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**Post-Covid: sustaining organisational and product innovation in national statistical offices.
Innovation in national statistical offices organization and working arrangements**

Stats New Zealand's response to changing needs for economic data brought on by Covid-19

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Summary

The document presents Stats New Zealand's response to changing needs for economic data brought on by the Covid-19 pandemic.

The document is presented to the Conference of European Statisticians' session on "Post-Covid: sustaining organisational and product innovation in national statistical offices - Innovation in national statistical offices organization and working arrangements" for discussion.

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I. Introduction – the need to see trade-offs in Near Real Time

1.   The health crisis brought on by the Covid-19 virus meant that the data landscape came to be dominated by a new set of statistics: reports on the number of people infected, having recovered or killed by the disease. These data appeared in near real-time and were updated daily, often on the same day, and very quickly came to drive policymaking.

2.   The absence of near real-time data on the impacts of lockdown measures on other economic, social and environmental phenomena meant that the immediate trade-offs on these other aspects of wellbeing were largely invisible and could only be anticipated or conjectured. This left many policymakers in the dark about the impacts of Covid containment measures on their respective areas of responsibility.

3.   In the early days of the crisis, and through interaction with key government policymakers, this data gap was most keenly felt in the economic sphere.

II. Strengths and weaknesses of existing data products

4.   The collection, compilation, analysis and publication of a wide range of economic indicators is a well-established and longstanding area of activity at most NSOs, and Stats NZ is no different. They are published with a lag and a frequency that made these indicators – in light of the fast-paced decision making environment brought on by COVID – significantly less relevant.

5.   This view was confirmed by Stats NZ's participation in various cross-government committees – notably an Economic Advisory Group (EAG) – where the need for more near-real-time[1] data was emphasized. Stats NZ made it a focus to support the economic data needs of the broader government policymaking community.

6.   However, the cost and the time needed to create full near-real-time versions of GDP, unemployment, inflation, etc., would have been prohibitive (costing millions of dollars, and requiring several years to implement), if we followed the route of scaling up existing processes.[2] This was never seriously considered.

III. Developing new near-real-time (NRT) macro-economic indicators

7.   A key early turning point occurred when Stats NZ offered to lead a brainstorming session with data-oriented policy analysts from other key ministries to see what could be done.

8.   Merchandise trade data became an immediate focus. The official merchandise trade statistics are compiled and published once a month, with a twenty-two day lag. The compilation process puts the raw customs data through a thorough quality assurance and error detection process. Once aggregated, key series are deflated and seasonally adjusted, enabling valid month-over-month comparisons. The opportunity for near-real-time was obvious: raw data on imports and exports are recorded by Customs and transmitted daily to Stats NZ.

9.   A brainstorming session with key clients from NZ's Treasury, Reserve Bank and Industry Ministry led to the decision to attempt to produce a weekly report of key export and import categories, especially to and from China. Such estimates would have several drawbacks: they would not be seasonally adjusted; being weekly, they would not sum neatly into months; and perhaps most importantly, they would not benefit from the meticulous

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[1] Near real-time: i.e., of higher frequency and timeliness.

[2] For example, taking value added by industry GDP to a monthly frequency would have required a significant investment in highly specialized human resources and in the spinning up of most of its feeder surveys (which are conducted at a quarterly frequency) to a monthly one: more staff, larger samples, major processing system modifications/upgrades.

quality assurance processes the data are normally subject to. This entailed the following risk: the signal from the weekly series might not be consistent with those of the regular monthly product, either because the former contained errors that would be corrected in the latter, or because seasonal effects that remained in the seasonally unadjusted weekly data would alter the trend in the very short term, etc. This could in turn lead to more market turbulence as users drew incorrect conclusions, creating more trouble than benefits (e.g., adding volatility to currency and other asset markets).

10.   However, consultation with market players allayed these concerns. To the key clients of merchandise trade data, the gains in frequency and timeliness more than compensated for any loss in accuracy and coherence/interpretability. And so Stats NZ began to publish (with some misgivings), a weekly report on imports and exports for selected product classes. This weekly release of daily data was labelled "experimental" and the first release was accompanied by an information session to which were invited key business news media, government and bank economists. The limitations of the data were carefully explained to them, as well as the risks of using them.

