

Canadian productivity growth: Stuck in the oil sands

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README and Guidance

Overview

The files in this replication package include all the data source (Statistics Canada, BEA, Statistik sentralbyrå, OECD, Penn World Tables). All analysis performed and graphs generated were done in Microsoft Excel. There are 7 main files:

- (1) CAN_VA_1961_2018_MASTER.xlsx
- (2) Province_MASTER.xlsx
- (3) USA_MASTER.xlsx
- (4) NOR_MASTER.xlsx
- (5) CAN_CAPITAL_MASTER.xlsx
- (6) Figures and Tables.xlsx

We also include the original raw subsets from StatsCan, BEA and Stats Norway for convenience. We also provide direct links to be able to locate and download all tables individually.

Data Availability and Provenance Statements

Details on Canada Data

Data on GDP in current prices, GDP in constant prices, Hours worked and Compensation at the aggregate level ``CAN_VA_1961_2018_MASTER.xlsx`` for all sectors except for Oil are taken from Stats Can Table [36-10-0208-01](#) (Statistics Canada, 2023a)

- Original table can be downloaded at <https://doi.org/10.25318/3610020801-eng>. The whole dataset includes several variables we do not use. The subset we use (Real GDP, GDP, Hours Worked and Compensation) is included in the file titled 3610020801.xlsx

Data on GDP in current prices, GDP in constant prices, Hours worked and Compensation at the aggregate level ``CAN_VA_1961_2018_20230901_MASTER.xlsx`` for the Oil Sector are taken from Stats Can Table [36-10-0217-01](#) (Statistics Canada, 2023b)

- Original table can be downloaded at <https://doi.org/10.25318/3610021701-eng>. The whole dataset includes several variables we do not use. The subset we use (Real GDP, GDP, Hours Worked and Compensation) is included in the file titled 3610021701.xlsx

Data on capital (Investment, Geometric End of Year Depreciation, and Geometric End of Year net stock) used in ``CAN_VA_1961_2018_20230901_MASTER.xlsx'' for all sectors are taken from Stats Can Table 36-10-0096-01 (Statistics Canada, 2022a)

- Original table can be downloaded at <https://doi.org/10.25318/3610009601-eng>. The whole dataset includes several variables we do not use. The subset we use (Investment, Geometric Depreciation, Geometric end-of-year net stock) is included in the file titled 3610009601_CANADA.xlsx

We also use constant price GDP (PPP) adjusted values from the Penn World Table (PWT 10.01) which can be downloaded at <https://www.rug.nl/ggdc/productivity/pwt/?lang=en> (PWT, 2023)

Details on Province Data

Data on GDP in current prices, Hours worked and Compensation at the provincial level used in ``Province_MASTER.xlsx'' are taken from Stats Can Table 36-10-0211-01 (Statistics Canada, 2023c)

- Original table can be downloaded at <https://doi.org/10.25318/3610021101-eng>. The whole dataset includes several variables we do not use. The subset we use (GDP, Hours Worked and Compensation) for the provinces Alberta and Ontario, for the years 1997-2018, is included in the file titled 3610021101.xlsx

Data on GDP in current prices at the provincial level used in ``Province_MASTER.xlsx'' for the Oil Sector are taken from Stats Can Table 36-10-0402-01 (Statistics Canada, 2023d)

- Original table can be downloaded at <https://doi.org/10.25318/3610040201-eng>. The whole dataset includes several variables we do not use. The subset we use (GDP) for Ontario and Alberta, years 1997-2018 is included in the file titled 3610040201.xlsx

Data on hours worked and compensation at the provincial level used in ``Province_MASTER.xlsx'' for the Oil Sector are taken from Stats Can Table 36-10-0489-01 (Statistics Canada, 2023e)

- Original table can be downloaded at <https://doi.org/10.25318/3610048901-eng>. The whole dataset includes several variables we do not use. The subset we use (Hours worked for all jobs and Total Compensation for All jobs) for Ontario and Alberta, years 1997-2018 is included in the file titled 3610048901.xlsx

Data on capital (Investment, Geometric End of Year Depreciation, and Geometric End of Year net stock) used in ``Province_MASTER.xlsx'' for all sectors are taken from Stats Can Table 36-10-0096-01 (Statistics Canada, 2022a)

- Original table can be downloaded at <https://doi.org/10.25318/3610009601-eng>. The whole dataset includes several variables we do not use. The subset we use (Investment, Geometric Depreciation, Geometric end-of-year net stock) for Ontario and Alberta for the years 1997-2018 is included in the file titled 3610009601_province.xlsx

Data on working age population used in ``Province_MASTER.xlsx`` for Ontario and Alberta are taken from Stats Can Table 14-10-0018-01 (Statistics Canada, 2019)

- Original table can be downloaded at <https://doi.org/10.25318/1410001801-eng>. The whole data set includes several variables we do not use. The subset we use (Population, aged 15-64, for Alberta and Ontario, years 1997-2018) is included in the file titled 1410001801.xlsx

Details on USA Data

Data on GDP in current prices, GDP in constant prices, at the aggregate level ``USA_MASTER.xlsx`` for all sectors BEA Tables ``Value Added by Industry (Historical)`` for the years 1961-1997 and ``GDP by Industry`` for the years 1997-2018, and ``Chain-Type Quantity Indexes for Value Added by Industry``

- The subsets we use are included in the files :
 - valueadded_1961_1997.xlsx
 - valueadded_1997_2018.xlsx
 - index_1961_1997.xlsx
- Original tables can be downloaded at
 - Value added in current prices, 1961-1997 (BEA, 2021a):
<https://apps.bea.gov/iTable/?reqid=147&step=2#eyJhcHBpZCI6MTQ3LCJzdGVwcyl6WzIsNTFkdLCJkYXRhIjpbWyJUYWJsZV9MaXN0IiwiaWMSJdXX0=>
 - Value added in current prices and Chain-Type Quantity Indexes, 1998-2018 (Download the folder GDP by Industry) (BEA, 2022a):
<https://apps.bea.gov/histdata/fileStructDisplay.cfm?HMI=8&DY=2022&DQ=Q2&DV=Annual&dNRD=September-29-2022>
 - Chain-Type Quantity Indexes for Value added, 1961-1997 (BEA, 2021b):
<https://apps.bea.gov/iTable/?reqid=147&step=2#eyJhcHBpZCI6MTQ3LCJzdGVwcyl6WzIsNTFkdLCJkYXRhIjpbWyJUYWJsZV9MaXN0IiwiaWMSJdXX0=>

Hours worked are taken from Table 6.9B. Hours Worked by Full-Time and Part-Time Employees by Industry, Table 6.9C. Hours Worked by Full-Time and Part-Time Employees by Industry and Table 6.9D. Hours Worked by Full-Time and Part-Time Employees by Industry

- The subsets we use are included in the files:

- hours_1961_1987.xlsx
- hours_1987_2000.xlsx
- hours_2000_2018.xlsx
- Original tables can be downloaded at
 - Hours worked, 1961-1986 (BEA, 2023a):
<https://apps.bea.gov/iTable/?reqid=19&step=2&isuri=1&1921=survey#eyJhcHBpZCI6MTkslnN0ZXBzIjpbMSwyLDNdLCJkYXRhIjpbWyJDYXRlZ29yaWVzliwiU3VydmV5Il0sWyJOSVBBX1RhYmxlX0xpc3QiLCIyMTAiXV19>
 - Hours worked, 1987-2000 (BEA, 2023b):
<https://apps.bea.gov/iTable/?reqid=19&step=2&isuri=1&1921=survey#eyJhcHBpZCI6MTkslnN0ZXBzIjpbMSwyLDNdLCJkYXRhIjpbWyJDYXRlZ29yaWVzliwiU3VydmV5Il0sWyJOSVBBX1RhYmxlX0xpc3QiLCIyMTAiXV19>
 - Hours worked, 2001-2018 (BEA, 2023c):
<https://apps.bea.gov/iTable/?reqid=19&step=2&isuri=1&1921=survey#eyJhcHBpZCI6MTkslnN0ZXBzIjpbMSwyLDNdLCJkYXRhIjpbWyJDYXRlZ29yaWVzliwiU3VydmV5Il0sWyJOSVBBX1RhYmxlX0xpc3QiLCIyMTAiXV19>

Employment numbers are taken from Table 6.4B. Full-Time and Part-Time Employees by Industry, Table 6.4C. Full-Time and Part-Time Employees by Industry and Table 6.4D. Full-Time and Part-Time Employees by Industry

- The subsets we use are included in the files:
 - employment_1961_1987.xlsx
 - employment_1987_2000.xlsx
 - employment_1998_2018.xlsx
- Original tables can be downloaded at
 - Employees by Industry, 1961-1986 (BEA, 2023d):
<https://apps.bea.gov/iTable/?reqid=19&step=2&isuri=1&1921=survey#eyJhcHBpZCI6MTkslnN0ZXBzIjpbMSwyLDNdLCJkYXRhIjpbWyJDYXRlZ29yaWVzliwiU3VydmV5Il0sWyJOSVBBX1RhYmxlX0xpc3QiLCIxOTEiXV19>
 - Employees by Industry, 1987-2000 (BEA, 2023e):
<https://apps.bea.gov/iTable/?reqid=19&step=2&isuri=1&1921=survey#eyJhcHBpZCI6MTkslnN0ZXBzIjpbMSwyLDNdLCJkYXRhIjpbWyJDYXRlZ29yaWVzliwiU3VydmV5Il0sWyJOSVBBX1RhYmxlX0xpc3QiLCIxOTIiXV19>
 - Employees by Industry, 2000-2018 (BEA, 2023f):
<https://apps.bea.gov/iTable/?reqid=19&step=2&isuri=1&1921=survey#eyJhcHBpZCI6MTkslnN0ZXBzIjpbMSwyLDNdLCJkYXRhIjpbWyJDYXRlZ29yaWVzliwiU3VydmV5Il0sWyJOSVBBX1RhYmxlX0xpc3QiLCIxOTMiXV19>

Data on Employee compensation comes from Table 6.2B. Compensation of Employees by Industry, Table 6.2C. Compensation of Employees by Industry, and Table 6.2D. Compensation of Employees by Industry

- The subsets we use are included in the files:
 - compensation_1961_1987.xlsx
 - compensation_1987_2000.xlsx

- compensation_1998_2018.xlsx
- Original data can be downloaded at
 - Compensation, 1961-1986 (BEA, 2023g):
<https://apps.bea.gov/iTable/?reqid=19&step=2&isuri=1&1921=survey#eyJhcHBpZCI6MTkslnN0ZXBzljpbMSwyLDNdLCJkYXRhIjpbWyJDYXRlZ29yaWVzliwiU3VydmV5Il0sWyJOSVBBX1RhYmxlX0xpc3QiLCIxODMiXV19>
 - Compensation, 1987-2000 (BEA, 2023h):
<https://apps.bea.gov/iTable/?reqid=19&step=2&isuri=1&1921=survey#eyJhcHBpZCI6MTkslnN0ZXBzljpbMSwyLDNdLCJkYXRhIjpbWyJDYXRlZ29yaWVzliwiU3VydmV5Il0sWyJOSVBBX1RhYmxlX0xpc3QiLCIxODQlXV19>
 - Compensation, 2001-2018 (BEA, 2023i):
<https://apps.bea.gov/iTable/?reqid=19&step=2&isuri=1&1921=survey#eyJhcHBpZCI6MTkslnN0ZXBzljpbMSwyLDNdLCJkYXRhIjpbWyJDYXRlZ29yaWVzliwiU3VydmV5Il0sWyJOSVBBX1RhYmxlX0xpc3QiLCIxODUiXV19>

