

Recording of data in the national accounts

Advisory Expert Group on National Accounts

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Statistics
Canada Statistique
Canada

Canada

A worrisome quote from the Governor of the Bank of Canada

“digitalization has led statistical agencies to underestimate investment, particularly in intangibles. A consequence is that central banks are working with estimates of potential output today that may be revised up in the future. The recent historical revisions to US GDP data, which improved the measurement of investment in intangibles such as software, indicate that this could be important. A similar exercise in Canada has delivered a large upward revision in investment, and, hence, potential output, beginning in 2014. This makes one wonder about what revisions may be forthcoming for 2015, 2016 and, of course, today.”

Stephen Poloz – The Fourth Industrial Revolution and Central Banking
Jackson Hole, Wyoming.

What is changing?

The uses of data

- Health Advice
- Education Delivery
- Targeted Marketing and advertising
- Navigation Services
- Insurance Services
- Legal Advice
- Customer Service

The number of firms / Industries acquiring data

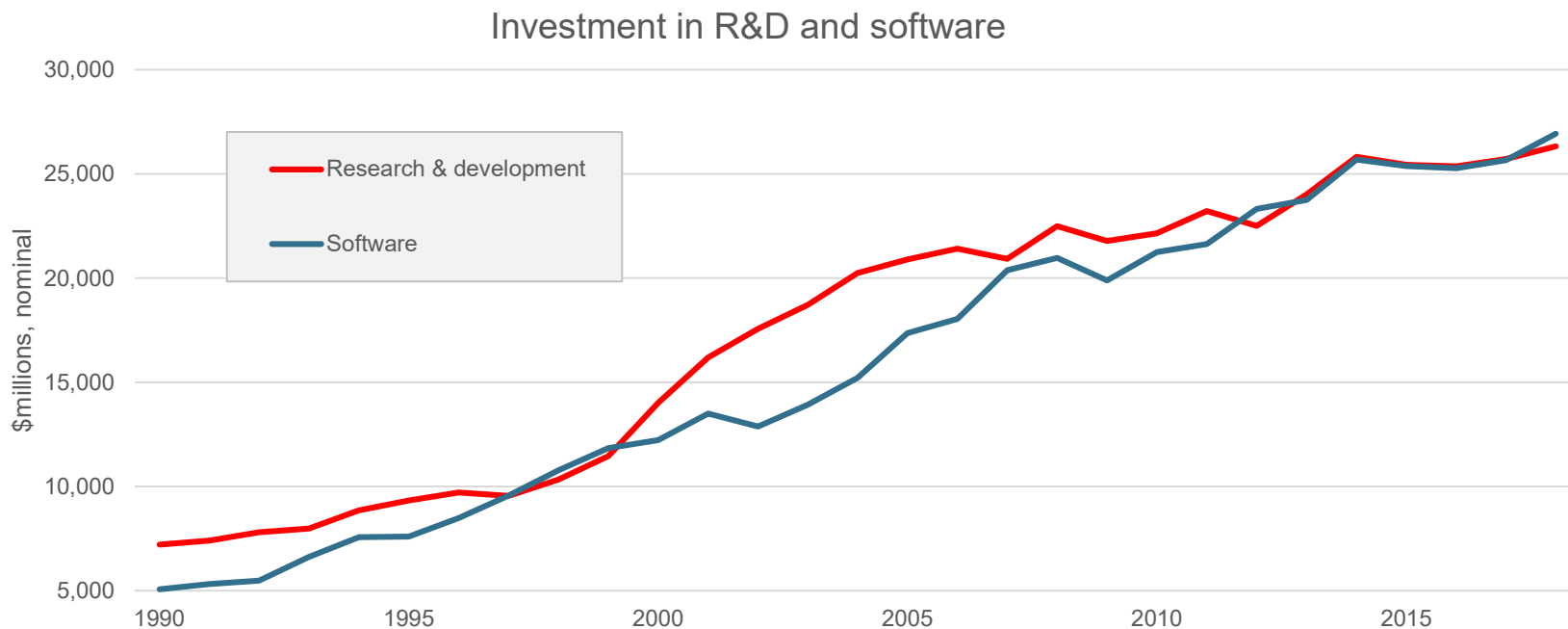
- Retail
- Wholesale
- Logistic / Transportation Industry
- Manufacturing / Support Services

The number of firms using data

- Retailers
- Professional Sports Teams
- Financial Institutions
- Platforms
- Farmers

A worrisome graph – Canada's investment in intangibles

- Intangible investment in research and development and software has slowed in recent years – at a time when a lot of anecdotal information suggests intangible investment is on the rise – **is something missing?**



Users expect visibility of “data” in macroeconomic statistics

- The words – **data assets, data science, ‘data-driven’, data is the new....** are common-place yet ‘data’ is not clearly visible in current SNA concepts and framework
- SNA treatment of data requires clarification and refinement in today’s world
- Choices are not straightforward; require more thorough, practical understanding of *data value chain*

What does the SNA say...

