



Workflow Automation

Experience-Based Operation → Standard Operating Procedure

Yang Hu



Output



Cyclically-adjusted balance, structural balance and total fiscal impulse⁶

Cyclically-adjusted balance and structural balance

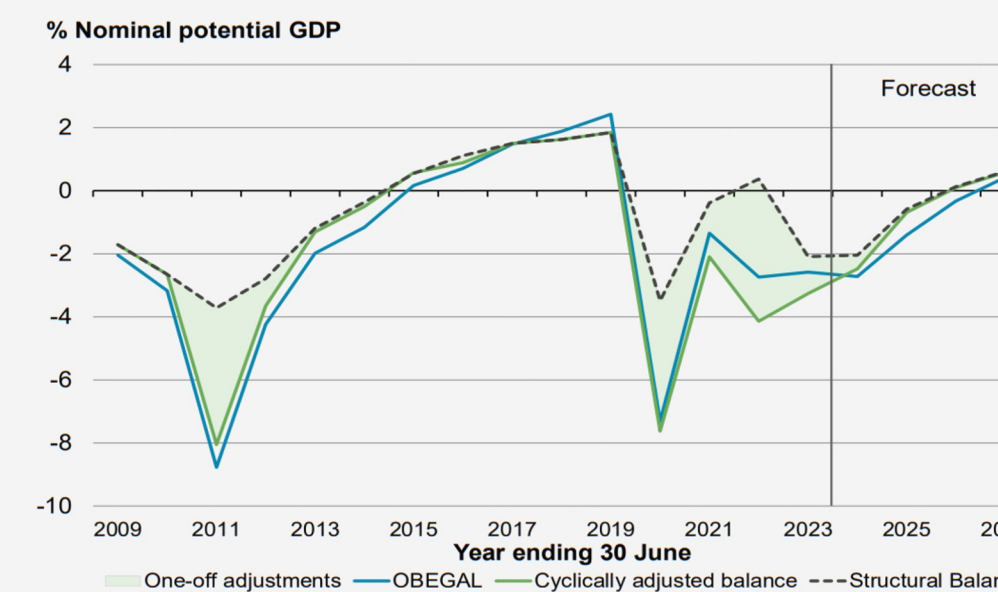
The cyclically-adjusted balance (CAB), the structural balance and OBEGAL together can be used to understand the Government's fiscal position.

The CAB shows what OBEGAL would be in the absence of fluctuations in expenses and tax revenue that happen automatically with time through the economic cycle (known as automatic stabilisers). The structural balance helps to show the underlying fiscal position by adjusting the CAB for significant one-off expenditure items, such as those associated with the North Island weather events.⁷

The structural balance and CAB are forecast to converge over the coming years as one-off spending associated with the COVID-19 pandemic and the North Island weather events comes to an end. These two measures are forecast to return to surplus by 2025/26. Relative to the *Budget Update*, OBEGAL is forecast to return to surplus one year later in 2026/27. This change is a consequence of higher expenditure relative to the *Budget Update*.

The lower position of the CAB relative to OBEGAL in 2022/23 reflects a positive forecast output gap, indicating that the economy was operating above its potential (so automatic stabilisers are improving OBEGAL relative to the CAB). A negative output gap is forecast for 2023/24 and the remainder of the forecast period, resulting in a higher CAB relative to OBEGAL for the remainder of the forecast period. The upward trajectory of the CAB indicates an improvement in the Government's underlying fiscal position over the forecast period, with a return to surplus for the CAB expected in 2025/26.

Figure 2.17 – OBEGAL, CAB and structural balance



Source: The Treasury

⁶ Refer to this guide for more detail on the methodology behind calculating the CAB, the structural balance and the total fiscal impulse: <https://www.treasury.govt.nz/publications/guide/methodologies-cyclically-adjusted-structural-balance-fiscal-impulse>.

⁷ In addition, these one-off adjustments include, for example, payments relating to the COVID-19 Wage Subsidy Scheme, COVID-19 vaccine purchases, and payments relating to the Christchurch and Kaikōura earthquakes. One-off measures to support New Zealanders with their day-to-day living costs, such as the Cost-of-Living Payment, have not been excluded from the structural balance as these do not meet the required materiality threshold (see note referred to in footnote 6, pages 5 to 6).

Total fiscal impulse

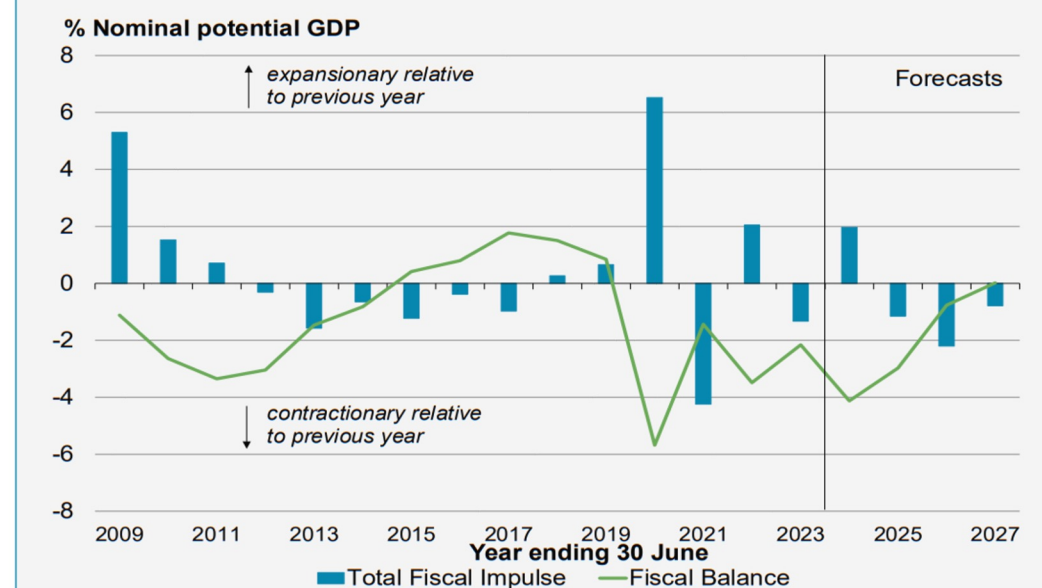
The total fiscal impulse is a measure of the change in the Government's fiscal support for aggregate demand from one year relative to the next, including the impacts of discretionary fiscal policy, automatic stabilisers and finance costs. It is calculated as the change in the fiscal balance, which is residual cash adjusted for some expenditure items that do not directly affect domestic demand. The fiscal balance is a cash measure of core Crown and Crown entity flows, and therefore differs from OBEGAL, the CAB and the structural balance.

A positive total fiscal impulse implies that the level of fiscal support is expanding compared to the previous year, while a negative total fiscal impulse implies it is contracting compared to the previous year. The total fiscal impulse does not estimate the absolute level of support or the economic impact of that support, which will vary depending on factors such as the composition of spending and the capacity of the economy to absorb new investment.

On aggregate, the total fiscal impulse is expected to be contractionary over the forecast period as the fiscal balance improves. However, as at the *Budget Update*, in 2023/24, the fiscal balance is forecast to decrease relative to 2022/23. As a result, the total fiscal impulse is expected to be expansionary in 2023/24.