Data on Capital stock, depreciation and investment comes from tables [Table 3.1ESI. Current-Cost Net Stock of Private Fixed Assets by Industry](#), [Table 3.4ESI. Current-Cost Depreciation of Private Fixed Assets by Industry](#) and [Table 3.7ESI. Investment in Private Fixed Assets by Industry](#)

- The subsets we use are included in the files:
 - kdepreciation_1961_2018.xlsx
 - kinvestment_1961_2018.xlsx
 - kstock_1961_2018.xlsx
- Original data can be downloaded at
 - Stock in current prices (BEA, 2022):
https://apps.bea.gov/iTable/?isuri=1&reqid=10&step=4&categories=flatfiles&nipa_table_list=1#eyJhcHBpZCI6MTAslnN0ZXBzljpbMSwyLDNdLCJkYXRhIjpbWyJjYXRlZ29yaWVzliwiUHVibGljRkFBIl0sWyJUYWJsZV9MaXN0IiwiaMTI2Il1dfQ==
 - Investment in current prices (BEA, 2022):
https://apps.bea.gov/iTable/?isuri=1&reqid=10&step=4&categories=flatfiles&nipa_table_list=1#eyJhcHBpZCI6MTAslnN0ZXBzljpbMSwyLDNdLCJkYXRhIjpbWyJjYXRlZ29yaWVzliwiUHVibGljRkFBIl0sWyJUYWJsZV9MaXN0IiwiaMTM4Il1dfQ==
 - Depreciation in current prices (BEA, 2022):
https://apps.bea.gov/iTable/?isuri=1&reqid=10&step=4&categories=flatfiles&nipa_table_list=1#eyJhcHBpZCI6MTAslnN0ZXBzljpbMSwyLDNdLCJkYXRhIjpbWyJjYXRlZ29yaWVzliwiUHVibGljRkFBIl0sWyJUYWJsZV9MaXN0IiwiaMTM4Il1dfQ==

We also use constant price GDP (PPP) adjusted values from the Penn World Table (PWT 10.01) which can be downloaded at <https://www.rug.nl/ggdc/productivity/pwt/?lang=en> (PWT, 2023).

Details on NOR Data

Data on GDP in current prices, hours worked, compensation and capital, used in “NOR_MASTER.xlsx”

- Original tables can be downloaded at <https://www.ssb.no/en/nasjonalregnskap-og-konjunkturer/nasjonalregnskap/artikler/annual-national-accounts-1970-xlsx-files>

- The subsets we use are included in the files:
 - valueadded_norway.xlsx
 - compensation_norway.xlsx
 - hours_norway.xlsx
 - norway_capital.xlsx
- The original data are taken from the following tables
 - Value added in current prices taken from [Table 9. Value added by kind of main activity at basic values. Current prices. NOK million \[xlsx\] \(Statistisk sentralbyrå, 2023a\)](#)
 - Employee compensation taken from [Table 13. Compensation of employees by kind of main activity. NOK million \[xlsx\] \(Statistisk sentralbyrå, 2023b\)](#)
 - Hours worked taken from [Table 15. Total hours worked by kind of main activity. Employees and self-employed. Million \[xlsx\] \(Statistisk sentralbyrå, 2023c\)](#)
 - Gross fixed capital stock taken from [Table 37. Fixed assets by kind of main activity. Current prices. NOK million \[xlsx\] \(Statistisk sentralbyrå, 2023d\)](#)

We also use the aggregate GDP deflator for Norway and working age population from stats.oecd.org

Statement about Rights

- **X** I certify that the author(s) of the manuscript have legitimate access to and permission to use the data used in this manuscript.
- **X** I certify that the author(s) of the manuscript have documented permission to redistribute/publish the data contained within this replication package. Appropriate permission are documented in the [LICENSE.txt](#) file.

Summary of Availability

- **X** All data **are** publicly available.
- ☐ Some data **cannot be made** publicly available.
- ☐ **No data can be made** publicly available.

Details on each Data Source

Statistics Canada

- National aggregate level data is found in the following files:
 - /submission/CAN_VA_1961_2018_MASTER.xlsx
 - /submission/Figures and Tables.xlsx
 - /submission/raw_tables/Canada/3610009601_allassets.xlsx

- /submission/raw_tables/Canada/3610009601_CANADA.xlsx
- /submission/raw_tables/Canada/3610020801.xlsx
- /submission/raw_tables/Canada/3610021701.xlsx
- /submission/CAN_CAPITAL_MASTER.xlsx
- Provincial aggregate data is found in the following files:
 - /submission/Province_MASTER.xlsx
 - /submission/raw_tables/provinces/1410001801.xlsx
 - /submission/raw_tables/provinces/3610009601_province.xlsx
 - /submission/raw_tables/provinces/3610021101.xlsx
 - /submission/raw_tables/provinces/3610040201.xlsx
 - /submission/raw_tables/provinces/3610048901.xlsx
 - /submission/Figures and Tables.xlsx

Bureau of Economic Analysis

- National aggregate data is found in the following files :
 - /submission/USA_MASTER.xlsx
 - /submission/Figures and Tables.xlsx
 - /submission/raw_tables/usa/compensation_1961_1987.xlsx
 - /submission/raw_tables/usa/compensation_1987_2000.xlsx
 - /submission/raw_tables/usa/compensation_1998_2018.xlsx
 - /submission/raw_tables/usa/employment_1961_1987.xlsx
 - /submission/raw_tables/usa/employment_1987_2000.xlsx
 - /submission/raw_tables/usa/employment_1998_2018.xlsx
 - /submission/raw_tables/usa/hours_1961_1987.xlsx
 - /submission/raw_tables/usa/hours_1987_2000.xlsx
 - /submission/raw_tables/usa/hours_2000_2018.xlsx
 - /submission/raw_tables/usa/index_1961_1997.xlsx
 - /submission/raw_tables/usa/kdepreciation_1961_2018.xlsx
 - /submission/raw_tables/usa/kinvestment_1961_2018.xlsx

- /submission/raw_tables/usa/kstock_1961_2018.xlsx
- /submission/raw_tables/usa/valueadded_1961_1997.xlsx
- /submission/raw_tables/usa/valueadded_1997_2018.xlsx

Statistics Norway (Statistisk sentralbyrå)

- National Aggregate data is found in the following files:
 - /submission/NOR_MASTER.xlsx
 - /submission/Figures and Tables.xlsx
 - /submission/raw_tables/norway/compensation_norway.xlsx
 - /submission/raw_tables/norway/hours_norway.xlsx
 - /submission/raw_tables/norway/Norway_capital.xlsx
 - /submission/raw_tables/norway/valueadded_norway.xlsx

OECD and PWT

- GDP deflators (Norway, OECD), Working age population (Canada, USA, Norway, OECD) and PPP adjusted real GDP (Canada, USA, PWT) are used in the following files
 - /submission/CAN_VA_1961_2018_MASTER.xlsx
 - /submission/USA_MASTER.xlsx
 - /submission/NOR_MASTER.xlsx

DATA DICTIONARY

The following variables are used across CAN_VA_1961_2018_MASTER.xlsx, USA_MASTER.xlsx, NOR_MASTER.xlsx, Province_MASTER.xlsx

- Year: annual year
- Y (current): GDP (aggregate or sector) in current prices
- Index: Chain valued indices used to convert current price values into constant price values where applicable
- Y (constant): GDP (aggregate or sector) in constant prices
- Y (defl): GDP deflator (aggregate)
- Y (real): GDP (aggregate or sector) in real values
- L : hours worked

- wL : employee compensation
- N : working age population
- K (current): capital stock in current prices
- K (real): capital stock in real values
- wL/Y : employee compensation-to-GDP ratio (aggregate or sector)
- α : capital intensity parameter
- $1-\alpha$: labour intensity parameter
- TFP: Total Factor Productivity
- Y/N : GDP per working age population (aggregate or sector)
- K/Y : Capital to GDP ratio (aggregate or sector)
- L/N : hours worked per working age population (aggregate or sector)
- TFP growth: TFP growth relative to first year (1961, 1970, 1997, 2001)
- Y/N growth: Y/N growth relative to first year (1961, 1970, 1997, 2001)
- K/Y growth: K/Y growth relative to first year (1961, 1970, 1997, 2001)
- L/N growth: L/N growth relative to first year (1961, 1970, 1997, 2001)
- $Y(Oil)/Y$: Oil extraction GDP as a percentage of aggregate GDP
- $K(Oil)/K$: Oil extraction capital as a percentage of aggregate capital stock

The following variables are specific to CAN_VA_1961_2018_MASTER.xlsx

- Conventional K: capital stock in conventional oil and gas extraction
- Sands K: capital stock in non-conventional oil and gas extraction
- $I(Oil)$: Investment in oil sector
- I (Conventional): Investment in conventional oil extraction
- I (sands): Investment in non-conventional oil extraction
- $K(Conventional)/K(Oil)$: capital stock in conventional oil extraction as a percentage of total oil extraction capital
- $K(Sands)/K(Oil)$: capital stock in non-conventional oil extraction as a percentage of total oil extraction capital
- $I(Conventional)/K(Oil)$: investment in conventional oil extraction as a percentage of total oil extraction investment

- $I(\text{Sands})/I(\text{Oil})$: investment in non-conventional oil extraction as a percentage of total oil investment
- $K(\text{Mining excl oil})/K$: capital stock in mining sector (excluding oil extraction) as a percentage of total capital stock
- $K(\text{Agriculture})/K$: capital stock in agriculture sector as a percentage of total capital stock
- $K(\text{Manufacturing})/K$: capital stock in manufacturing sector as a percentage of total capital stock
- $K(\text{Services})/K$: capital stock in services (aggregate economy excluding Agriculture, Manufacturing, and Oil) sector as a percentage of total capital stock

Dataset list

Mapping Raw Data to ``CAN_VA_1961_2018_MASTER.xlsx``:

- Sheet “Agg”
 - Value added in current prices (Column B, titled Y (current)) corresponds to column AJ in 3610020801.xlsx.
 - Column C (titled Index) corresponds to column B in 3610020801.xlsx. These are the Index values to transform the Value Added current price series into constant prices.
 - Value added in constant prices (Column D, titled Y (constant)) is computed by multiplying the entry in the “Index” column by the “Y (current)” entry for 2012 (Cell B53) and then dividing by 100.
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is computed by taking the ratio of Value Added in current prices (column B) divided by Value added in constant prices (Column D).
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Hours worked (Column G, titled “L”) corresponds to column S in 3610020801.xlsx
 - Labour compensation (Column H, titled “wL”) corresponds to column BA in 3610020801.xlsx
 - Working Age Population (Column I, titled “N”) are taken from stats.oecd.org
 - Capital stock in current prices (Column J, titled “K (current)”) is from 3610009601.xlsx according to the following steps:
 - Construct the investment series (I) by taking column C and subtracting columns EQ and EN
 - Construct the depreciated capital series (dK) by taking column D and subtracting columns ER and EO

- Construct the end of year stock (K prime) by taking column E and subtracting columns ES and EP
 - Then construct the capital series as $K \text{ prime} + dK - I$, or $[(E-ES-EP)+(D-ER-EO) - (C - EQ - EN)]$
 - Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
 - The capital share (column M, titled “α”) is constructed by taking 1-average(column L)
 - The labour share (column N, titled “1-α”) is constructed by taking 1 – column M
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}}))^{\frac{1}{\text{Column N}}})$
 - Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
 - Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$
 - Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
 - The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
 - The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “Agriculture”
 - Value added in current prices (Column B, titled Y (current)) corresponds to column AK in 3610020801.xlsx.