2008 SNA:

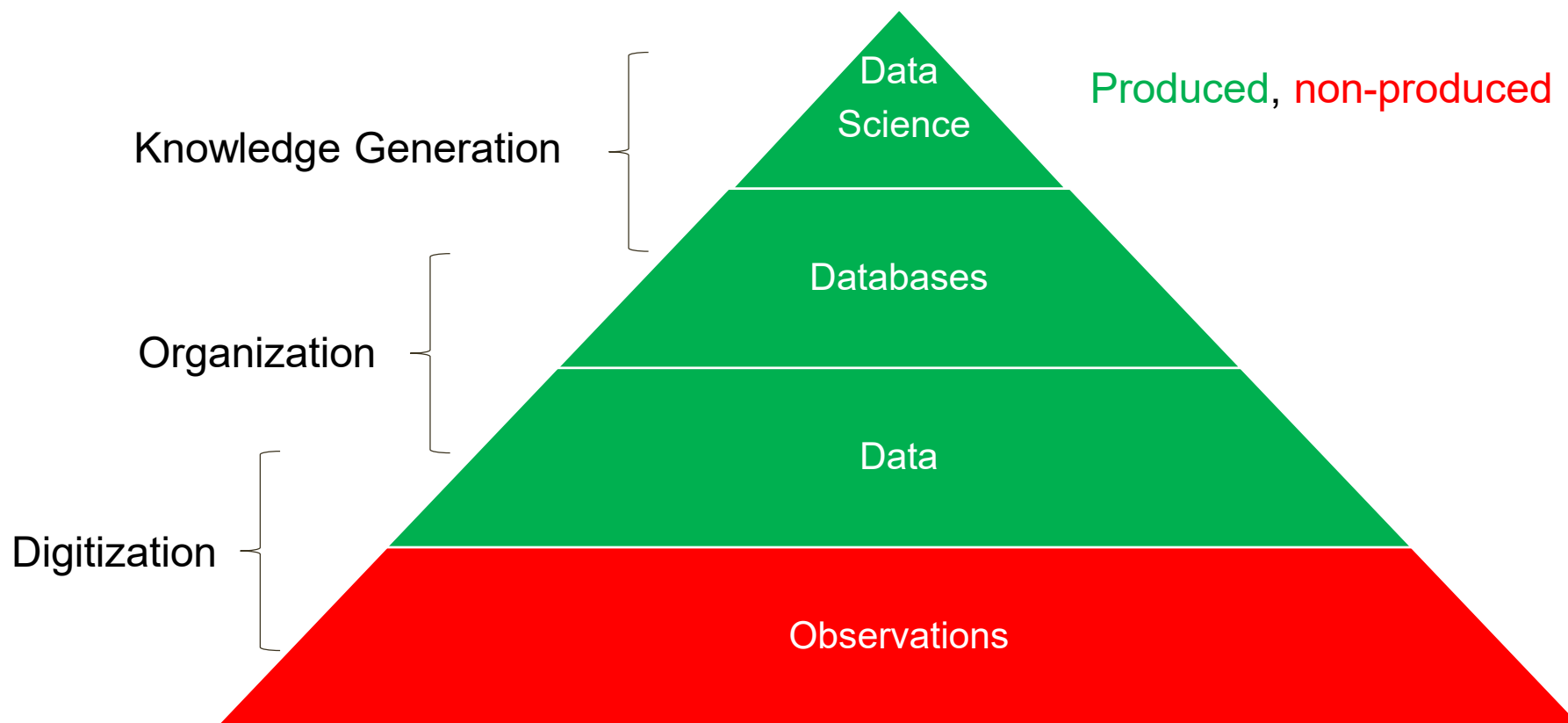
- *10.109 Computer software and databases are grouped together because a computerized database cannot be developed independently of a database management system (DBMS), which is itself computer software.*
 - AN.1173 Computer software and databases
 - AN.11731 Computer software
 - AN. 11732 Databases
- ***10.112 Databases consist of files of data organized in such a way as to permit resource-effective access and use of the data. Databases may be developed exclusively for own use or for sale as an entity or for sale by means of a licence to access the information contained. The standard conditions apply for when an own-use database, a purchased database or the licence to access a database constitutes an asset.***

What does the SNA say...