Relative to the *Budget Update*, the total fiscal impulse was slightly less contractionary in 2022/23 and is forecast to be slightly more expansionary in 2023/24. A total fiscal impulse of 2.0% of nominal potential GDP is now forecast for 2023/24, compared to 1.7% of nominal potential GDP forecast at the *Budget Update*. This is a consequence of the larger forecast fiscal balance deficit for 2023/24, compared to the *Budget Update*, driven largely by higher operating expenses. From 2024/25, and through the remainder of the forecast period, the fiscal balance is forecast to increase, with a balanced or slightly positive fiscal balance expected by 2026/27. As a result, the total fiscal impulse is forecast to be negative (contractionary) from 2024/25 and through the remainder of the forecast period.

Figure 2.18 – Total fiscal impulse and fiscal balance⁸



Source: The Treasury

⁸ The total fiscal impulse is not cyclically adjusted. Note that we have adjusted for the Matariki holiday falling on 28 June 2024, when taxes are due, by shifting \$4.95 billion in tax receipts from the 2025 fiscal year to the 2024 fiscal year to better reflect the economic impact.



Output

(another team) Prepare & Review Narratives

Update Models & Produce Charts

Cyclically-adjusted balance, structural balance and total fiscal impulse⁶

Cyclically-adjusted balance and structural balance

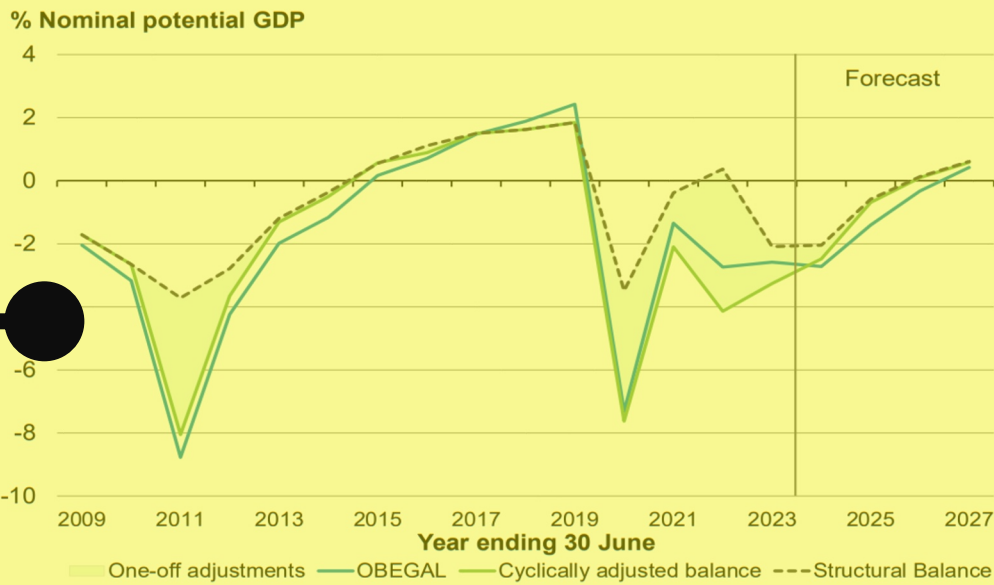
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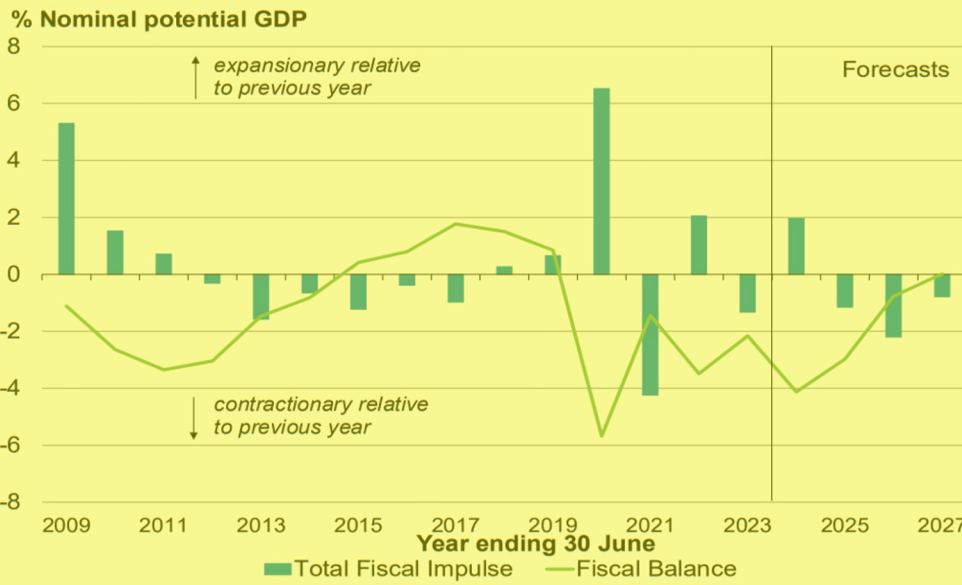
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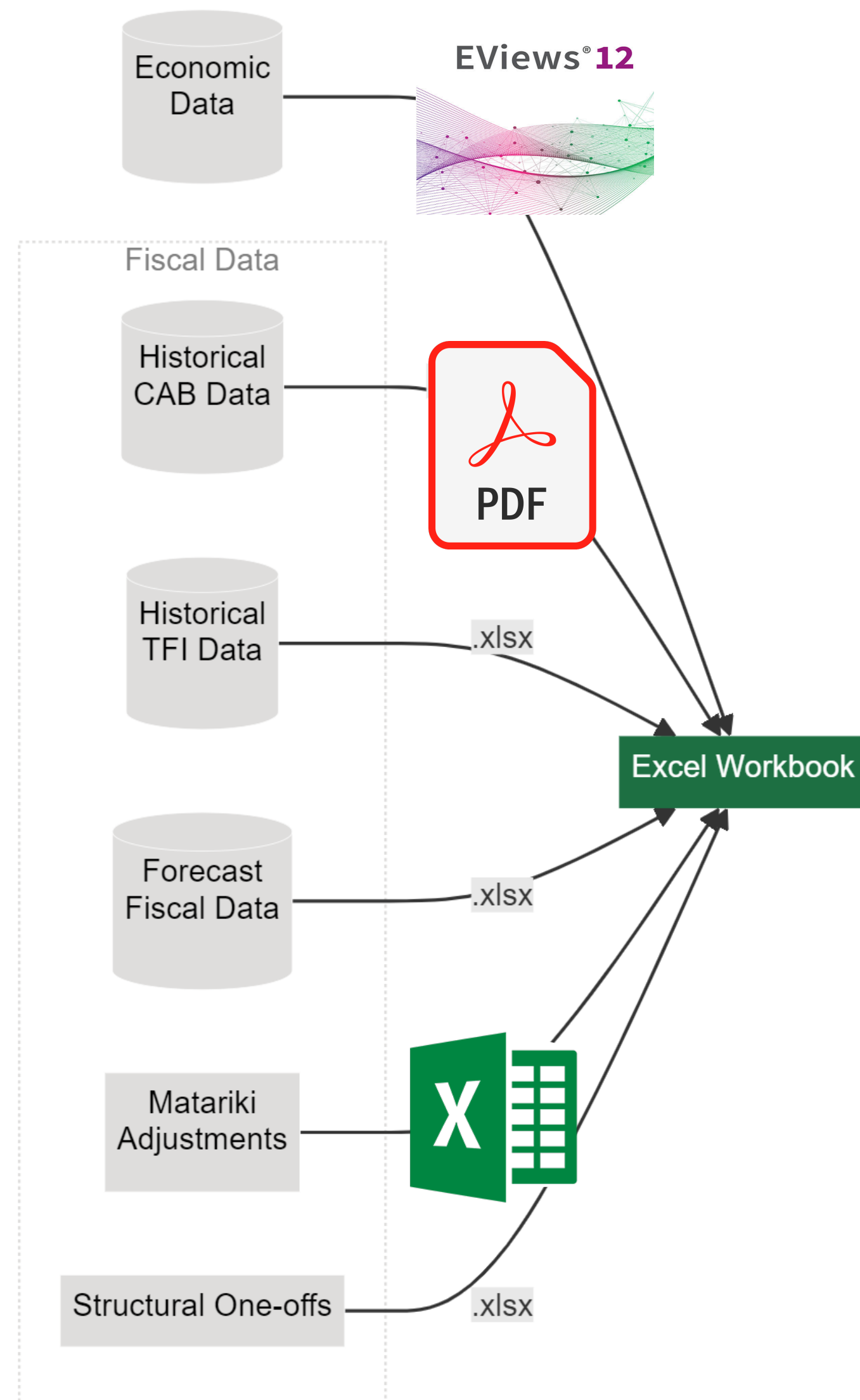