- The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same values as the aggregate deflator from sheet “Agg” and copy/pasted for
- Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
- Hours worked (Column G, titled “L”) corresponds to column T in 3610020801.xlsx
- Labour compensation (Column H, titled “wL”) corresponds to column BB in 3610020801.xlsx
- Working Age Population (Column I, titled “N”) is the same values as in the sheet “Agg” and are copy/pasted for convenience
- Capital stock in current prices (Column J, titled “K (current)”) is from 3610009601.xlsx according to the following steps:
 - Construct the investment series (I) by taking column F
 - Construct the depreciated capital series (dK) by taking column G
 - Construct the end of year stock (K prime) by taking column H
 - Then construct the capital series as $K \text{ prime} + dK - I$, or $[H+G-F]$
- Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
- The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
- The capital share (column M, titled “ α ”) is constructed by taking $1 - \text{average}(\text{column L})$
- The labour share (column N, titled “ $1 - \alpha$ ”) is constructed by taking $1 - \text{column M}$
- Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}}) * (\text{Column G}^{\text{Column N}}))^{\frac{1}{\text{Column N}}}$
- Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
- Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{\frac{\text{Column M}}{\text{Column N}}}$
- Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
- TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2) * 100$
- Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2) * 100$
- The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2) * 100$

- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the V_j entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “Manufacturing”
 - Value added in current prices (Column B, titled “Y (current)”) corresponds to column AO in 3610020801.xlsx.
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same values as the aggregate deflator from sheet “Agg” and copy/pasted for
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Hours worked (Column G, titled “L”) corresponds to column X in 3610020801.xlsx
 - Labour compensation (Column H, titled “wL”) corresponds to column BF in 3610020801.xlsx
 - Working Age Population (Column I, titled “N”) is the same values as in the sheet “Agg” and are copy/pasted for convenience
 - Capital stock in current prices (Column J, titled “K (current)”) is from 3610009601.xlsx according to the following steps:
 - Construct the investment series (I) by taking column AM
 - Construct the depreciated capital series (dK) by taking column AN
 - Construct the end of year stock (K prime) by taking column AO
 - Then construct the capital series as $K \text{ prime} + dK - I$, or $[AO+AN-AM]$
 - Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
 - The capital share (column M, titled “ α ”) is constructed by taking $1 - \text{average}(\text{column L})$
 - The labour share (column N, titled “ $1 - \alpha$ ”) is constructed by taking $1 - \text{column M}$
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}})))^{(1/\text{Column N})}$
 - Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
 - Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell S_j is
 - $S_j = (O_j/O_2)*100$

- Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
- The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “Oil”
 - Value added in current prices (Column B, titled Y (current)) corresponds to column AN in 3610021701.xlsx.
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same values as the aggregate deflator from sheet “Agg” and copy/pasted for
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Hours worked (Column G, titled “L”) corresponds to column V in 3610021701.xlsx
 - Labour compensation (Column H, titled “wL”) corresponds to column BF in 3610021701.xlsx
 - Working Age Population (Column I, titled “N”) is the same values as in the sheet “Agg” and are copy/pasted for convenience
 - Capital stock in current prices (Column J, titled “K (current)”) is from 3610009601.xlsx according to the following steps:
 - Construct the investment series (I) by taking column AA+AD
 - Construct the depreciated capital series (dK) by taking column AB+AE
 - Construct the end of year stock (K prime) by taking column AC+AF
 - Then construct the capital series as K prime + dK – I, or
 - $[(AC+AF)+(AB+AE)-(AA+AD)]$
 - Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
 - The capital share (column M, titled “α”) is constructed by taking 1-average(column L)
 - The labour share (column N, titled “1-α”) is constructed by taking 1 – column M
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}}) * (\text{Column G}^{\text{Column N}}))^{\text{1/Column N}}$

- Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
 - Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$
 - Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
 - The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
 - The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “Services”
 - Value added in current prices (Column B, titled Y (current)), Hours worked (Column G, titled “L”), Labour compensation (Column H, titled “wL”) and the Capital stock in current prices (column J, titled “K (current)”) are all constructed by taking the same column in the sheet “Agg” and subtracting the equivalent columns in “Agriculture”, “Manufacturing”, and “Oil”
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same values as the aggregate deflator from sheet “Agg” and copy/pasted for
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Working Age Population (Column I, titled “N”) is the same values as in the sheet “Agg” and are copy/pasted for convenience
 - Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
 - The capital share (column M, titled “α”) is constructed by taking 1-average(column L)
 - The labour share (column N, titled “1-α”) is constructed by taking 1 – column M
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to

- $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}}))^{\frac{1}{\text{Column N}}})$
 - Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
 - Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$
 - Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
 - The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
 - The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “Mining excl Oil”
 - Value added in current prices (Column B, titled Y (current)) is constructed by taking column AM and subtracting column AN in 3610021701.xlsx.
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same values as the aggregate deflator from sheet “Agg” and copy/pasted for
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Hours worked (Column G, titled “L”) is constructed by taking column U and subtracting column V in 3610021701.xlsx
 - Labour compensation (Column H, titled “wL”) is constructed by taking column BE and subtracting column BF in 3610021701.xlsx
 - Working Age Population (Column I, titled “N”) is the same values as in the sheet “Agg” and are copy/pasted for convenience
 - Capital stock in current prices (Column J, titled “K (current)”) is from 3610009601.xlsx according to the following steps:
 - Construct the investment series (I) by taking column X-AA-AD
 - Construct the depreciated capital series (dK) by taking column Y-AB-AE

- Construct the end of year stock (K prime) by taking column Z-AC-AF
 - Then construct the capital series as $K \text{ prime} + dK - I$, or
 - $[(Z-AC-AF)+(Y-AB-AE)-(X-AA-AD)]$
 - Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “ wL/Y ”) is constructed by dividing column H by column B
 - The capital share (column M, titled “ α ”) is constructed by taking 1-average(column L)
 - The labour share (column N, titled “ $1-\alpha$ ”) is constructed by taking $1 - \text{column M}$
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}})))^{(1/\text{Column N})}$
 - Value added per WAP (Column P, titled “ Y/N ”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “ K/Y ”) is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
 - Hours worked per WAP (column R, titled “ L/N ”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$
 - Value added per WAP growth (column T, titled “ Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
 - The capital to value added ratio growth (column U, titled “ K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
 - The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “Agg No Oil”
 - Value added in current prices (Column B, titled Y (current)), Hours worked (Column G, titled “L”), Labour compensation (Column H, titled “ wL ”) and the Capital stock in current prices (column J, titled “K (current)”) are all constructed

by taking the same column in the sheet “Agg” and subtracting the equivalent columns in “Oil”

- The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same values as the aggregate deflator from sheet “Agg” and copy/pasted for
- Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
- Working Age Population (Column I, titled “N”) is the same values as in the sheet “Agg” and are copy/pasted for convenience
- Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
- The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
- The capital share (column M, titled “α”) is constructed by taking 1-average(column L)
- The labour share (column N, titled “1-α”) is constructed by taking 1 – column M
- Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}}))^{\text{1/Column N}})$
- Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
- Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
- Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
- TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$
- Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
- The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$

- Sheet “Agg No Agriculture”

- Value added in current prices (Column B, titled "Y (current)"), Hours worked (Column G, titled "L"), Labour compensation (Column H, titled "wL") and the Capital stock in current prices (column J, titled "K (current)") are all constructed by taking the same column in the sheet "Agg" and subtracting the equivalent columns in "Agriculture"
- The aggregate GDP deflator (Column E, titled "Y (defl)") is the same values as the aggregate deflator from sheet "Agg" and copy/pasted for
- Real GDP (Column F, titled "Y (real)") is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
- Working Age Population (Column I, titled "N") is the same values as in the sheet "Agg" and are copy/pasted for convenience
- Capital stock in real terms (Column K, titled "K (real)") is taken by dividing Column J by column E
- The Labour Compensation to Value Added ratio (column L, titled "wL/Y") is constructed by dividing column H by column B
- The capital share (column M, titled " α ") is constructed by taking 1-average(column L)
- The labour share (column N, titled " $1-\alpha$ ") is constructed by taking 1 – column M
- Total Factor Productivity (column O, titled "TFP") is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}}))^{\frac{1}{\text{Column N}}})$
- Value added per WAP (Column P, titled "Y/N") is constructed by dividing Column F by Column I
- Capital to Value added ratio (Column Q, titled "K/Y") is constructed according to
 - $(\text{Column K} / \text{column F})^{\text{Column M/Column N}}$
- Hours worked per WAP (column R, titled "L/N") is constructed by taking Column G divided by Column I
- TFP growth (Column S, titled "TFP growth") is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$
- Value added per WAP growth (column T, titled "Y/N growth") is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
- The capital to value added ratio growth (column U, titled "K/Y growth") is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$

- Sheet “Agg No Manufacturing”
 - Value added in current prices (Column B, titled “Y (current)”), Hours worked (Column G, titled “L”), Labour compensation (Column H, titled “wL”) and the Capital stock in current prices (column J, titled “K (current)”) are all constructed by taking the same column in the sheet “Agg” and subtracting the equivalent columns in “Manufacturing”
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same values as the aggregate deflator from sheet “Agg” and copy/pasted for
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Working Age Population (Column I, titled “N”) is the same values as in the sheet “Agg” and are copy/pasted for convenience
 - Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
 - The capital share (column M, titled “α”) is constructed by taking 1-average(column L)
 - The labour share (column N, titled “1-α”) is constructed by taking 1 – column M
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}}) * (\text{Column G}^{\text{Column N}}))^{\frac{1}{\text{Column N}}}$
 - Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{\frac{\text{Column M}}{\text{Column N}}}$
 - Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2) * 100$
 - Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2) * 100$
 - The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2) * 100$

- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the V_j entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “Agg No Services”
 - Value added in current prices (Column B, titled “Y (current)”), Hours worked (Column G, titled “L”), Labour compensation (Column H, titled “wL”) and the Capital stock in current prices (column J, titled “K (current)”) are all constructed by taking the same column in the sheet “Agg” and subtracting the equivalent columns in “Services”
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same values as the aggregate deflator from sheet “Agg” and copy/pasted for
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Working Age Population (Column I, titled “N”) is the same values as in the sheet “Agg” and are copy/pasted for convenience
 - Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
 - The capital share (column M, titled “ α ”) is constructed by taking 1-average(column L)
 - The labour share (column N, titled “ $1-\alpha$ ”) is constructed by taking 1 – column M
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}}) * (\text{Column G}^{\text{Column N}}))^{\text{1/Column N}}$
 - Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M/Column N})}$
 - Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell S_j is
 - $S_j = (O_j/O_2)*100$
 - Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in T_j is
 - $T_j = (P_j/P_2)*100$

- The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2) * 100$
- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2) * 100$
- Sheet “Agg moving alpha”
 - All columns are identical to the columns in sheet “Agg” except for the capital and labour shares (columns M and N, titled “α” and “1-α” respectively) and other columns that use these values. Column M is now computed as 1-column L, and Column N is then recomputed as 1-Column M. All other columns that are transformations using these variables adjust accordingly
- Sheet “Agg No Oil moving alpha”
 - All columns are identical to the columns in sheet “Agg No Oil” except for the capital and labour shares (columns M and N, titled “α” and “1-α” respectively) and other columns that use these values. Column M is now computed as 1-column L, and Column N is then recomputed as 1-Column M. All other columns that are transformations using these variables adjust accordingly
- Sheet “Agg PWT”
 - All columns are identical to the columns in sheet “Agg” except for the column with constant price GDP (column D, titled “Y (constant)” and other columns that use these values. Column D is replaced with the Output-side real GDP” values for Canada taken from the Penn World Tables (Column F, titled “rgdpo”, filtered for the country “Canada” for the years 1961-2018) All other columns that are transformations using these variables adjust accordingly. In particular, this affects the deflator we use, which then impacts all the “real valued” variables
- Sheet “Agg No Oil PWT”
 - All columns are identical to the columns in sheet “Agg No Oil” except we now use the deflator computed in the sheet “Agg PWT”. It is copy and pasted for convenience
- Sheet “Agg No Oil benchmark alpha”

- This sheet is identical to “Agg No Oil”, except that we use the values for capital and labour share (“ α ” and “ $1-\alpha$ ” respectively) from the sheet “Agg”. All other columns that are computed using these values adjust accordingly
- Sheet “Oil Type Capital”
 - Capital in conventional oil extraction (Column B, titled “Conventional K”) is computed by taking $(AC + AB - AA)$ in the file 3610009601.xlsx
 - Capital in non conventional oil extraction (Column C, titled “Sands K”) is computed by taking $(AF + AE - AD)$ in the file 3610009601.xlsx
 - Oil sector investment (Column D titled “I (Oil)”) is computed by taking $(AA + AD)$ in the file 3610009601.xlsx
 - Conventional Oil extraction investment (Column E titled “I (Conventional)”) is computed by taking Column AA in the file 3610009601.xlsx
 - Non Conventional Oil extraction investment (Column E titled “I (Sands)”) is computed by taking Column AD in the file 3610009601.xlsx
- Sheet “Sector Shares”
 - The percentage of GDP from the oil sector (column B titled “ $Y(Oil)/Y$ ”) is taken by dividing Column F in the sheet “Oil” by Column F in the Sheet “Agg” and multiplying by 100. So for any row number j
 - $B_j = Oil!F_j / Agg!F_j * 100$
 - The percentage of Capital from the oil sector (column C titled “ $K(Oil)/K$ ”) is taken by dividing Column K in the sheet “Oil” by Column K in the Sheet “Agg” and multiplying by 100. So for any row number j
 - $C_j = Oil!K_j / Agg!K_j * 100$
 - The percentage of Oil capital installed in conventional extraction (Column D titled “ $K(Conventional)/K(Oil)$ ”) is taken by dividing columns B in the sheet “Oil Type Capital” by Column J in the sheet “Oil” and multiplying by 100. So for any row number j
 - $D_j = 'Oil\ Type\ Capital'!B_j / Oil!J_j * 100$
 - The percentage of Oil capital installed in non conventional extraction (Column D titled “ $K(Sands)/K(Oil)$ ”) is taken by dividing columns C in the sheet “Oil Type Capital” by Column J in the sheet “Oil” and multiplying by 100. So for any row number j
 - $D_j = 'Oil\ Type\ Capital'!C_j / Oil!J_j * 100$
 - The percentage of Oil investment going to conventional oil extraction (Column F, titled “ $I(Conventional)/I(Oil)$ ”) is constructed by dividing Column E by Column D in the sheet “Oil Type Capital” and multiplying by 100. So for any row number j
 - $F_j = 'Oil\ Type\ Capital'!E_j / 'Oil\ Type\ Capital'!D_j$

- The percentage of Oil investment going to non conventional oil extraction (Column F, titled “I(Sands)/I(Oil)”) is constructed by dividing Column F by Column D in the sheet “Oil Type Capital” and multiplying by 100. So for any row number j
 - $F_j = \text{'Oil Type Capital'!F}_j / \text{'Oil Type Capital'!D}_j$
- The percentage of Capital from the Mining (excluding oil) sector (column H titled “K(Mining excl Oil)/K”) is taken by dividing Column K in the sheet “Mining excl Oil” by Column K in the Sheet “Agg” and multiplying by 100. So for any row number j
 - $H_j = \text{'Mining Excl Oil'!K}_j / \text{Agg!K}_j * 100$
- The percentage of Capital from the Agriculture sector (column I titled “K(Agriculture)/K”) is taken by dividing Column K in the sheet “Agriculture” by Column K in the Sheet “Agg” and multiplying by 100. So for any row number j
 - $I_j = \text{Agriculture!K}_j / \text{Agg!K}_j * 100$
- The percentage of Capital from the Manufacturing sector (column J titled “K(Manufacturing)/K”) is taken by dividing Column K in the sheet “Manufacturing” by Column K in the Sheet “Agg” and multiplying by 100. So for any row number j
 - $J_j = \text{Manufacturing!K}_j / \text{Agg!K}_j * 100$
- The percentage of Capital from the Services sector (column K titled “K(Services)/K”) is taken by dividing Column K in the sheet “Services” by Column K in the Sheet “Agg” and multiplying by 100. So for any row number j
 - $K_j = \text{Services!K}_j / \text{Agg!K}_j * 100$

Mapping Raw Data to “Province_MASTER.xlsx”:

- Sheet “Alberta Agg”
 - Value added in current prices (Column B, titled Y (current)) corresponds to column F in 3610021101.xlsx.
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same GDP deflator from the file “CAN_VA_1961_2018_MASTER.xlsx” computed in the sheet “Agg” (column E, titled “Y(defl)”). We take that deflator for the years 1997-2018 and paste it here for convenience.
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Hours worked (Column G, titled “L”) corresponds to column E in 3610021101.xlsx
 - Labour compensation (Column H, titled “wL”) corresponds to column G in 3610021101.xlsx
 - Working Age Population (Column I, titled “N”) are taken from column E in 1410001801.xlsx

- Capital stock in current prices (Column J, titled “K (current)”) is from 3610009601_province.xlsx according to the following steps:
 - Construct the investment series (I) by taking column Q and subtracting columns Z and AC
 - Construct the depreciated capital series (dK) by taking column R and subtracting columns AA and AD
 - Construct the end of year stock (K prime) by taking column S and subtracting columns AB and AE
 - Then construct the capital series as $K \text{ prime} + dK - I$, or $[(S-AB-AE)+(R-AA-AD) - (Q-Z-AC)]$
- Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
- The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
- The capital share (column M, titled “ α ”) is constructed by taking 1-average(column L)
- The labour share (column N, titled “ $1-\alpha$ ”) is constructed by taking $1 - \text{column M}$
- Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K} ^ \text{column M}) * (\text{Column G} ^ \text{Column N})) ^ (1/\text{Column N})$
- Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
- Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F}) ^ (\text{Column M}/\text{Column N})$
- Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
- TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2) * 100$
- Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2) * 100$
- The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2) * 100$
- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2) * 100$
- Sheet “Alberta Oil”

- Value added in current prices (Column B, titled "Y (current)") corresponds to column C in 3610040201.xlsx.
- The aggregate GDP deflator (Column E, titled "Y (defl)") is the same GDP deflator from the file "CAN_VA_1961_2018_MASTER.xlsx" computed in the sheet "Agg" (column E, titled "Y(defl)"). We take that deflator for the years 1997-2018 and paste it here for convenience.
- Real GDP (Column F, titled "Y (real)") is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
- Hours worked (Column G, titled "L") corresponds to column D/1000 in 3610048901.xlsx
- Labour compensation (Column H, titled "wL") corresponds to column E/1000 in 3610048901.xlsx
- Working Age Population (Column I, titled "N") are taken from column E in 1410001801.xlsx
- Capital stock in current prices (Column J, titled "K (current)") is from 3610009601_province.xlsx according to the following steps:
 - Construct the investment series (I) by adding columns T and W
 - Construct the depreciated capital series (dK) by adding columns U and X
 - Construct the end of year stock (K prime) by adding columns V and Y
 - Then construct the capital series as $K \text{ prime} + dK - I$, or $[(V+Y)+(U+X) - (T+W)]$
- Capital stock in real terms (Column K, titled "K (real)") is taken by dividing Column J by column E
- The Labour Compensation to Value Added ratio (column L, titled "wL/Y") is constructed by dividing column H by column B
- The capital share (column M, titled " α ") is constructed by taking 1-average(column L)
- The labour share (column N, titled " $1-\alpha$ ") is constructed by taking $1 - \text{column M}$
- Total Factor Productivity (column O, titled "TFP") is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{column N}})))^{(1/\text{Column N})}$
- Value added per WAP (Column P, titled "Y/N") is constructed by dividing Column F by Column I
- Capital to Value added ratio (Column Q, titled "K/Y") is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
- Hours worked per WAP (column R, titled "L/N") is constructed by taking Column G divided by Column I
- TFP growth (Column S, titled "TFP growth") is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$

- Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
- The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “Alberta Agg No Oil”
 - Value added in current prices (Column B, titled Y (current)), Hours worked (Column G, titled “L”), Labour compensation (Column H, titled “wL”) and the Capital stock in current prices (column J, titled “K (current)”) are all constructed by taking the same column in the sheet “Alberta Agg” and subtracting the equivalent columns in “Alberta Oil”
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same values as the aggregate deflator from sheet “Alberta Agg” and copy/pasted for convenience
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Working Age Population (Column I, titled “N”) is the same values as in the sheet “Alberta Agg” and are copy/pasted for convenience
 - Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
 - The capital share (column M, titled “α”) is constructed by taking 1-average(column L)
 - The labour share (column N, titled “1-α”) is constructed by taking 1 – column M
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}})))^{(1/\text{Column N})}$
 - Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
 - Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is