11.   The weekly trade product has been highly successful and remains a very popular product for specialized economists. The release has been credited with supporting the NZ dollar in the early days of the crisis, when there was an information vacuum and merchandise trade was thought to be collapsing (it wasn't!). Building on this success, other weekly indicators appeared in the following months, including estimates of weekly migration and employment.

12.   However, user needs went far beyond these few series – far beyond what SNZ could supply. SNZ would have step up and provide more, when COVID meant running regular operations was a challenge. Clearly, a deeper level of collaboration with new partners would be required.

IV.   Rethinking data quality, and being flexible about it

13.   The quality of a statistic can be seen as consisting of a number of characteristics or dimensions, the most important of which are listed below:

        (a)   Accuracy: The precision of a statistic, or the extent to which it actually represents what is being measured. Related concepts include the confidence interval (a function of its sample size and variance), non-sampling error, whether the estimator is biased, etc.

        (b)   Coherence: the extent to which concepts and definitions used in measurement are consistent with to those of other statistics. A coherent statistic is one that can easily be used in conjunction with other statistics because it shares similar compilation practices, concepts and definitions, etc.

        (c)   Frequency: The rate at which a statistic is compiled and published. Often referred to as the reference period. Typical frequencies or reference periods for economic time series are: annual, quarterly, monthly, weekly, daily.

        (d)   Timeliness: The span of time between a reference period and the publication of the statistic describing it. Typically, economic time series are published several weeks or months after the reference period they are describing.

14.   Any statistic is compiled with a particular choice of quality settings, i.e., a particular set of choices of accuracy, coherence, frequency and timeliness. For example, the Gross Domestic Product in New Zealand is considered to be highly accurate (it relies on a complete set of sub-annual indicators), and highly coherent (it is fully consistent with SNA 2008); it is published at a quarterly frequency, with a timeliness of 10 weeks after the quarter is describes. Under normal economic circumstances, it is considered "fit for purpose" for a host of fiscal and monetary policy-related applications.

15.   However, COVID demonstrated that the quality settings acceptable to users may change. In particular, the onset of an economic crisis may call for different settings for a

statistic to continue to be fit for purpose. In the context of COVID, most of Stats NZ official statistics were not considered timely or frequent enough.

Figure 1
Illustration of the quality settings of official statistics in the context of the COVID Crisis


16. Unfortunately, Stat NZ's ability to change these settings was very limited. Indeed, quality settings generally cannot easily be reset. For example, the quality settings on the New Zealand consumer price index (CPI) are a function of its price sample, which is still largely collected manually via in-store visits. This sample has been carefully chosen to produce an inflation indicator that is of an accuracy that is fit-for-purpose for interest-rate setting and inflation monitoring decisions that need to be made *at a quarterly frequency*.

17. Any attempt to scale up this operation to, say, a monthly or weekly frequency, would require a significant increase in sample size (i.e., collecting 3x or 12x as many price quotes) that would require significant investment in money and time to implement. In this sense, the quality settings of the CPI are quite rigid, or *inflexible*. However, if the data source for prices was instead a weekly feed of point-of-sale (scanner) data providing prices and quantities by unique SKU and store address, then any of the aforementioned compilation frequencies would be possible[3], at virtually no additional cost. Under such a scenario, quality would become *flexible*, and the ability of the statistical agency to adjust its quality settings to meet changing circumstances greatly enhanced. Indeed, big data sources and processing methods offer the tantalizing prospect of ushering in a period of *flexible quality*, where aggregation/compilation paths are no longer singular, but numerous, and the statistical agency's responsiveness greatly enhanced.

18. It is no accident that the only indicators that Stats NZ was able to convert to near-real-time were those which, like merchandise trade, were compiled on the basis of near-real-time (daily, available the next day) administrative data feeds. Moreover, the increases in timeliness and frequency were achieved at the cost of a loss of accuracy and coherence with other statistics. However, key clients indicated that this trade-off was worthwhile.