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Tight Turnaround Time



! Inputs come in different formats and platforms

! Most time is used for locating, copying and pasting

! More time is spent on re-formatting charts

FISCAL OUTLOOK

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2023 PRE-ELECTION ECONOMIC AND FISCAL UPDATE

Total fiscal impulse

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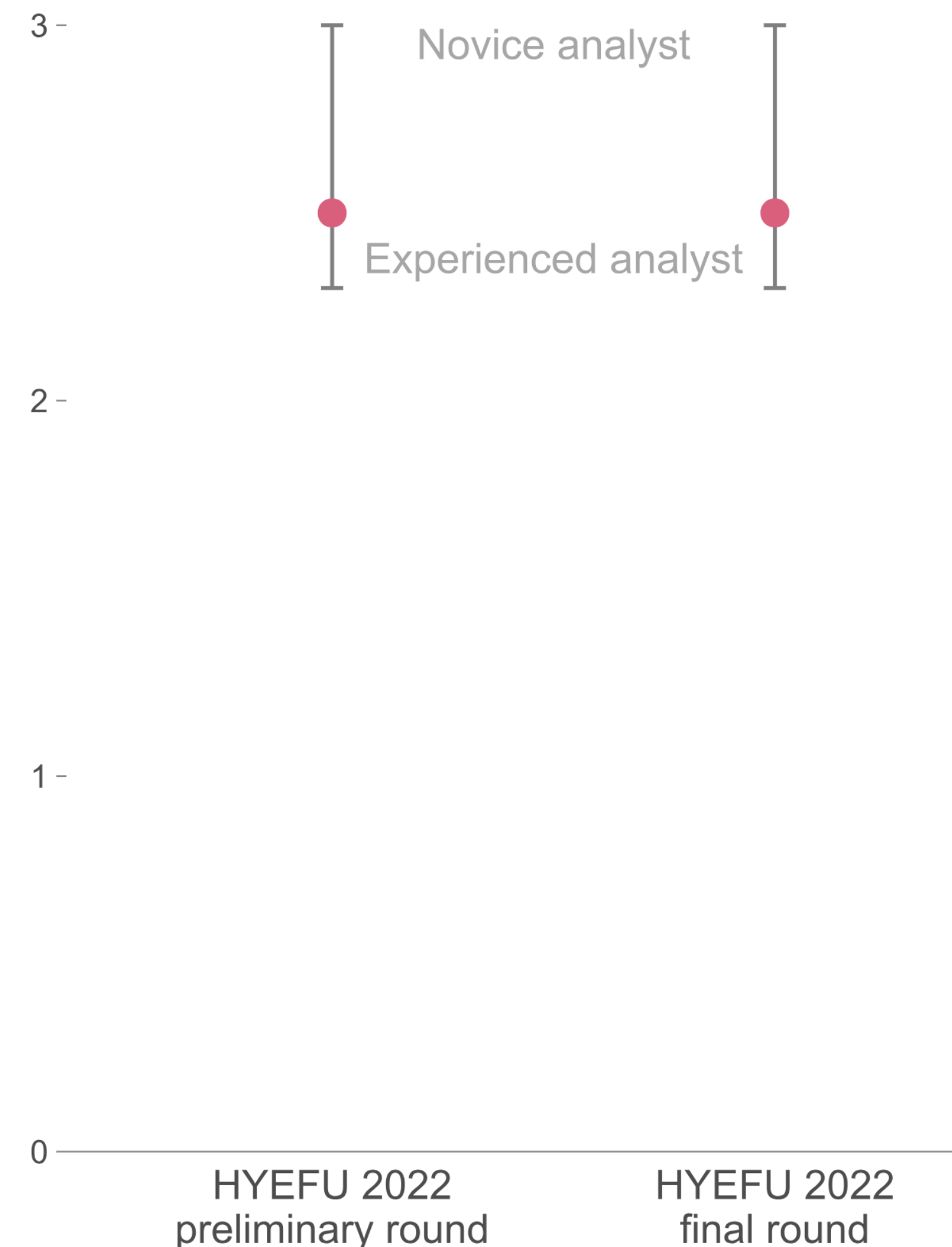
B.16 | 57

58 | B.16



Tight Turnaround Time

Time spent (in working days)



! Experience can marginally reduce required time

When results don't match¹:

× Unclear what caused the difference

× Time-consuming to review

× No time left for the next team

When results match:

! Same mistakes may be made but won't be detected

¹ Payne, J. W., Bettman, J. R., & Luce, M. F. (1996). When time is money: Decision behaviour under opportunity-cost time pressure. *Organizational behaviour and human decision processes*, 66(2), 131-152.