2008 SNA:

- *10.113 The creation of a database will generally have to be estimated by a sum-of-costs approach. The cost of the data base management system (DBMS) used should not be included in the costs but be treated as a computer software asset unless it is used under an operating lease. The cost of preparing data in the appropriate format is included in the cost of the database but **not the cost of acquiring or producing the data**. Other costs will include staff time estimated on the basis of the amount of time spent in developing the database, an estimate of the **capital services of the assets used in developing the database and costs of items used as intermediate consumption**.*
- *10.114 Databases for sale should be valued at their market price, which includes the value of the information content. If the value of a software component is available separately, it should be recorded as the sale of software.*

An information chain / production chain



Types of 'data' transactions:

- **Assets** - used on a continuous basis for more than a year to produce goods and services -- a financial institution consults a consumer credit database to determine credit worthiness
- **Intermediate input** - used in the process of production -- an application in a tractor that subscribes to a stream of positional information helping guide the tractor as it ploughs a field
- **Household final consumption** – Consumption of “free” digital services, often in exchange for providing data in what can be thought of as a barter transaction – the use of social media, e-mail, search engines or GPS navigational tools

*If it is
consumed
it must
also be
produced...*

Valuing data flows

Cost based valuation of own-account activity of firms:

- Experimental estimates to gauge scale of activity (Statistics Canada)
 - Untested assumptions need refinement via more explicit measurement of data production function
 - Extent of duplication with R&D and software not yet assessed

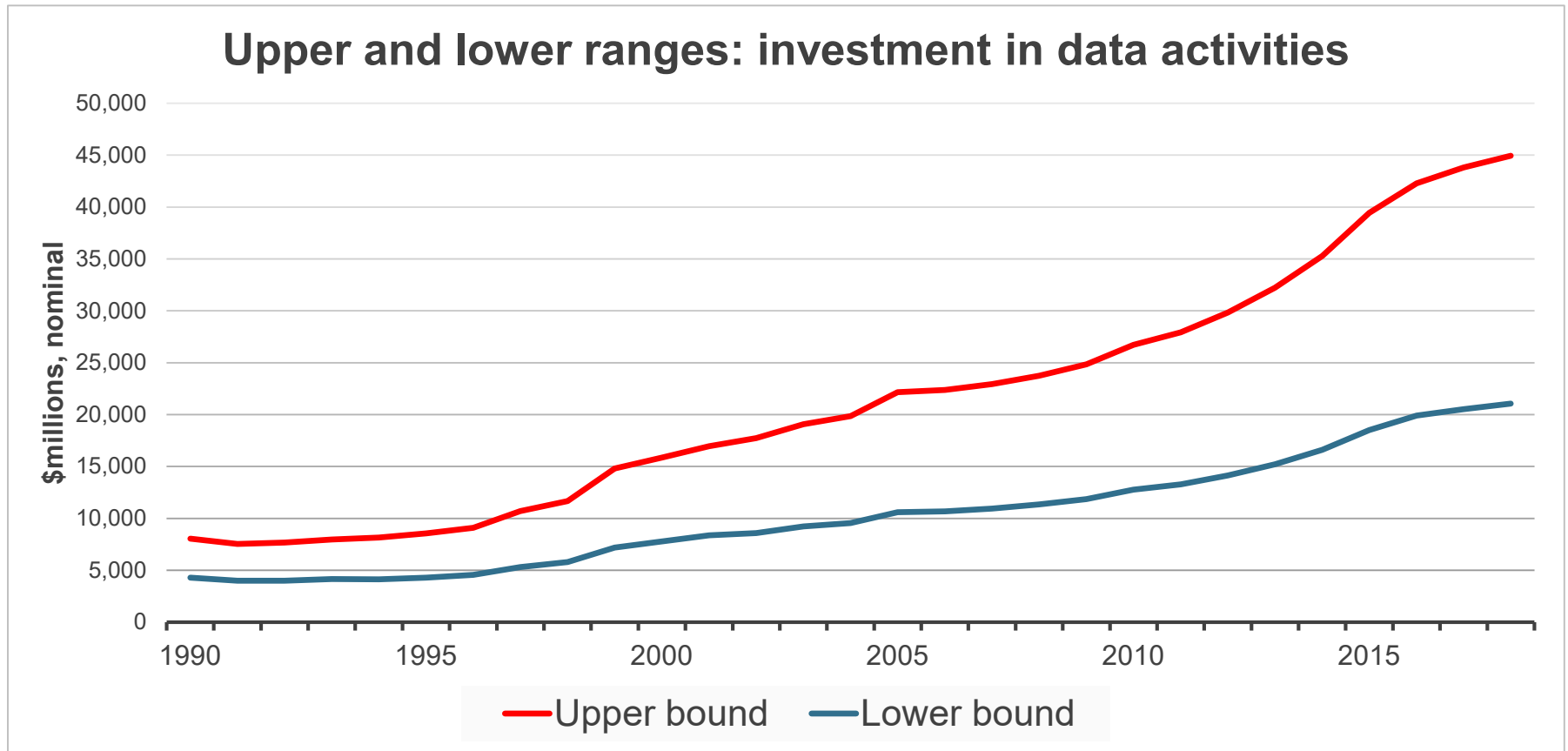
Barter transactions with households (OECD and others):