- $S_j = (O_j/O_2)*100$
 - Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
 - The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
 - The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “Ontario Agg”
 - Value added in current prices (Column B, titled Y (current)) corresponds to column C in 3610021101.xlsx.
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same GDP deflator from the file “CAN_VA_1961_2018_MASTER.xlsx” computed in the sheet “Agg” (column E, titled “Y(defl)”). We take that deflator for the years 1997-2018 and paste it here for convenience.
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Hours worked (Column G, titled “L”) corresponds to column B in 3610021101.xlsx
 - Labour compensation (Column H, titled “wL”) corresponds to column D in 3610021101.xlsx
 - Working Age Population (Column I, titled “N”) are taken from column D in 1410001801.xlsx
 - Capital stock in current prices (Column J, titled “K (current)”) is from 3610009601_province.xlsx according to the following steps:
 - Construct the investment series (I) by taking column B and subtracting columns K and N
 - Construct the depreciated capital series (dK) by taking column C and subtracting columns L and O
 - Construct the end of year stock (K prime) by taking column D and subtracting columns M and P
 - Then construct the capital series as K prime + dK – I, or [(D-M-P)+(C-L-O) – (B-K-N)]
 - Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B

- The capital share (column M, titled “ α ”) is constructed by taking 1-average(column L)
- The labour share (column N, titled “ $1-\alpha$ ”) is constructed by taking 1 – column M
- Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}})))^{(1/\text{Column N})}$
- Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
- Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
- Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
- TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$
- Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
- The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “Ontario Oil”
 - Value added in current prices (Column B, titled Y (current)) corresponds to column B in 3610040201.xlsx.
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same GDP deflator from the file “CAN_VA_1961_2018_MASTER.xlsx” computed in the sheet “Agg” (column E, titled “Y(defl)”). We take that deflator for the years 1997-2018 and paste it here for convenience.
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Hours worked (Column G, titled “L”) corresponds to column B/1000 in 3610048901.xlsx
 - Labour compensation (Column H, titled “wL”) corresponds to column C/1000 in 3610048901.xlsx
 - Working Age Population (Column I, titled “N”) are taken from column D in 1410001801.xlsx

- Capital stock in current prices (Column J, titled “K (current)”) is from 3610009601_province.xlsx according to the following steps:
 - Construct the investment series (I) by adding columns E and H
 - Construct the depreciated capital series (dK) by adding columns F and I
 - Construct the end of year stock (K prime) by adding columns G and J
 - Then construct the capital series as K prime + dK – I, or $[(G+J)+(F+I) - (E+H)]$
 - Note missing values for certain years were replaced with 0’s in this calculation
 - Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
 - The capital share (column M, titled “α”) is constructed by taking 1-average(column L)
 - The labour share (column N, titled “1-α”) is constructed by taking 1 – column M
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K} ^ \text{column M}) * (\text{Column G} ^ \text{Column N})) ^ (1 / \text{Column N})$
 - Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F}) ^ (\text{Column M} / \text{Column N})$
 - Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j / O_2) * 100$
 - Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j / P_2) * 100$
 - The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j / Q_2) * 100$
 - The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j / R_2) * 100$
- Sheet “Ontario Agg No Oil”

- Value added in current prices (Column B, titled "Y (current)"), Hours worked (Column G, titled "L"), Labour compensation (Column H, titled "wL") and the Capital stock in current prices (column J, titled "K (current)") are all constructed by taking the same column in the sheet "Ontario Agg" and subtracting the equivalent columns in "Ontario Oil"
- The aggregate GDP deflator (Column E, titled "Y (defl)") is the same values as the aggregate deflator from sheet "Ontario Agg" and copy/pasted for convenience
- Real GDP (Column F, titled "Y (real)") is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
- Working Age Population (Column I, titled "N") is the same values as in the sheet "Ontario Agg" and are copy/pasted for convenience
- Capital stock in real terms (Column K, titled "K (real)") is taken by dividing Column J by column E
- The Labour Compensation to Value Added ratio (column L, titled "wL/Y") is constructed by dividing column H by column B
- The capital share (column M, titled " α ") is constructed by taking $1 - \text{average}(\text{column L})$
- The labour share (column N, titled " $1 - \alpha$ ") is constructed by taking $1 - \text{column M}$
- Total Factor Productivity (column O, titled "TFP") is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}})^{(1/\text{Column N}})))^{(1/\text{Column N})}$
- Value added per WAP (Column P, titled "Y/N") is constructed by dividing Column F by Column I
- Capital to Value added ratio (Column Q, titled "K/Y") is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
- Hours worked per WAP (column R, titled "L/N") is constructed by taking Column G divided by Column I
- TFP growth (Column S, titled "TFP growth") is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2) * 100$
- Value added per WAP growth (column T, titled "Y/N growth") is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2) * 100$
- The capital to value added ratio growth (column U, titled "K/Y growth") is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2) * 100$
- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is

$$V_j = (R_j/R_2) * 100$$

Mapping Raw Data to ``USA_MASTER.xlsx``:

- Sheet “USA Agg”
 - Value added in current prices (Column B, titled “Y (current)”) for the years 1961-1996 corresponds to row 8 (columns C-AL) in “valueadded_1961_1997.xlsx”. The values for the years 1997-2018 correspond to row 10 (columns D to Y) in the sheet “TVA105-A” in “valueadded_1997_2018.xlsx”.
 - The chain-type quantity index (Column C, titled “Index”) for the years 1961-1997 corresponds to row 8 (columns C-AM) in “index_1961_1997.xlsx”. For the years 1997-2018 the values correspond to row 10 (columns E to Y) in the sheet “TVA103-A” in “valueadded_1997_2018.xlsx”
 - Constant price value added (Column D, titled “Y (constant)”) is computed by multiplying the index (Column C) by the current price Value added in 2012 (Column B, row 53) and dividing by 100, so for any row j, we have
 - $D_j = C_j * B_{53} / 100$
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is computed by taking the ratio of Value Added in current prices (column B) divided by Value added in constant prices (Column D).
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Hours worked (Column G, titled “L”) for the years 1961-1986 corresponds to row 10, columns C-AB in “hours_1961_1987.xlsx”. Years 1987-1999 corresponds to row 10, columns C-O in “hours_1987_2000.xlsx”. Years 2000-2018 corresponds to row 10, columns C-U in “hours_2000_2018.xlsx”.
 - Labour compensation (Column H, titled “wL”) for the years 1961-1986 corresponds to row 10, columns C-AB in “compensation_1961_1987.xlsx”. Years 1987-1997 correspond to row 10, columns C-M in “compensation_1987_2000.xlsx”. Years 1998-2018 correspond to row 10, columns C-W in “compensation_1998_2018.xlsx”
 - Working Age Population (Column I, titled “N”) are taken from stats.oecd.org
 - Capital stock in current prices (Column J, titled “K (current)”) constructed according to the following steps:
 - Construct the investment series (I) by taking row 8, columns C to BH in “kinvestment_1961_2018.xlsx”
 - Construct the depreciated capital series (dK) by taking row 8, columns C to BH in “kdepreciation_1961_2018.xlsx”
 - Construct the end of year stock (K prime) by row 8, columns C to BH in kstock_1961_2018.xlsx”

- Then construct the capital series as $K' + dK - I$
 - Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “ wL/Y ”) is constructed by dividing column H by column B
 - The capital share (column M, titled “ α ”) is constructed by taking 1-average(column L)
 - The labour share (column N, titled “ $1-\alpha$ ”) is constructed by taking $1 - \text{column M}$
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}})))^{(1/\text{Column N})}$
 - Value added per WAP (Column P, titled “ Y/N ”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “ K/Y ”) is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
 - Hours worked per WAP (column R, titled “ L/N ”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$
 - Value added per WAP growth (column T, titled “ Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
 - The capital to value added ratio growth (column U, titled “ K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
 - The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “Oil”
 - Value added in current prices (Column B, titled Y (current)) for the years 1961-1996 corresponds to row 9 (columns C-AL) in “valueadded_1961_1997.xlsx”. The values for the years 1997-2018 correspond to row 15 (columns D to Y) in the sheet “TVA105-A” in “valueadded_1997_2018.xlsx”.
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same deflator computed in the sheet “USA Agg” (Column E) and pasted for convenience.

- Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
- Hours worked (Column G, titled “L”) is computed in the following way:
 - We take hours worked in Mining (1961-1986 corresponds to row 14, columns C to AB in “hours_1961_1987.xlsx”, 1987-1999 corresponds to row 14, columns C to O in “hours_1987_2000.xlsx”, and 2000-2018 corresponds to row 14 columns C to U in “hours_2000_2018.xlsx”)
 - We take employment in Mining (1961-1986 corresponds to row 14, Columns C to AB in “employment_1961_1987.xlsx”, 1987-1997 corresponds to row 14, columns C to M in “employment_1987_2000.xlsx”, and 1998-2018 corresponds to row 14, columns C to W in “employment_1998_2018.xlsx”)
 - We take employment in Oil and Gas extraction (1961-1986 corresponds to row 17, columns C to AB in “employment_1961_1987.xlsx”, 1987-1997 corresponds to row 17, columns C to M in “employment_1987_2000.xlsx”, and 1998-2018 corresponds to row 15, columns C to W in “employment_1998_2018.xlsx”)
 - Then to compute hours worked in oil and gas extraction, we compute “Hours worked in Mining/Employment in Mining x Employment in Oil and Gas extraction”
 - For 1961-1986: Hours (row 14)/Employment (row 14) x Employment (row 17)
 - For 1987-1997: Hours (row 14)/Employment (row 14) x Employment (row 17)
 - For 1998-2018: Hours (row 14) / Employment (row 14) x Employment (row 15)
- Labour compensation (Column H, titled “wL”) for the years 1961-1986 corresponds to row 17, columns C-AB in “compensation_1961_1987.xlsx”. Years 1987-1997 correspond to row 17, columns C-M in “compensation_1987_2000.xlsx”. Years 1998-2018 correspond to row 15, columns C-W in “compensation_1998_2018.xlsx”
- Working Age Population (Column I, titled “N”) are taken from stats.oecd.org
- Capital stock in current prices (Column J, titled “K (current)”) constructed according to the following steps:
 - Construct the investment series (I) by taking row 13, columns C to BH in “kinvestment_1961_2018.xlsx”
 - Construct the depreciated capital series (dK) by taking row 13, columns C to BH in “kdepreciation_1961_2018.xlsx”
 - Construct the end of year stock (K prime) by row 13, columns C to BH in kstock_1961_2018.xlsx”
 - Then construct the capital series as $K \text{ prime} + dK - I$
- Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E

- The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
 - The capital share (column M, titled “α”) is constructed by taking 1-average(column L)
 - The labour share (column N, titled “1-α”) is constructed by taking 1 – column M
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}}))^{\text{1/Column N}})$
 - Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{\text{(Column M/Column N)}}$
 - Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$
 - Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
 - The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
 - The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “USA Agg No Oil”
 - Value added in current prices (Column B, titled Y (current)), Hours worked (Column G, titled “L”), Labour compensation (Column H, titled “wL”) and the Capital stock in current prices (column J, titled “K (current)”) are all constructed by taking the same column in the sheet “USA Agg” and subtracting the equivalent columns in “USA Oil”
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same values as the aggregate deflator from sheet “USA Agg” and copy/pasted for

- Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
- Working Age Population (Column I, titled “N”) is the same values as in the sheet “USA Agg” and are copy/pasted for convenience
- Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
- The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
- The capital share (column M, titled “ α ”) is constructed by taking 1-average(column L)
- The labour share (column N, titled “ $1-\alpha$ ”) is constructed by taking 1 – column M
- Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}}))^{\frac{1}{\text{Column N}}})$
- Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
- Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{\text{Column M/Column N}}$
- Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
- TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$
- Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
- The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “USA Agg PWT”
 - All columns are identical to the columns in sheet “Agg” except for the column with constant price GDP (column D, titled “Y (constant)”) and other columns that use these values. Column D is replaced with the Output-side real GDP” values for Canada taken from the Penn World

Tables (Column F, titled “rgdpo”, filtered for the country “USA” for the years 1961-2018) All other columns that are transformations using these variables adjust accordingly. In particular, this affects the deflator we use, which then impacts all the “real valued” variables

- Sheet “USA Agg No Oil PWT”
 - All columns are identical to the columns in sheet “Agg No Oil” except we now use the deflator computed in the sheet “Agg PWT”. It is copy and pasted for convenience

- Sheet “Oil Shares”
 - The percentage of GDP from the oil sector (column B titled “Y(Oil)/Y”) is taken by dividing Column F in the sheet “USA Oil” by Column F in the Sheet “USA Agg” and multiplying by 100. So for any row number j
 - $B_j = \text{'USA Oil'!Fj} / \text{'USA Agg'!Fj} * 100$
 - The percentage of Capital from the oil sector (column C titled “K(Oil)/K”) is taken by dividing Column K in the sheet “USA Oil” by Column K in the Sheet “USA Agg” and multiplying by 100. So for any row number j

$$C_j = \text{'USA Oil'!Kj} / \text{'USA Agg'!Kj} * 100$$

Mapping Raw Data to “NOR_MASTER.xlsx”:

- Sheet “NOR Agg”
 - Value added in current prices (Column B, titled Y (current)) corresponds to row 5, columns B to AX in “valueadded_norway.xlsx”.
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is taken from the national accounts section in stats.oecd.org.
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Hours worked (Column G, titled “L”) corresponds to row 5, columns B to AX in “hours_norway.xlsx”.
 - Labour compensation (Column H, titled “wL”) corresponds to row 5, columns B to AX in “compensation_norway.xlsx”
 - Working Age Population (Column I, titled “N”) are taken from stats.oecd.org (population aged 15-64)
 - Capital stock in current prices (Column J, titled “K (current)”) corresponds to row 5 columns B to AX in “norway_capital.xlsx”

- Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
 - The capital share (column M, titled “α”) is constructed by taking 1-average(column L)
 - The labour share (column N, titled “1-α”) is constructed by taking 1 – column M
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}})))^{(1/\text{Column N})}$
 - Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
 - Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$
 - Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
 - The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
 - The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$
- Sheet “NOR Oil”
 - Value added in current prices (Column B, titled Y (current)) corresponds to row 10, columns B to AX in “valueadded_norway.xlsx”.
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is taken from the national accounts section in stats.oecd.org.
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.

- Hours worked (Column G, titled “L”) corresponds to row 10, columns B to AX in “hours_norway.xlsx”.
- Labour compensation (Column H, titled “wL”) corresponds to row 10, columns B to AX in “compensation_norway.xlsx”
- Working Age Population (Column I, titled “N”) are taken from stats.oecd.org (population aged 15-64)
- Capital stock in current prices (Column J, titled “K (current)”) corresponds to row 10 columns B to AX in “norway_capital.xlsx”
- Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
- The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
- The capital share (column M, titled “α”) is constructed by taking 1-average(column L)
- The labour share (column N, titled “1-α”) is constructed by taking 1 – column M
- Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}} * (\text{Column G}^{\text{Column N}}))^{\text{1/Column N}})$
- Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
- Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{(\text{Column M}/\text{Column N})}$
- Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
- TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2)*100$
- Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2)*100$
- The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2)*100$
- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2)*100$

- Sheet “NOR Agg No Oil”
 - Value added in current prices (Column B, titled “Y (current)”), Hours worked (Column G, titled “L”), Labour compensation (Column H, titled “wL”) and the Capital stock in current prices (column J, titled “K (current)”) are all constructed by taking the same column in the sheet “NOR Agg” and subtracting the equivalent columns in “NOR Oil”
 - The aggregate GDP deflator (Column E, titled “Y (defl)”) is the same values as the aggregate deflator from sheet “NOR Agg” and copy/pasted for
 - Real GDP (Column F, titled “Y (real)”) is computed by taking Value added in current prices (Column B) divided by the deflator (column E). For the aggregate economy, this column is identical to Column D.
 - Working Age Population (Column I, titled “N”) is the same values as in the sheet “NOR Agg” and are copy/pasted for convenience
 - Capital stock in real terms (Column K, titled “K (real)”) is taken by dividing Column J by column E
 - The Labour Compensation to Value Added ratio (column L, titled “wL/Y”) is constructed by dividing column H by column B
 - The capital share (column M, titled “ α ”) is constructed by taking 1-average(column L)
 - The labour share (column N, titled “ $1-\alpha$ ”) is constructed by taking 1 – column M
 - Total Factor Productivity (column O, titled “TFP”) is constructed according to
 - $(\text{Column F} / (\text{Column K}^{\text{column M}}) * (\text{Column G}^{\text{Column N}}))^{\text{1/Column N}}$
 - Value added per WAP (Column P, titled “Y/N”) is constructed by dividing Column F by Column I
 - Capital to Value added ratio (Column Q, titled “K/Y”) is constructed according to
 - $(\text{Column K} / \text{column F})^{\text{Column M/Column N}}$
 - Hours worked per WAP (column R, titled “L/N”) is constructed by taking Column G divided by Column I
 - TFP growth (Column S, titled “TFP growth”) is constructed by dividing the entries in column O by cell O2 and multiplying by 100, or for any cell number j, the entry in cell Sj is
 - $S_j = (O_j/O_2) * 100$
 - Value added per WAP growth (column T, titled “Y/N growth”) is similarly constructed by dividing the entries in column P by P2 and multiplying by 100, so that for any cell number j, the entry in Tj is
 - $T_j = (P_j/P_2) * 100$
 - The capital to value added ratio growth (column U, titled “K/Y growth”) is constructed by dividing the entries in column Q by Q2 and multiplying by 100, so that for any cell number j, the Uj entry is
 - $U_j = (Q_j/Q_2) * 100$

- The hours worked per WAP growth (column V) is constructed by dividing the entries in column R by the entry in cell R2 and multiplying by 100 so that for any cell number j, the Vj entry is
 - $V_j = (R_j/R_2) * 100$
- Sheet “NOR Oil Shares”
 - The percentage of GDP from the oil sector (column B titled “Y(Oil)/Y”) is taken by dividing Column F in the sheet “NOR Oil” by Column F in the Sheet “NOR Agg” and multiplying by 100. So for any row number j
 - $B_j = \text{'NOR Oil'!Fj/'NOR Agg'!Fj} * 100$
 - The percentage of Capital from the oil sector (column C titled “K(Oil)/K”) is taken by dividing Column K in the sheet “NOR Oil” by Column K in the Sheet “NOR Agg” and multiplying by 100. So for any row number j

$$C_j = \text{'NOR Oil'!Kj/'NOR Agg'!Kj} * 100$$

Mapping Raw Data to ``CAN_CAPITAL_MASTER.xlsx``:

This file uses data from StatsCan Table 36-10-0096-01 for the sectoral breakdown of different types of capital (Engineering construction, Machinery & Equipment and Intellectual Property Products). For simplicity the relevant sectors/variables are saved in the file `/submission/raw_tables/Canada/3610009601_allassets.xlsx`

As with the rest of the Canadian capital stock, the series contained are constructed by taking the end-of-year stock (K'), geometric depreciation (dK) and investment (I) and getting

$$K = K' + dK + I$$

- Sheet “Total”
 - The total capital stock in conventional oil extraction (Column B, titled “Conventional”) is constructed as follows:
 - In `/submission/raw_tables/Canada/3610009601_allassets.xlsx`, add columns AT and AP and subtract AL so that for any year j, we have
 - $\text{Conventional}_j = AT_j + AP_j - AL_j$
 - The total capital stock in non-conventional oil extraction (Column C, titled “Sands”) is constructed as follows:

- In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns BF and BB and subtract AX so that for any year j, we have
 - $Sands_j = BF_j + BB_j - AX_j$
 - The total capital stock in oil extraction (Column D, titled “Oil”) is constructed as follows:
 - Add column B (“Conventional”) to column C (“Sands”)
 - The total capital stock in manufacturing (Column E, titled “Manufacturing”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns CP and CL and subtract CH so that for any year j, we have
 - $Manufacturing_j = CP_j + CL_j - CH_j$
- Sheet “EC”
 - The Engineering Construction capital stock in conventional oil extraction (Column B, titled “Conventional”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns AU and AQ and subtract AM so that for any year j, we have
 - $Conventional_j = AU_j + AQ_j - AM_j$
 - The Engineering Construction capital stock in non-conventional oil extraction (Column C, titled “Sands”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns BG and BC and subtract AY so that for any year j, we have
 - $Sands_j = BG_j + BC_j - AY_j$
 - The Engineering Construction capital stock in oil extraction (Column D, titled “Oil”) is constructed as follows:
 - Add column B (“Conventional”) to column C (“Sands”)
 - The Engineering Construction capital stock in manufacturing (Column E, titled “Manufacturing”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns CP and CL and subtract CH so that for any year j, we have
 - $Manufacturing_j = CQ_j + CM_j - Cl_j$
 - The Engineering Construction capital stock in Total Industries (Column F, titled “Total”) is constructed as follows:

- In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns K and G and subtract C so that for any year j, we have
 - $Total_j = K_j + G_j - C_j$
 - The Engineering Construction capital stock in Non Profits serving Households (Column G, titled “Non Prof”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns DC and CY and subtract CU so that for any year j, we have
 - $NonProf_j = DC_j + CY_j - CU_j$
 - The Engineering Construction capital stock in Government (Column H, titled “Gov”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns DO and DK and subtract DG so that for any year j, we have
 - $Gov_j = DO_j + DK_j - DG_j$
 - The Engineering Construction capital stock in Aggregate (Column I, titled “Agg”) is constructed as follows:
 - From column F (“Total”), subtract column G (“Non Prof”) and column H (“Gov”)
- Sheet “ME”
 - The Machinery and Equipment capital stock in conventional oil extraction (Column B, titled “Conventional”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns AV and AR and subtract AN so that for any year j, we have
 - $Conventional_j = AV_j + AR_j - AN_j$
 - The Machinery and Equipment capital stock in non-conventional oil extraction (Column C, titled “Sands”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns BH and BD and subtract AZ so that for any year j, we have
 - $Sands_j = BH_j + BD_j - AZ_j$
 - The Machinery and Equipment capital stock in oil extraction (Column D, titled “Oil”) is constructed as follows:
 - Add column B (“Conventional”) to column C (“Sands”)
 - The Machinery and Equipment capital stock in manufacturing (Column E, titled “Manufacturing”) is constructed as follows:

- In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns CR and CN and subtract CJ so that for any year j, we have
 - $\text{Manufacturing}_j = \text{CR}_j + \text{CN}_j - \text{CJ}_j$
 - The Machinery and Equipment capital stock in Total Industries (Column F, titled “Total”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns L and H and subtract D so that for any year j, we have
 - $\text{Total}_j = \text{L}_j + \text{H}_j - \text{D}_j$
 - The Machinery and Equipment capital stock in Non Profits serving Households (Column G, titled “Non Prof”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns DD and CZ and subtract CV so that for any year j, we have
 - $\text{NonProf}_j = \text{DD}_j + \text{CZ}_j - \text{CV}_j$
 - The Machinery and Equipment capital stock in Government (Column H, titled “Gov”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns DP and DL and subtract DH so that for any year j, we have
 - $\text{Gov}_j = \text{DP}_j + \text{DL}_j - \text{DH}_j$
 - The Machinery and Equipment capital stock in Aggregate (Column I, titled “Agg”) is constructed as follows:
 - From column F (“Total”), subtract column G (“Non Prof”) and column H (“Gov”)
- Sheet “IPP”
 - The Intellectual Property Products capital stock in conventional oil extraction (Column B, titled “Conventional”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns AW and AS and subtract AO so that for any year j, we have
 - $\text{Conventional}_j = \text{AW}_j + \text{AS}_j - \text{AO}_j$
 - The Intellectual Property Products capital stock in non-conventional oil extraction (Column C, titled “Sands”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns BI and BE and subtract BA so that for any year j, we have

- $Sands_j = B_{lj} + BE_j - BA_j$
- The Intellectual Property Products capital stock in oil extraction (Column D, titled “Oil”) is constructed as follows:
 - Add column B (“Conventional”) to column C (“Sands”)
- The Intellectual Property Products capital stock in manufacturing (Column E, titled “Manufacturing”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns CS and CO and subtract CK so that for any year j, we have
 - $Manufacturing_j = CS_j + CO_j - CK_j$
- The Intellectual Property Products capital stock in Total Industries (Column F, titled “Total”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns M and I and subtract E so that for any year j, we have
 - $Total_j = M_j + I_j - E_j$
- The Intellectual Property Products capital stock in Non Profits serving Households (Column G, titled “Non Prof”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns DE and DA and subtract CW so that for any year j, we have
 - $NonProf_j = DE_j + DA_j - CW_j$
- The Intellectual Property Products capital stock in Government (Column H, titled “Gov”) is constructed as follows:
 - In /submission/raw_tables/Canada/3610009601_allassets.xlsx, add columns DQ and DM and subtract DI so that for any year j, we have
 - $Gov_j = DQ_j + DM_j - DI_j$
- The Intellectual Property Products capital stock in Aggregate (Column I, titled “Agg”) is constructed as follows:
 - From column F (“Total”), subtract column G (“Non Prof”) and column H (“Gov”)

Computational and Software requirements

All analysis, tables and graphs were performed and constructed using Microsoft Excel

Description of Tables and Figures

All tables and figures are produced in the file submission/Figures and Tables.xlsx. This file copies/references cells in the other data files for convenience. Below is a description of how to reproduce those figures using the provided data (for details on how some of the columns and values were constructed from the raw data, see the previous description for the relevant file)

Figure 1

- Figure 1 uses columns A, S, T, U, V in the sheet titled “Agg” in “CAN_VA_1961_2018_MASTER.xlsx”

Figure 2

- Figure 2 uses columns A, S, T, U, V in the sheet titled “Agg No Oil” in “CAN_VA_1961_2018_MASTER.xlsx”

Table 1

- Column 1, Row 1 (1961-2018) is computed from sheet “Agg” in “CAN_VA_1961_2018_MASTER.xlsx” as
 - $(O59^N59/O2^N2)^{(1/(2018-1961))} * 100-100$
- Column 1 Row 2 (1971-1981) is computed from sheet “Agg” in “CAN_VA_1961_2018_MASTER.xlsx” as
 - $(O22^N22/O12^N12)^{(1/(1981-1971))} * 100-100$
- Column 1 Row 3 (1981-1991) is computed from sheet “Agg” in “CAN_VA_1961_2018_MASTER.xlsx” as
 - $(O32^N32/O22^N22)^{(1/(1991-1981))} * 100-100$
- Column 1 Row 4 (1991-2001) is computed from sheet “Agg” in “CAN_VA_1961_2018_MASTER.xlsx” as
 - $(O42^N42/O32^N32)^{(1/(2001-1981))} * 100-100$
- Column 1 Row 5 (2001-2018) is computed from sheet “Agg” in “CAN_VA_1961_2018_MASTER.xlsx” as
 - $(O59^N59/O42^N42)^{(1/(2018-2001))} * 100-100$
- Column 2, Row 1 (1961-2018) is computed from sheet “Agg No Oil” in “CAN_VA_1961_2018_MASTER.xlsx” as
 - $(O59^N59/O2^N2)^{(1/(2018-1961))} * 100-100$
- Column 2 Row 2 (1971-1981) is computed from sheet “Agg No Oil” in “CAN_VA_1961_2018_MASTER.xlsx” as
 - $(O22^N22/O12^N12)^{(1/(1981-1971))} * 100-100$

- Column 2 Row 3 (1981-1991) is computed from sheet “Agg No Oil” in “CAN_VA_1961_2018_MASTER.xlsx” as
 - $(O32^N32/O22^N22)^{(1/(1991-1981))} * 100 - 100$
- Column 2 Row 4 (1991-2001) is computed from sheet “Agg No Oil” in “CAN_VA_1961_2018_MASTER.xlsx” as
 - $(O42^N42/O32^N32)^{(1/(2001-1991))} * 100 - 100$
- Column 2 Row 5 (2001-2018) is computed from sheet “Agg No Oil” in “CAN_VA_1961_2018_MASTER.xlsx” as
 - $(O59^N59/O42^N42)^{(1/(2018-2001))} * 100 - 100$

Figure 3

- Figure 3 (a) uses columns A, S, T, U, V in the sheet “Alberta Agg” from “Province_MASTER.xlsx”
- Figure 3 (b) uses columns A, S, T, U, V in the sheet “Alberta Agg No Oil” from “Province_MASTER.xlsx”
- Figure 3 (c) uses columns A, S, T, U, V in the sheet “Ontario Agg” from “Province_MASTER.xlsx”
- Figure 3 (d) uses columns A, S, T, U, V in the sheet “Ontario Agg No Oil” from “Province_MASTER.xlsx”

Figure 4

- Figure 4 (a) is constructed in the following way:
 - The line “CAN, Aggregate” uses columns O and N in the sheet “Agg” from “CAN_VA_1961_2018_MASTER.xlsx”. For any year t, the value is
 - $(Ot^Nt)/(O2^N2) * 100$
 - The line “CAN, No Oil” uses columns O and N in the sheet “Agg No Oil” from “CAN_VA_1961_2018_MASTER.xlsx”. For any year t, the value is
 - $(Ot^Nt)/(O2^N2) * 100$
 - The line “USA, Aggregate” uses columns O and N in the sheet “USA Agg” from “USA_MASTER.xlsx”. For any year t, the value is
 - $(Ot^Nt)/(O2^N2) * 100$
 - The line “USA, No Oil” uses columns O and N in the sheet “USA Agg No Oil” from “USA_MASTER.xlsx”. For any year t, the value is
 - $(Ot^Nt)/(O2^N2) * 100$
- Figure 4 (b) is constructed in the following way:
 - The line “CAN, Aggregate” uses columns O and N in the sheet “Agg” from “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (2001-2018), the value is
 - $(Ot^Nt)/(O42^N42) * 100$
 - The line “CAN, No Oil” uses columns O and N in the sheet “Agg No Oil” from “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (2001-2018), the value is
 - $(Ot^Nt)/(O42^N42) * 100$

- The line “USA, Aggregate” uses columns O and N in the sheet “USA Agg” from “USA_MASTER.xlsx”. For any year t (2001-2018),, the value is
 - $(O_t^{Nt})/(O_{42}^{N_{42}})*100$
- The line “USA, No Oil” uses columns O and N in the sheet “USA Agg No Oil” from “USA_MASTER.xlsx”. For any year t (2001-2018),, the value is
 - $(O_t^{Nt})/(O_{42}^{N_{42}})*100$

Figure 5

- Figure 5 is constructed in the following way
 - The lines “Y(Oil)/Y, CAN” and “K(Oil)/K, CAN” come from columns B and C in the sheet “Sector Shares” in the file “CAN_VA_1961_2018_MASTER.xlsx”
 - The lines “Y(Oil)/Y, USA” and “K(Oil)/K, USA” come from columns B and C in the sheet “USA Oil Shares” in the file “USA_MASTER.xlsx”

Figure 6

- Figure 6 (a) is constructed in the following way:
 - The line “CAN, Aggregate” uses columns O and N in the sheet “Agg” from “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (1970-2018), the value is
 - $(O_t^{Nt})/(O_{11}^{N_{11}})*100$
 - The line “CAN, No Oil” uses columns O and N in the sheet “Agg No Oil” from “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (1970-2018), the value is
 - $(O_t^{Nt})/(O_{11}^{N_{11}})*100$
 - The line “NOR, Aggregate” uses columns O and N in the sheet “NOR Agg” from “NOR_MASTER.xlsx”. For any year t, the value is
 - $(O_t^{Nt})/(O_2^{N_2})*100$
 - The line “NOR, No Oil” uses columns O and N in the sheet “NOR Agg No Oil” from “NOR_MASTER.xlsx”. For any year t, the value is
 - $(O_t^{Nt})/(O_2^{N_2})*100$
- Figure 6 (b) is constructed in the following way:
 - The line “CAN, Aggregate” uses columns O and N in the sheet “Agg” from “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (2001-2018), the value is
 - $(O_t^{Nt})/(O_{42}^{N_{42}})*100$
 - The line “CAN, No Oil” uses columns O and N in the sheet “Agg No Oil” from “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (2001-2018),, the value is
 - $(O_t^{Nt})/(O_{42}^{N_{42}})*100$
 - The line “NOR, Aggregate” uses columns O and N in the sheet “NOR Agg” from “NOR_MASTER.xlsx”. For any year t (2001-2018),, the value is
 - $(O_t^{Nt})/(O_{33}^{N_{33}})*100$
 - The line “NOR, No Oil” uses columns O and N in the sheet “NOR Agg No Oil” from “NOR_MASTER.xlsx”. For any year t (2001-2018),, the value is

$$\blacksquare \quad (O_t^N N_t) / (O_{33}^N N_{33}) * 100$$

Figure 7

- Figure 7 is constructed in the following way
 - The lines “Y(Oil)/Y, CAN” and “K(Oil)/K, CAN” come from columns B and C in the sheet “Sector Shares” in the file “CAN_VA_1961_2018_MASTER.xlsx”
 - The lines “Y(Oil)/Y, NOR” and “K(Oil)/K, NOR” come from columns B and C in the sheet “NOR Oil Shares” in the file “NOR_MASTER.xlsx”