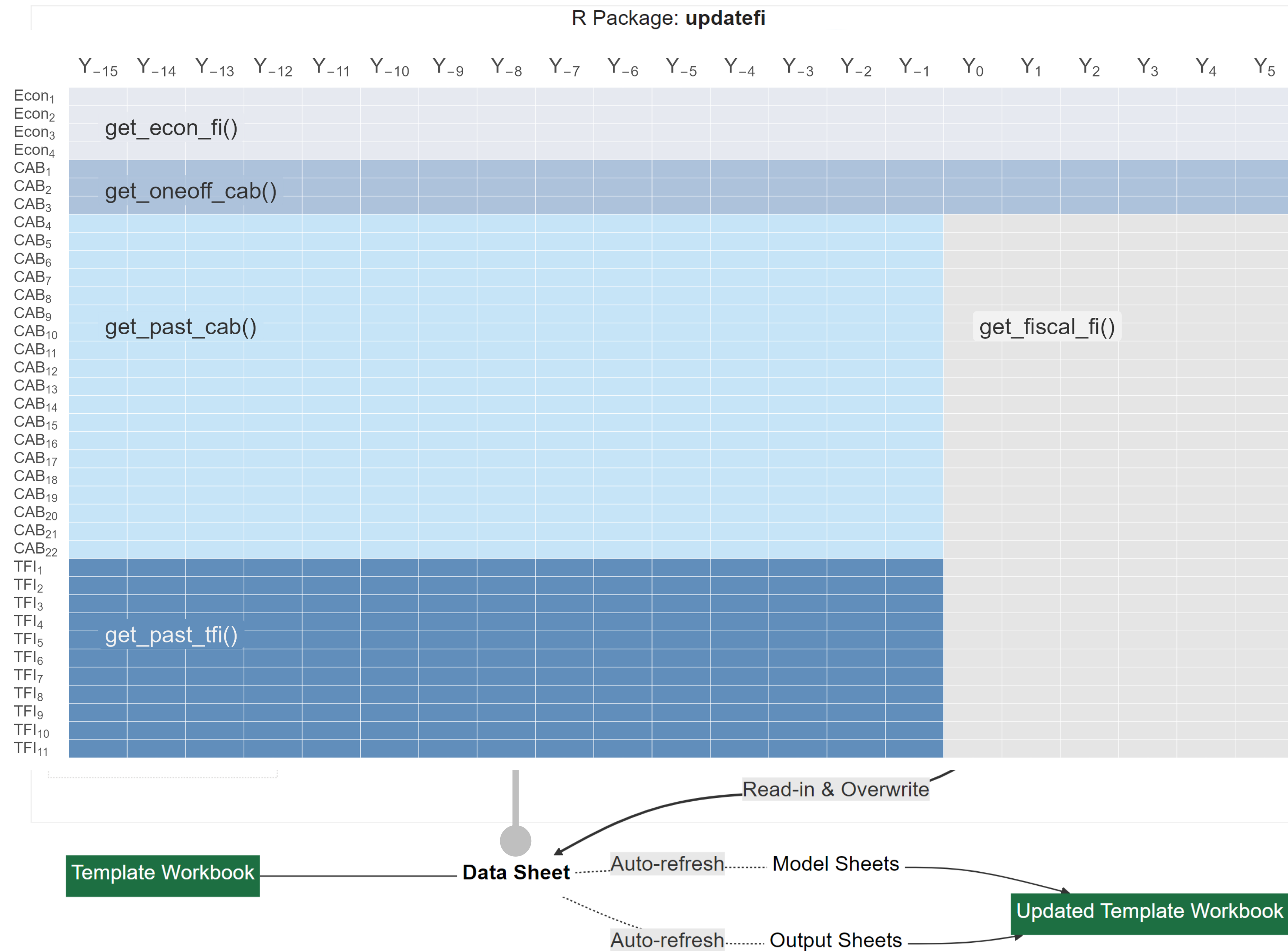


Project Objectives

- **Tight time frame** during the updating phase is unlikely to change.
- This project is a pragmatic attempt to automate the workflow.
- A set of R functions and an Excel template were developed to achieve the goal.
- Functions are packed and maintained as the **R Package** called '**updatefi**'.
(**update** fiscal indicators)



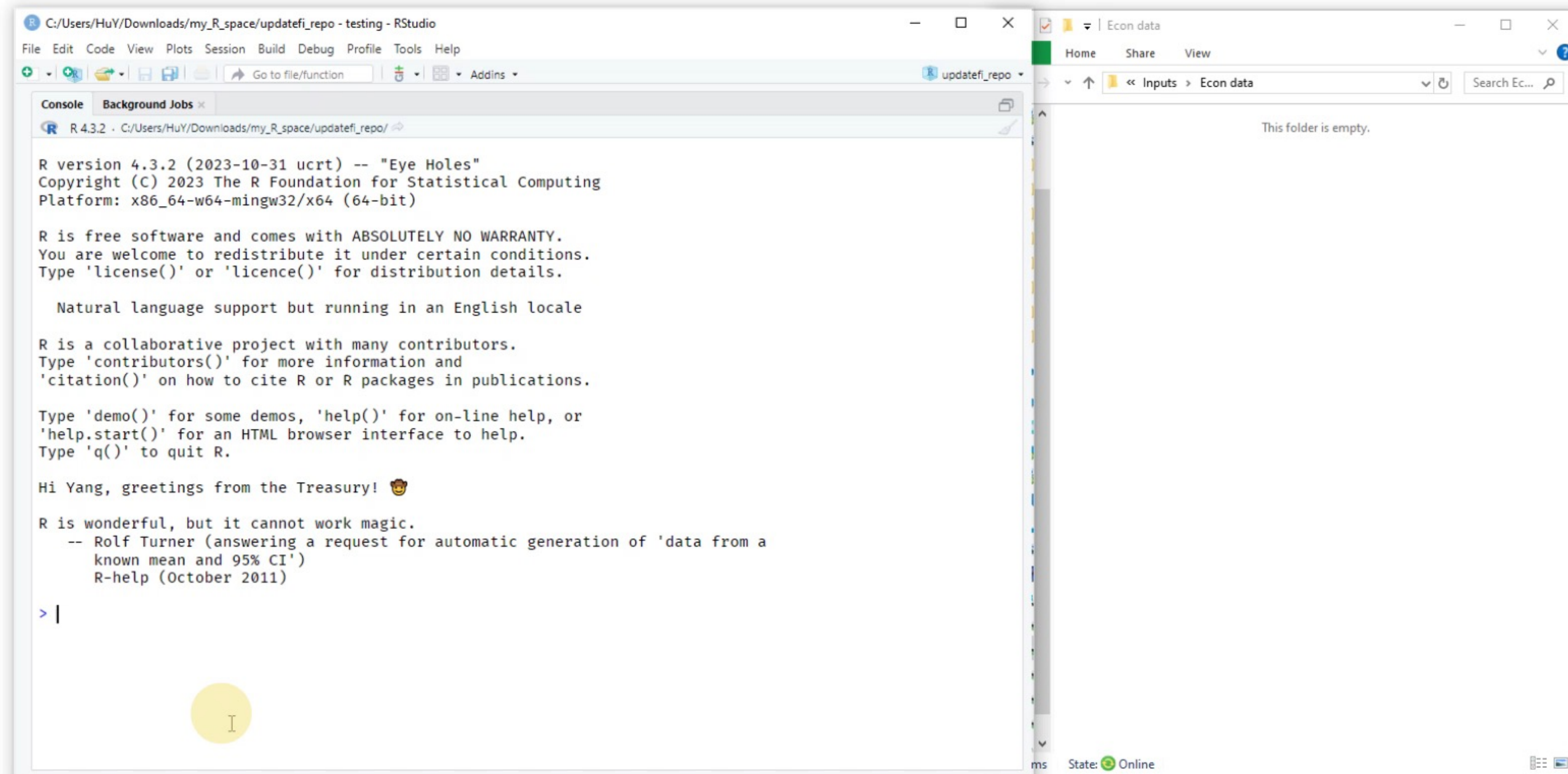
Input/Output Structure





Demo 1: Economic Data

The **get_econ_fi()** function manipulates² EViews® to export data to a .csv file:



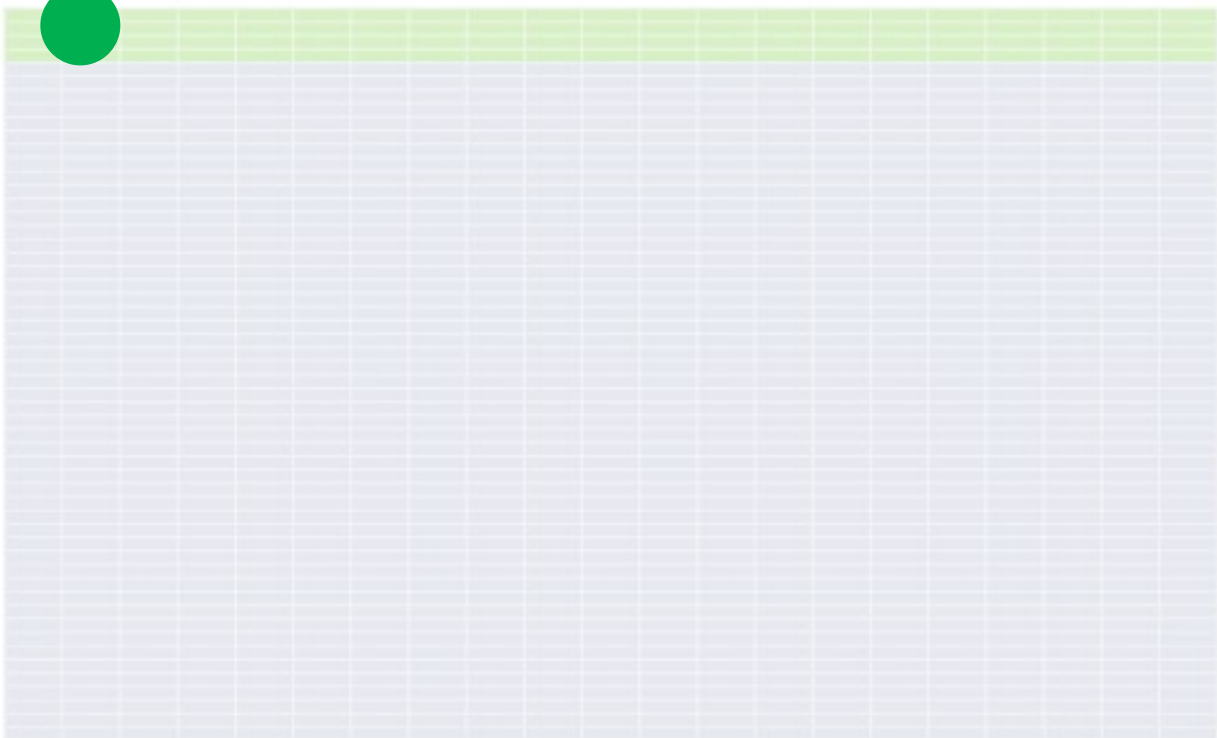
² Mati S. (2020). EviewsR: A Seamless Integration of EViews and R. CRAN. <https://CRAN.R-project.org/package=DynareR>

Mati S., Civcir I., Abba S.I (2023). EviewsR: An R Package for Dynamic and Reproducible Research Using EViews, R, R Markdown and Quarto. *The R Journal*. doi:10.32614/RJ-2023-045, url: <https://journal.r-project.org/articles/RJ-2023-045/>



Demo 1: Output

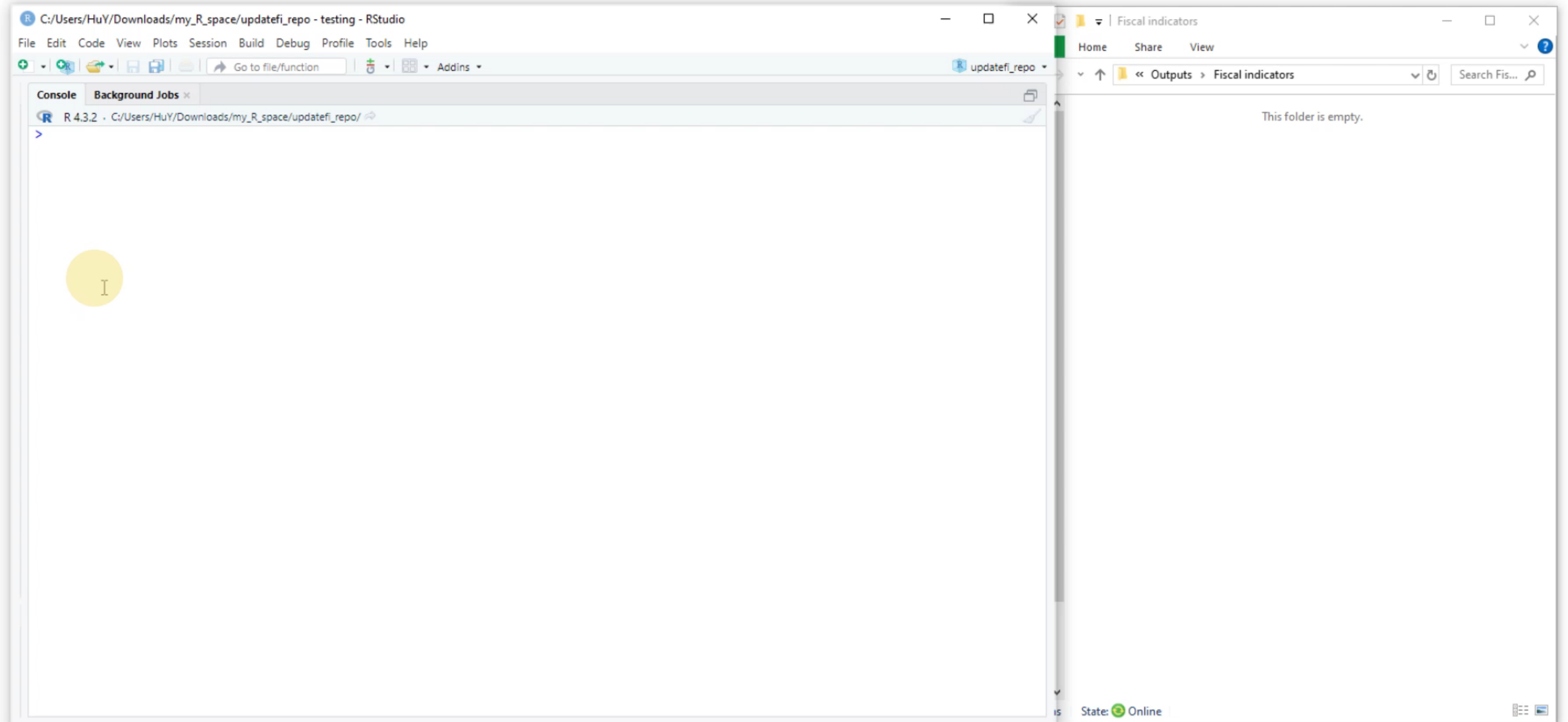
2023_prefu_finals_econ.csv								
File Home Insert Draw Page Layout Formulas Data Review View Automate Developer Help iManage								
H23								
	A	B	C	D	E	F	G	H
1	type	variable	2007	2008	2009	2010	2011	2012
2	ECON	Treasury real output gap	2.59887	2.7551	-0.71775	-1.17475	-1.93168	-1.40788
3	ECON	Unemployment rate	3.6	3.8	5.8	6.6	6.1	6.4
4	ECON	Trend unemployment rate	5.13145	5.08626	5.06206	5.04761	5.03266	5.0099
5	ECON	Nominal potential GDP	170919	183745	190767	199196	209692	218015
6								
7	Configuration report:							
8	Completed at 2024-04-30 12:03:05							
9	By user HuY							
10	EViews database: pre23.edb							
11	Selected variables: outgapq lhurzq ut ngdpzq							
12	Starting year and quarter: 2007Q2							
13	Output file: I:\fiscal model\Fiscal indicators (CAB and TFI)\Inputs\Econ data\2023_PREFU_finals_econ.csv							



Location in Data Matrix



Demo 2: Update the Fiscal Indicators





Demo 2: Output

AutoSave Off 📄 ↶ ↷ 🔍 2023_PREFU_finals_Fiscal_Indicators... Saved to this PC 🔍 Search

