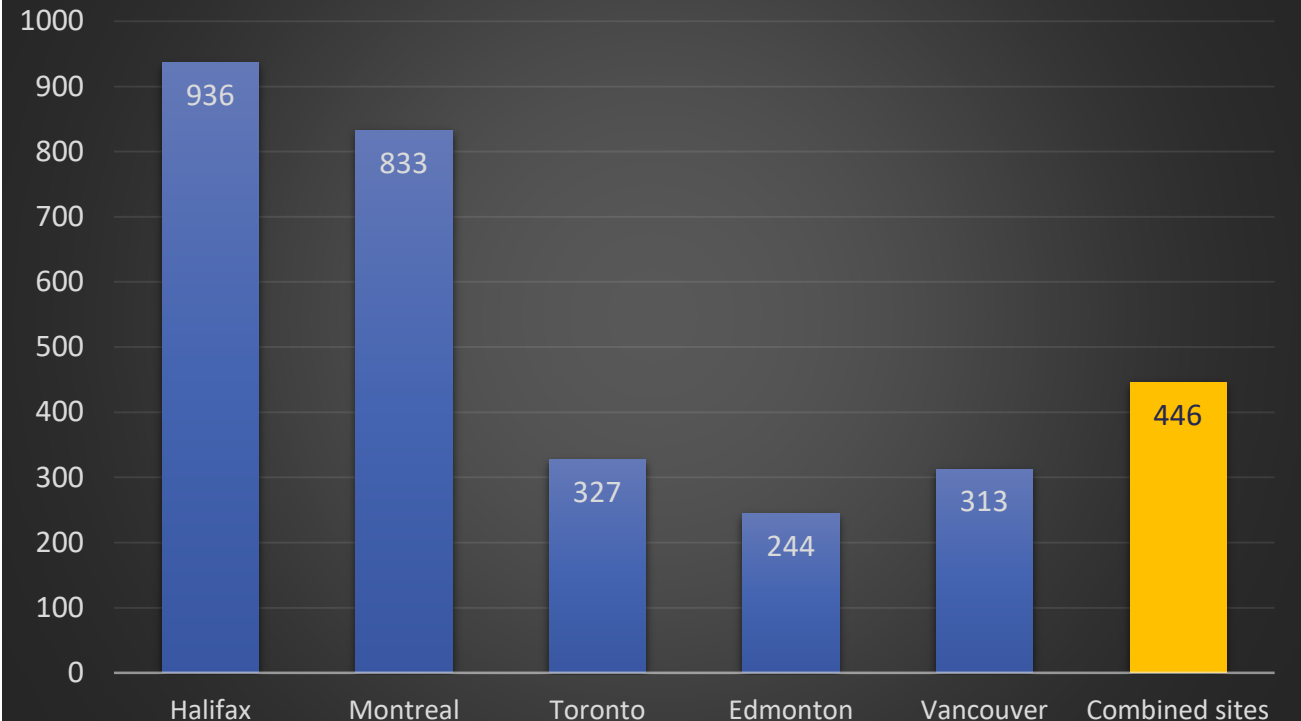
Legalization in October 2018

THC-COOH load per capita



Consumption differs across Canada

Average load per capita



Wastewater analysis

Consumption of cannabis



- Advantages of this technique
 - Low cost.
 - Timeliness.
 - Ability to monitor change over time at the city level.
- Limitations
 - Many of the drugs analyzed degrade rapidly in wastewater, making them difficult to measure.
 - Many of the opioids transform into the same compound, making it difficult to determine what proportion of the morphine comes from which opioid.
 - Does not provide information on the number or characteristics of individuals who consumed or how the drugs were consumed – other surveys are used to help determine these more detailed data.

Algorithm to balance supply and use tables (SUTs)

New methods

IMF SUT Balancing Tool



- Supply and use tables (SUTs) play a central role in a country's statistical system
- Their principal uses include:
 - Providing a statistical anchor for the system of macroeconomic accounts
 - Benchmarking GDP
 - Assessing quality and completeness
 - Analytical
 - Economic modelling
 - Structural analysis and productivity studies

New methods

IMF SUT Balancing Tool



- Compiling SUTs is a labour-intensive process involving the balancing of supply and use at a detailed product-by-product level
- Compilers use a combination of manual and automated balancing techniques
- Finalizing SUTs (resolving small errors to balance rows and columns) could be time-consuming, difficult, but of little added analytical value

New methods

IMF SUT Balancing Tool



- The IMF has developed an Excel-based SUT Balancing Tool with many advantages:
 - Flexible: works with different products/industries and several constraints
 - Easy to install and use: only 5 tables in Excel
 - Dynamic and fast: new balanced tables are generated instantly
- Implemented recently in Jordan and several other countries including Colombia, Paraguay, Belize, Serbia, Estonia, Zambia, Seychelles, Madagascar, Mongolia (and partially in Vietnam, South Africa and Namibia).
- The Jordan experience showed that it adds significant value in terms of reducing compilation time, increasing compiler knowledge, and adding analytical capacity.

Going forward



- Digital economy
 - IMF course on Digital Economy being developed
- Scanner data
 - Many challenges, including:
 - Acquisition: Data is sensitive and security is important
 - “Big” nature of data: More significant IT storage and processing requirements
 - Methodology: Integration of scanner data with data collected in stores
 - Capacity: Highly specialized skills required, e.g. data scientists
- Webscraping
 - IMF is developing a web scraping tool kit for property listings to help with Real Property Price Index (RPPI)
 - If pilot is successful tool kit can be shared sometime in 2020
 - With potential for follow-up assistance to compile RPPI
- SUT Balancing Tool
 - METAC just conducted workshop on SUTs at the IMF Centre for Economic and Finance in Kuwait
 - Country missions on SUTs e.g. Jordan, Egypt
 - Input-output tool being developed



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For more information, please
visit

www.imfmetac.org

References

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