Figure 2
Illustration of the quality of non-official Statistics being used by policymakers during the COVID crisis
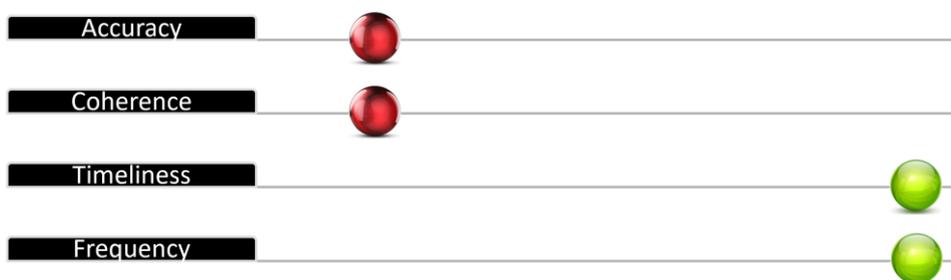
19. Key clients continued to indicate that they were ready to make decisions on the basis of non-official data sources, as long as they were more frequent and more timely. For example, daily broadband usage published by one of New Zealand's main broadband internet

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[3] Not to mention possible improvements in timeliness (through the sheer automation of the collection process), accuracy (through a much larger price sample), and coherence (through the possibility of different index number formulae, if quantities are present).

providers went up dramatically in New Zealand as soon as the first lockdown was implemented – reflecting the number of stay-at-home workers holding Zoom meetings, etc., – and this became an oft-consulted statistic.

V. Enhancing accessibility to near-real-time macro-economic indicators: the COVID Data Portal

20.   The realization that policymakers were using more and more non-official indicators to understand the economy's direction of travel pointed to an unmet need, and Stats NZ's next step.

21.   Many policy analysts were becoming their own statisticians, spending time gathering data, typing them into small databases (usually spreadsheets), keeping them up to date, etc. This was time-consuming and not an area of core expertise. Additionally, this also led to much duplication of effort (many analysts from different Ministries were collecting the same data) or a lack of discoverability (some analysts had discovered interesting data series that others did not know about), and a lack of public transparency (the public had little or no awareness of the data being used for decision-making).

22.   Thus, Stats NZ created COVID-19 Data Portal[4] to house a growing list of key economic indicators[5] to help track the impact of COVID-19 on New Zealand. Stats NZ data brokers and wranglers consulted directly with policymakers to find out which ones to include. Thus, in a real sense, the data included in the Portal were crowd-sourced. The decision to include data in the portal generally hinged on whether or not they were actually being used by one or more policy analysts in a client department. Little to no consideration was given to the concepts and methods, compilation methods, etc. (i.e., accuracy or coherence). If they were being used to understand the impacts of COVID, then they were included (if permission was granted by their owner).

23.   There are currently over 800 individual series presented in the Portal. Most are sourced from other government bodies, banks, associations, etc. They are updated within a day of any updates to the source data. Thus users can be confident that the data always "fresh". The Portal offers limited interactivity: users can capture graph images, filter the data by region, and download many of the datasets for further use.

24.   Since the Covid-19 Data Portal was deployed in April 2020 there have been more than 72,000 unique page visits to the site, equivalent to about 200 visits a day. Moreover, visitors spend about 10 minutes each on the site.

VI. Enhancing coherence: the New Zealand Activity Index (NZAC)

25.   With such a wide variety of near-real-time indicators that – unlike official statistics – have no inherent coherence, there was always a risk of confusion around the meaning of their various movements. Indeed, in a given week in which lockdown was instituted, debit/credit spending might plummet 60%, truck traffic drop 40% and electricity consumption fall 15%... What does it all mean? What does it imply for aggregate economic activity?

26.   In a collaborative effort, staff from Stats NZ, Treasury and Reserve Bank attempted to enhance the coherence of the above by developing the New Zealand Activity Index (NZAC)[6]. The index uses principle components analysis to model the underlying co-movement of a subset of the Portal's cross-economy high frequency indicators. To aid in

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[4] COVID 19 Data Portal: https://www.stats.govt.nz/experimental/covid-19-data-portal
[5] This was subsequently expanded to include health, income support, environmental and social indicators.

Treasury New Zealand Activity Index (NZAC) links:

https://www.treasury.govt.nz/publications/research-and-commentary/new-zealand-activity-index
https://www.treasury.govt.nz/publications/nzac/nzac-technical-note

interpretability, it is scaled to the mean and variance of year-over-year change in quarterly GDP. It is intended to provide users an early reading on the evolution of overall economic activity while they wait for the more accurate, more coherent and analytically insightful GDP to be published. It is published simultaneously on Stats NZ's COVID Data Portal, as well as on the Treasury's website; the latter provides economic commentary and technical backgrounders.