FileHomeInsertDrawPage LayoutFormulasDataReviewViewAutomateDeveloper

A1✖✓*f_x*type

	A	B	C	D	E	F
52	TFI	Net Capital Cash Flows		-4502	-4112	-4554
53	TFI	Residual Cash Surplus / (Deficit)		7223	7294.691	-2459
54	TFI	Total Adjustments		555	391	329
55	TFI	Income-Related Benefits ex. Superannuation		8012	8482	9036
56						
57	Reference report:					
58	Completed at 2024-04-30 12:10:43					
59	By user HuY					
60						
61	Economic data:					
62	I:\fiscal model\Fiscal indicators (CAB and TFI)					
63	Historical structural one-off data:					
64	I:\fiscal model\Fiscal indicators (CAB and TFI)					
65	Historical CAB data:					
66	I:\fiscal model\Fiscal indicators (CAB and TFI)					
67	Historical TFI data:					
68	I:\fiscal model\Fiscal indicators (CAB and TFI)					
69	Structural one-off data:					
70	I:\fiscal model\Fiscal indicators (CAB and TFI)					
71	CAB and TFI data:					
72	I:\fiscal model\Fiscal indicators (CAB and TFI)					
73	-----					
74	Technical manual:					
75	I:\fiscal model\Fiscal indicators (CAB and TFI)					
76						
77	Repository of the updatefi project:					
78	https://dev.azure.com/nztreasury/Modeling					
79						

DataCABTFI

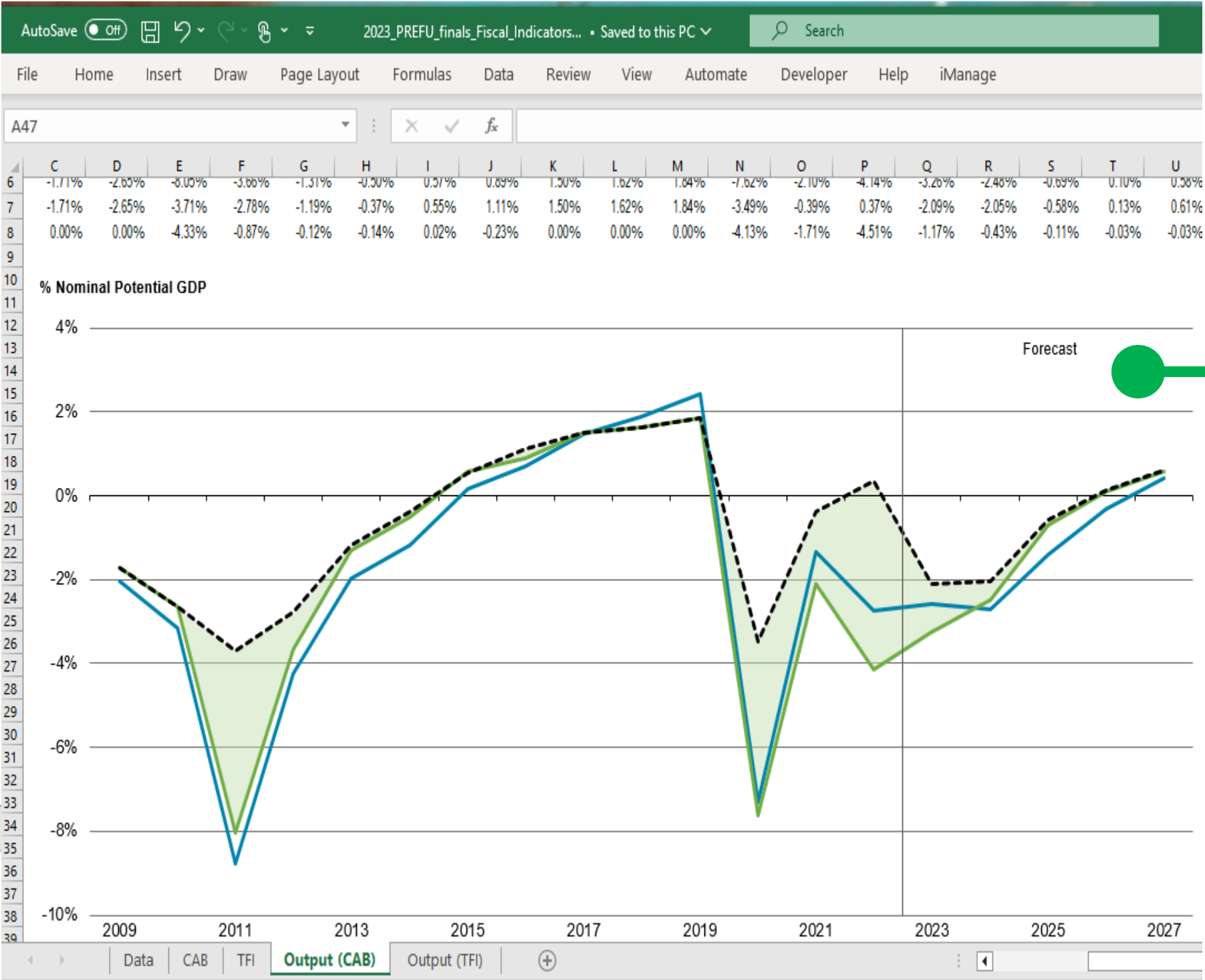
AutoSave Off 📄 ↶ ↷ 🔍 2023_PREFU_finals_Fiscal_Indicators... Saved to this PC 🔍 Search

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Elasticity_Individual_Income_Tax✖✓*f_x*1.02

	A	B	C	D	E	F	G
1				Year (Year ending 30 June, \$ million)			
2	Type	Variable	Elasticity	2007	2008	2009	2010
54							
55	Operating Balance (cyclically adjusted)	OBEGAL					
56	Operating Balance (cyclically adjusted)	OBEGAL - cyclically adjusted					
57	Structural Balance	Structural Balance					
58							
59	Output for Fiscal Reporting	OBEGAL (% Nominal Potential GDP)					
60	Output for Fiscal Reporting	Cyclically-adjusted balance (% Nominal Potential GDP)					
61	Output for Fiscal Reporting	Structural Balance (% Nominal Potential GDP)					
62	Output for Fiscal Reporting	One-off adjustments (% Nominal Potential GDP)					
63							
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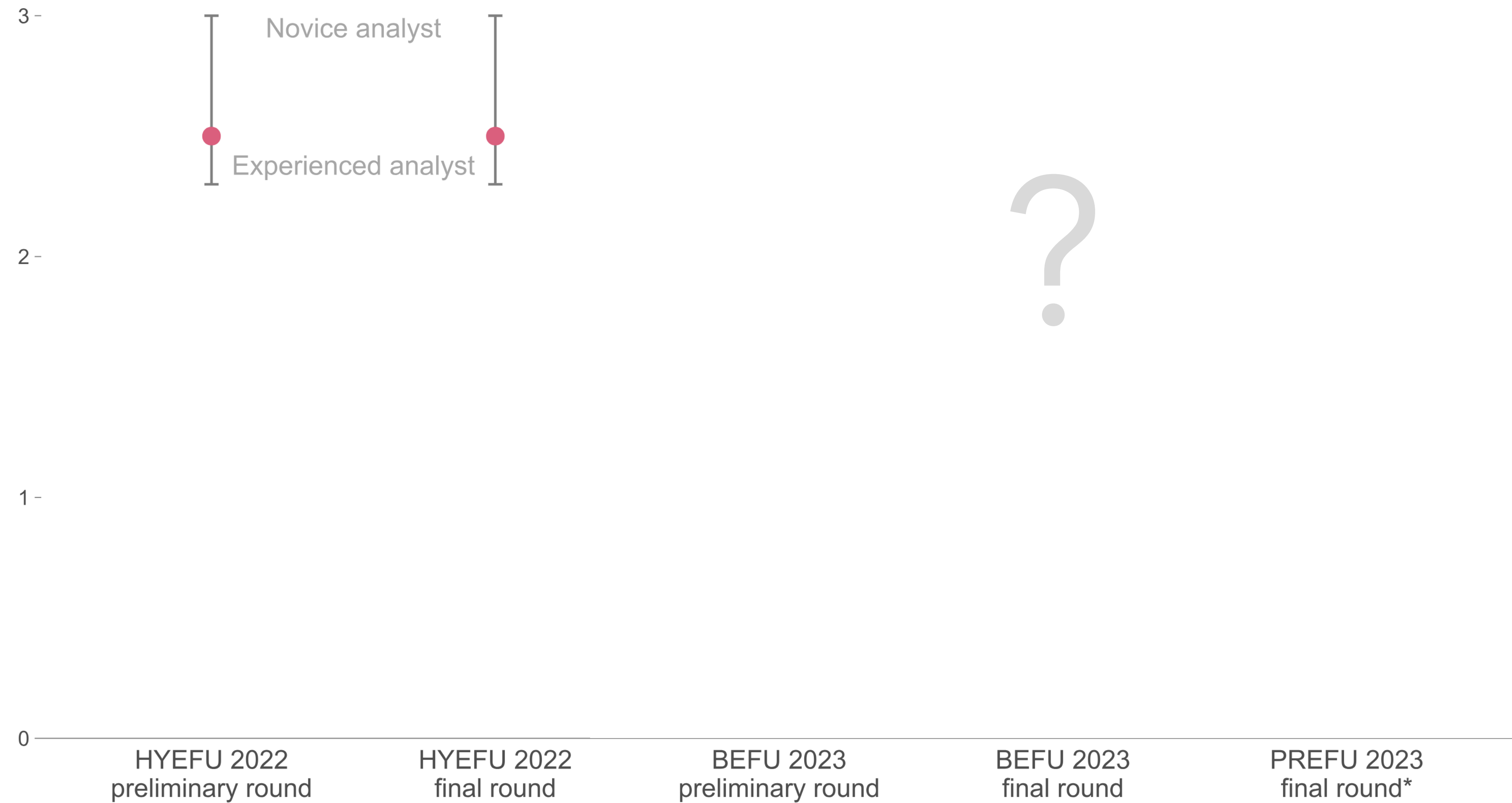
DataCABTFIOutput (CAB)Output (TFI)