Figure 8

- Figure 8 (a) is constructed as follows:
 - The line “Aggregate” comes from Columns O and N in the sheet “Agg” in the file “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (1961-2018), it is computed as
 - $(O_t^N N_t / O_{20}^N N_{20}) * 100$
 - The line “Oil” comes from Columns O and N in the sheet “Oil” in the file “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (1961-2018), it is computed as
 - $(O_t^N N_t / O_{20}^N N_{20}) * 100$
- Figure 8 (b) is constructed as follows:
 - The line “Agriculture” comes from Columns O and N in the sheet “Agriculture” in the file “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (1961-2018), it is computed as
 - $(O_t^N N_t / O_{20}^N N_{20}) * 100$
 - The line “Manufacturing” comes from Columns O and N in the sheet “Manufacturing” in the file “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (1961-2018), it is computed as
 - $(O_t^N N_t / O_{20}^N N_{20}) * 100$
 - The line “Services” comes from Columns O and N in the sheet “Services” in the file “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (1961-2018), it is computed as
 - $(O_t^N N_t / O_{20}^N N_{20}) * 100$
 - The line “Oil” comes from Columns O and N in the sheet “Oil” in the file “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (1961-2018), it is computed as
 - $(O_t^N N_t / O_{20}^N N_{20}) * 100$

Figure 9

- Figure 9 (a) uses columns G and E in the sheet “Sector Shares” in the file “CAN_VA_1961_2018_MASTER.xlsx”
- Figure 9 (b) uses the average annual closing price of WTI Crude Oil (accessed <https://www.macrotrends.net/2516/wti-crude-oil-prices-10-year-daily-chart>)

Figure 10

- Figure 10 (a) is constructed as follows:
 - o The line “TFP (Mining, non Oil)” comes from Columns O and N in the sheet “Mining excl Oil” in the file “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (1961-2018), it is computed as
 - $(O_t^N_t / O_2^N_2) * 100$
 - o The line “TFP (Oil)” comes from Columns O and N in the sheet “Oil” in the file “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (1961-2018), it is computed as
 - $(O_t^N_t / O_2^N_2) * 100$
- Figure 10 (b) is constructed as follows:
 - o The line “K (Mining excl Oil)/K” comes from Columns H in the sheet “Sector Shares” in the file “CAN_VA_1961_2018_MASTER.xlsx”
 - o The line “K (Oil)/K” comes from Columns C in the sheet “Sector Shares” in the file “CAN_VA_1961_2018_MASTER.xlsx”

Figure 11

- Figure 11 uses columns I, J, K and C in the sheet “Sector Shares” in the file “CAN_VA_1961_2018_MASTER.xlsx”

Figure 12

- Figure 12 (a) is constructed by adding up the oil sector capital stock of each type of capital (EC, IPP, ME) and graphing them as a fraction of the oil sectors total capital stock. The graph can be reproduced according to the following steps:
 - o The file 3610009601_allassets.xlsx is a subset of Statistics Canada table 36-10-0096-01 (which can be downloaded from <https://doi.org/10.25318/3610009601-eng>). We use Investment, Geometric Depreciation and Geometric end-year net stock. The capital stocks are constructed as previously described and saved in the file “/submission/CAN_CAPITAL_MASTER.xlsx”
 - o The line “EC” can be constructed by taking column D in sheet “EC” and dividing by column D in sheet “Total” and multiplying by 100. So for any year j , we have
 - $EC_j = EC!D_j / Total!D_j * 100$
 - o The line “IPP” can be constructed by taking column D in sheet “IPP” and dividing by column D in sheet “Total” and multiplying by 100. So for any year j , we have
 - $IPP_j = IPP!D_j / Total!D_j * 100$

- The line “ME” can be constructed by taking column D in sheet “IPP” and dividing by column D in sheet “Total” and multiplying by 100. So for any year j, we have
 - $ME_j = ME!D_j / Total!D_j * 100$
- Figure 12 (b) is similarly constructed for the Manufacturing sector. The graph can be reproduced according to the following steps:
 - The line “EC” can be constructed by taking column E in sheet “EC” and dividing by column E in sheet “Total” and multiplying by 100. So for any year j, we have
 - $EC_j = EC!E_j / Total!E_j * 100$
 - The line “IPP” can be constructed by taking column E in sheet “IPP” and dividing by column E in sheet “Total” and multiplying by 100. So for any year j, we have
 - $IPP_j = IPP!E_j / Total!E_j * 100$
 - The line “ME” can be constructed by dividing column E by E and multiplying by 100. So for any year j, we have
 - $ME_j = ME!E_j / Total!E_j * 100$

Figure 13

- Figure 13 also uses data found in the file 3610009601_allassets.xlsx is a subset of Statistics Canada table 36-10-0096-01 (which can be downloaded from <https://doi.org/10.25318/3610009601-eng>). The figures use the transformed data in the file ‘/submission/CAN_CAPITAL_MASTER.xlsx’
- Figure 13 (a) is constructed in the following way, using sheet “EC” in “/submission/CAN_CAPITAL_MASTER.xlsx”
 - For each line, the denominator is column I
 - The numerator in the line “Oil” is computed using column D / Denominator and multiplied by 100. So for any year j,
 - $Oil_j = D_j / I_j * 100$
 - The numerator in the line “Conventional” is computed as Column B / Denominator and multiplied by 100. So for any year j,
 - $Conventional_j = B_j / I_j * 100$
 - The numerator in the line “Non-Conventional” is computed as Column C / Denominator and multiplied by 100. So for any year j,
 - $Non-Conventional_j = C_j / I_j * 100$
 - The numerator in the line “Manufacturing” is computed as Column E / Denominator and multiplied by 100. So for any year j,
 - $Manufacturing_j = E_j / I_j * 100$
- Figure 13 (b) is constructed in the following way, using sheet “IPP” in “/submission/CAN_CAPITAL_MASTER.xlsx”
 - For each line, the denominator is column I
 - The numerator in the line “Oil” is computed using column D / Denominator and multiplied by 100. So for any year j,
 - $Oil_j = D_j / I_j * 100$
 - The numerator in the line “Conventional” is computed as Column B / Denominator and multiplied by 100. So for any year j,

- $\text{Conventional}_j = B_j / I_j * 100$
 - The numerator in the line “Non-Conventional” is computed as Column C / Denominator and multiplied by 100. So for any year j,
 - $\text{Non-Conventional}_j = C_j / I_j * 100$
 - The numerator in the line “Manufacturing” is computed as Column E / Denominator and multiplied by 100. So for any year j,
 - $\text{Manufacturing}_j = E_j / I_j * 100$
- Figure 13 (C) is constructed in the following way, using sheet “ME” in “/submission/CAN_CAPITAL_MASTER.xlsx”
 - For each line, the denominator is column I
 - The numerator in the line “Oil” is computed using column D / Denominator and multiplied by 100. So for any year j,
 - $\text{Oil}_j = D_j / I_j * 100$
 - The numerator in the line “Conventional” is computed as Column B / Denominator and multiplied by 100. So for any year j,
 - $\text{Conventional}_j = B_j / I_j * 100$
 - The numerator in the line “Non-Conventional” is computed as Column C / Denominator and multiplied by 100. So for any year j,
 - $\text{Non-Conventional}_j = C_j / I_j * 100$
 - The numerator in the line “Manufacturing” is computed as Column E / Denominator and multiplied by 100. So for any year j,
 - $\text{Manufacturing}_j = E_j / I_j * 100$

Figure B1

- Figure B1 uses columns A, S, T, U, V in the sheet “Agg no Agriculture” in the file “CAN_VA_1961_2018_MASTER.xlsx”

Figure B2

- Figure B2 uses columns A, S, T, U, V in the sheet “Agg no Manufacturing” in the file “CAN_VA_1961_2018_MASTER.xlsx”

Figure B3

- Figure B3 uses columns A, S, T, U, V in the sheet “Agg no Services” in the file “CAN_VA_1961_2018_MASTER.xlsx”

Figure B4

- Figure B4 uses columns A, S, T, U, V in the sheet “Agg no Mining excl Oil” in the file “CAN_VA_1961_2018_MASTER.xlsx”

Figure C1

- Figure C1 (a) uses columns A, S, T, U, V in the sheet “Agg PWT” in the file “CAN_VA_1961_2018_MASTER.xlsx”
- Figure C1 (b) uses columns A, S, T, U, V in the sheet “Agg No Oil PWT” in the file “CAN_VA_1961_2018_MASTER.xlsx”

Figure C2

- Figure C2 (a) is constructed in the following way:
 - o The line “CAN, Aggregate” uses columns O and N in the sheet “Agg PWT” from “CAN_VA_1961_2018_MASTER.xlsx”. For any year t, the value is
 - $(O_t^N N_t) / (O_2^N N_2) * 100$
 - o The line “CAN, No Oil” uses columns O and N in the sheet “Agg No Oil PWT” from “CAN_VA_1961_2018_MASTER.xlsx”. For any year t, the value is
 - $(O_t^N N_t) / (O_2^N N_2) * 100$
 - o The line “USA, Aggregate” uses columns O and N in the sheet “USA Agg PWT” from “USA_MASTER.xlsx”. For any year t, the value is
 - $(O_t^N N_t) / (O_2^N N_2) * 100$
 - o The line “USA, No Oil” uses columns O and N in the sheet “USA No Oil PWT” from “USA_MASTER.xlsx”. For any year t, the value is
 - $(O_t^N N_t) / (O_2^N N_2) * 100$
- Figure C2 (b) is constructed in the following way:
 - o The line “CAN, Aggregate” uses columns O and N in the sheet “Agg PWT” from “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (2001-2018), the value is
 - $(O_t^N N_t) / (O_42^N N_42) * 100$
 - o The line “CAN, No Oil” uses columns O and N in the sheet “Agg No Oil PWT” from “CAN_VA_1961_2018_MASTER.xlsx”. For any year t (2001-2018), the value is
 - $(O_t^N N_t) / (O_42^N N_42) * 100$
 - o The line “USA, Aggregate” uses columns O and N in the sheet “USA Agg PWT” from “USA_MASTER.xlsx”. For any year t (2001-2018), the value is
 - $(O_t^N N_t) / (O_42^N N_42) * 100$
 - o The line “USA, No Oil” uses columns O and N in the sheet “USA No Oil PWT” from “USA_MASTER.xlsx”. For any year t (2001-2018), the value is
 - $(O_t^N N_t) / (O_42^N N_42) * 100$

Figure D1

- Figure D1 uses columns A, S, T, U, V in the sheet titled “Agg No Oil benchmark alpha” in “CAN_VA_1961_2018_MASTER.xlsx”

Figure D2

- Figure D2 (a) uses columns A, S, T, U, V in the sheet titled "Agg moving alpha" in "CAN_VA_1961_2018_MASTER.xlsx"
- Figure D2 (b) uses columns A, S, T, U, V in the sheet titled "Agg no Oil moving alpha" in "CAN_VA_1961_2018_MASTER.xlsx"

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