Figure 3
New Zealand Activity Index
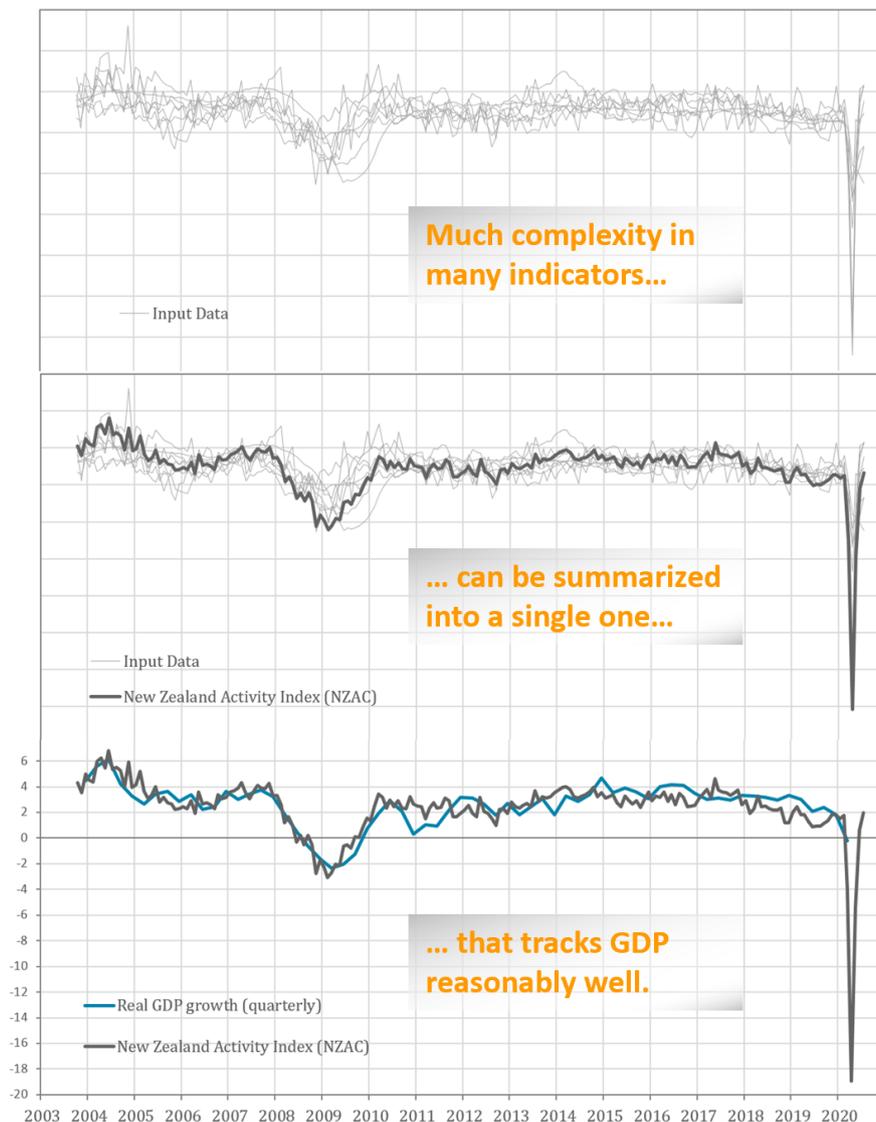
VII. Development principles: the "lessons of COVID"

27. It must be emphasized that these developments occurred during a very challenging period at a relatively small statistical agency, with no additional funding. Thus, it was essential that the most efficient and expedient development methods be used. Consequently, an agile-inspired collaborative approach was used throughout. I.e., enthusiastic and committed clients were actively involved every step of the way; minimum viable products were developed and put into active use to test them; there were multiple pivots based on feedback; finally, upper management did its best to stay out of the way and let competent staff make decisions on the ground, limiting itself to staying informed, removing roadblocks and being accountable (i.e., taking on risk).

VIII. Conclusion

28.   2020 was a very challenging year, but ultimately a good year for statistics, one rich in fruitful interactions and stimulating developments. Additional funding was eventually granted, supporting the work of a small COVID Data Team. This team is working to develop new COVID-related indicators and is guided by the principles outlined above, namely:

- Agile/collaborative development with customers

- Aiming for flexible quality

- Innovative mindset

- Calculated risk taking.