✓ Efficiency Boost

Time spent (in working days)



* PREFU only has one final update round.



✓ Transparency

✓ No Arguments: Use smart Graphical User Interface (GUI) to guide users

R 4.3.2 · C:/Users/HuY/Downloads/my_R_space/updatefi_repo/

> get_fiscal-fi()
✓ Confirm workbook exists
✓ Select input workbook
✓ Cartesian coordinates established
✓ Workbook data imported

Prepare CAB variables:
✓ 'Sole Parent Support' ready
✓ Standard CAB variables ready
✓ 'All other transfer payments and

Prepare TFI variables:
✓ 'Matariki adjustments' ready
✓ Standard TFI variables ready
✓ Signs of TFI variables aligned

Assemble & export variables:
✓ Output variables bound
✓ Output .csv prepared
✓ Input data written
✓ Configuration report added
✓ Workflow completed

Configuration report:
Completed at 2024-04-23 09:24:35
By user HuY
FR file: I:\fiscal model\Fiscal in
Output file: I:\fiscal model\Fisca

AutoSave ☐ Off 2023_prefu_prelims_f... • Saved to this PC

File Home Insert Draw Page Layout Formulas Data Review View Automate De

A1 type

	A	B	C	D	E	F	G	H	I	J	
43	TFI		Deposit Gu	0	0	0	0	0	0	Fiscal Data	F
44	TFI		Kiwisaver (964	997	1057	1115	1162	1210	Fiscal Data	F
45	TFI		Net Studen	-310	-363	-290	-223	-224	-258	Fiscal Data	F
46	TFI		Net EQC an	354	330	531	322	171	202	Fiscal Data	F
47	TFI		Fiscal Balar	-12354	-8671	-17244	-12995	-3630	-368	Fiscal Data	F
48	TFI		Matariki ac	0	0	4950	-4950	0	0		
49											
50	Configuration report:										
51	Completed at 2024-04-23 09:24:35										
52	By user HuY										
53	FR file: I:\fiscal model\Fiscal indicators (CAB and TFI)\Inputs\Fiscal data from FR\PREFU 23 prelims.xlsx										
54	Output file: I:\fiscal model\Fiscal indicators (CAB and TFI)\Inputs\Fiscal data processed\2023_prefu_prelims_fr.csv										

- ✓ When?
- ✓ Who?
- ✓ What?
- ✓ Where?

✓ Same metadata in each file



✓ Fully Referenced (PDF inputs)

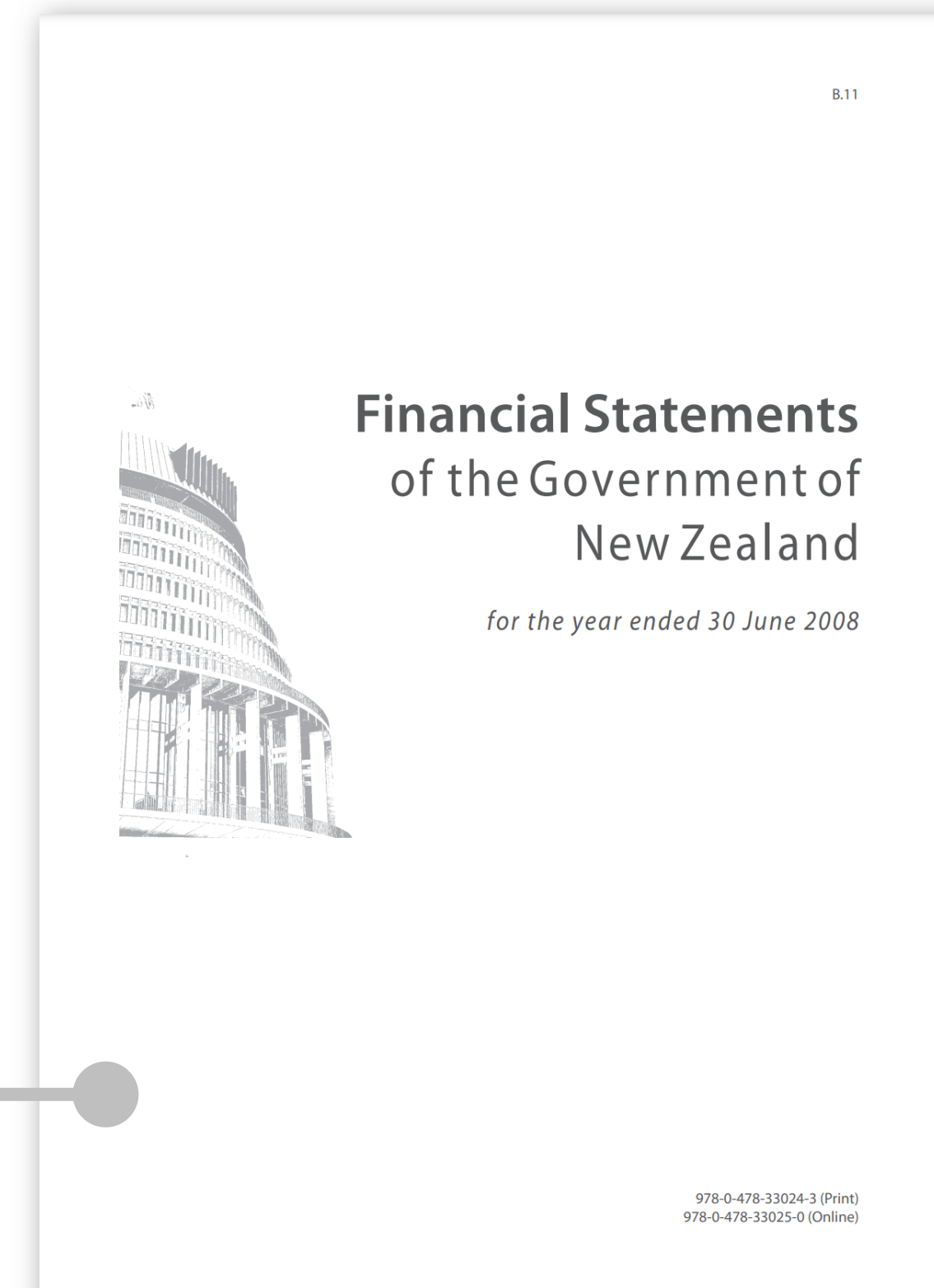
type	group	variable	2007
CAB	Revenue	Individual Income Tax	24808
CAB	Revenue	Corporate Tax	9891
CAB	Revenue	Withholding/Other Direct Tax	2318