- Does not cover all data capture activities (e.g. retailers capturing customer info)
- Must impute output and household consumption of “free” media services
 - Market equivalence, advertising revenue or willingness to pay?
- If a *produced* asset, measure 1) own account production, 2) capital formation of database and 3) generation of market output

Estimating data stocks

- Accumulating cost-based flows using perpetual inventory method
- Estimating the net present value of a future revenue stream
 - *Can this be predicted?*

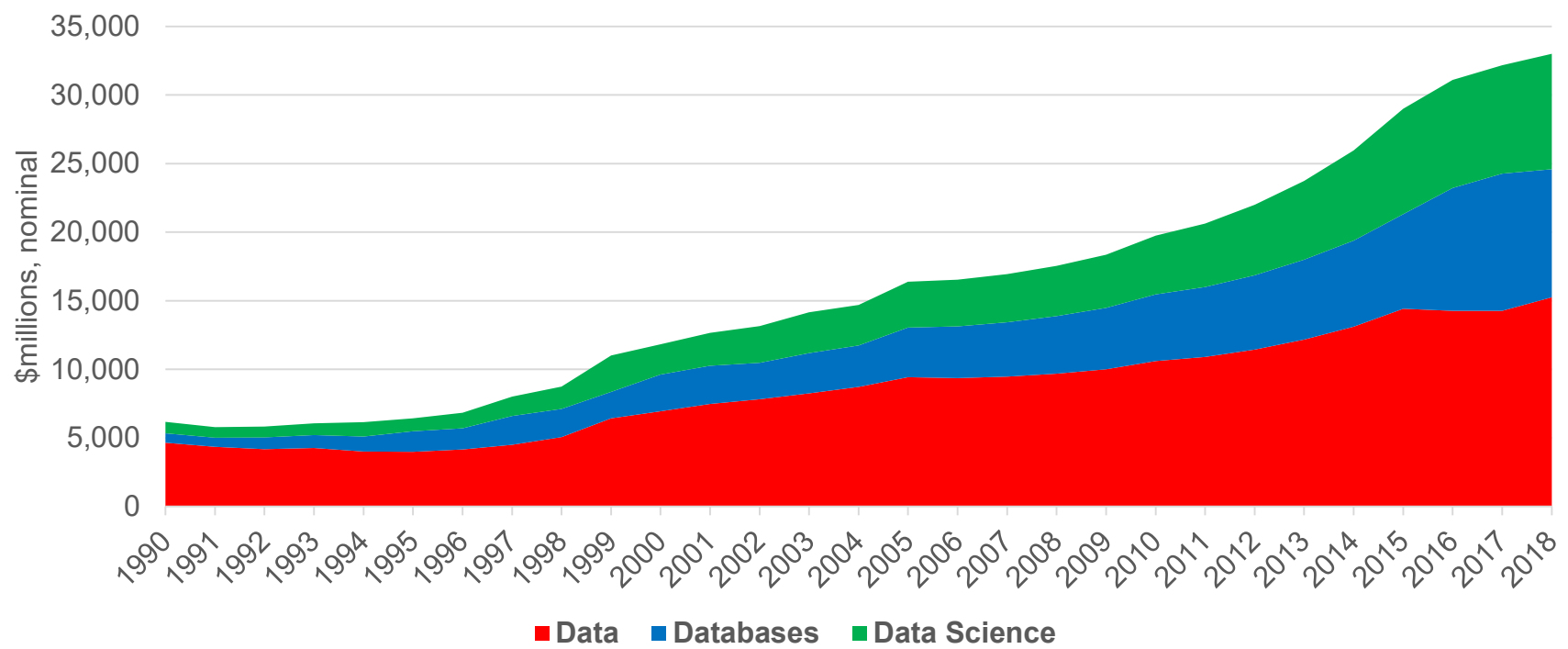
Canadian Investment Flows – range





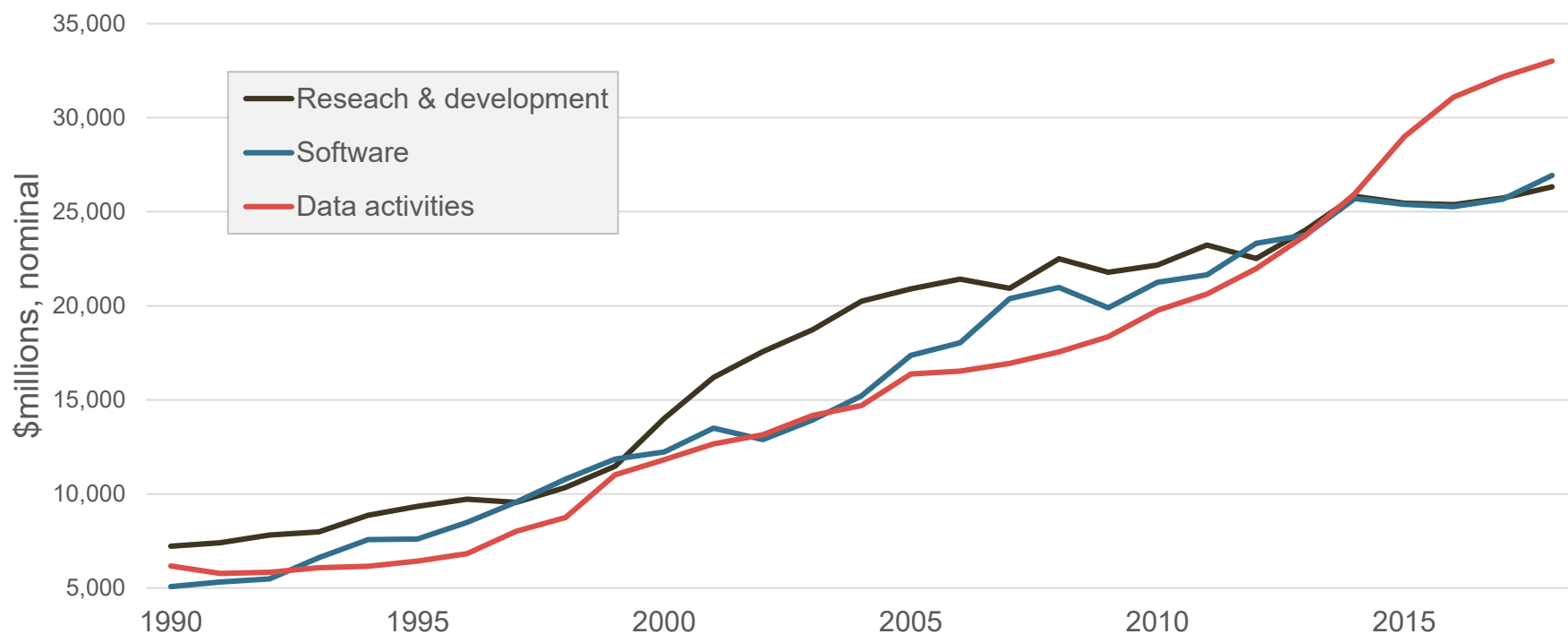
Canadian Investment Flows – Data, Databases, Data Science

Investment Flows



Canadian 'Data' flows compared with other Intellectual Property Flows

Investment in R&D, software, data, DB, DS



Issues for further discussion:

- Data (digitized observations): produced or non-produced asset?
 - Should 'data' be identified distinctly in the SNA framework?
 - Implications for the value chain?
 - Ancillary data activities
 - Originals and copies – parallel treatment to software?
 - Valuation at cost
 - What costs to include?
 - Refining the cost valuation parameters and eliminating double counting with software, databases and R&D activity
 - Valuation method for barter transactions
- *Choices have varying implications for production boundary and GDP*



Questions for AEG

The AEG is invited to comment on:

- the need for making data transactions visible in the SNA framework
- the relative merits of alternative treatments and approaches presented
- priorities for future research and investigation on the data production chain