(a) Excel Model workbook

fsg_report	data_year	value_m	pdf_page	key
2008	2007	24808	50	Total individuals
2009	2008	27468	56	Total individuals
2010	2009	25859	55	Total individuals

(b) .csv database

Financial Statements of the Government of New Zealand for the Year Ended 30 June 2008 - 6 October 2008				
Forecast				
Original Budget \$m	Estimated Actuals \$m			
		Direct Income Tax Revenue		
		Individuals		
22,334	22,735	Source deductions		
4,553	4,986	Other persons		
(1,102)	(1,290)	Refunds		
474	521	Fringe benefit tax		
26,259	26,952	Total individuals		



(c) Original PDF



✓ Fully Referenced (Excel inputs)

type	group	variable	2022
CAB	Revenue	Individual Income Tax	52513
CAB	Revenue	Corporate Tax	19896
CAB	Revenue	Withholding/Other Direct Tax	1950

(a) Excel Model workbook

type	variable	2022	sheet	name_range	data_range
CAB	Individual Income Tax	52513	Fiscal Data - new CAB	F8	I8:N8
CAB	Corporate Tax	19896	Fiscal Data - new CAB	F9	I9:N9
CAB	Withholding/Other D	1950	Fiscal Data - new CAB	F10	I10:N10

(b) .csv database

	F	I
4	June years (\$ million)	2022
5	Revenue	
7	Taxation Revenue	
8	Individual Income Tax	52,513.00
9	Corporate Tax	19,896.00
10	Withholding/Other Direct Tax	1,950.00
11	GST	26,124.00
12	Other Indirect Tax	7,390.00
13	Total Taxation Revenue	107,873.00
14		

(c) Excel input file



✓ Documentation

A comprehensive Quarto document for the package:

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[Introduction](#)

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[Installation](#)

[Usage](#)

[Maintenance](#)




</> Code ▼

Technical Manual of the R package ‘updatefi’¹

Automate the workflow of updating the fiscal indicators

AUTHOR

Yang Hu 

TEAM

Modelling and Research

LAST UPDATED

April 24, 2024

Introduction

“Calculate the [preliminary] indicators takes about 2 days, ...the final indicators takes another 2-3 days. QAing the results needs additional few days on top.”

“We have tried to make the process straightforward, but there are often unforeseen obstacles that slow the process down [given the tight time frame].”

— *Excerpts from the instruction in the past*

The development of the `updatefi`² package³ was not started with lofty goals but as a pragmatic attempt to address the conflict between the tight time frame and the stress analysts bear during the updating phase.

`updatefi` consists of a set of functions that automate the workflow of updating the fiscal indicators under the supervision of analysts. The outputs generated are fully referenced and reproducible, which has led to an increase in the transparency of the updating process.

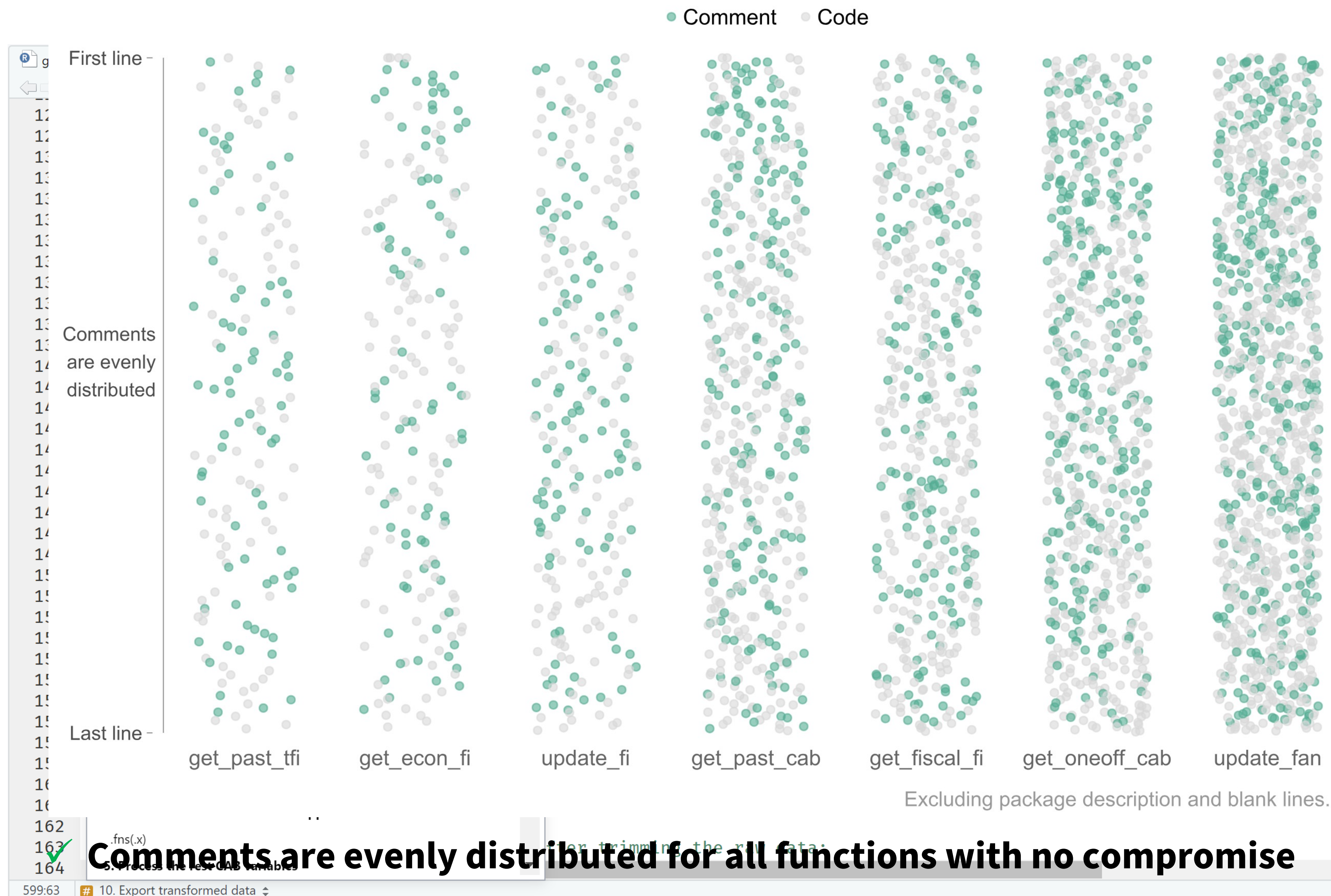


Hex sticker⁴ of

`updatefi`



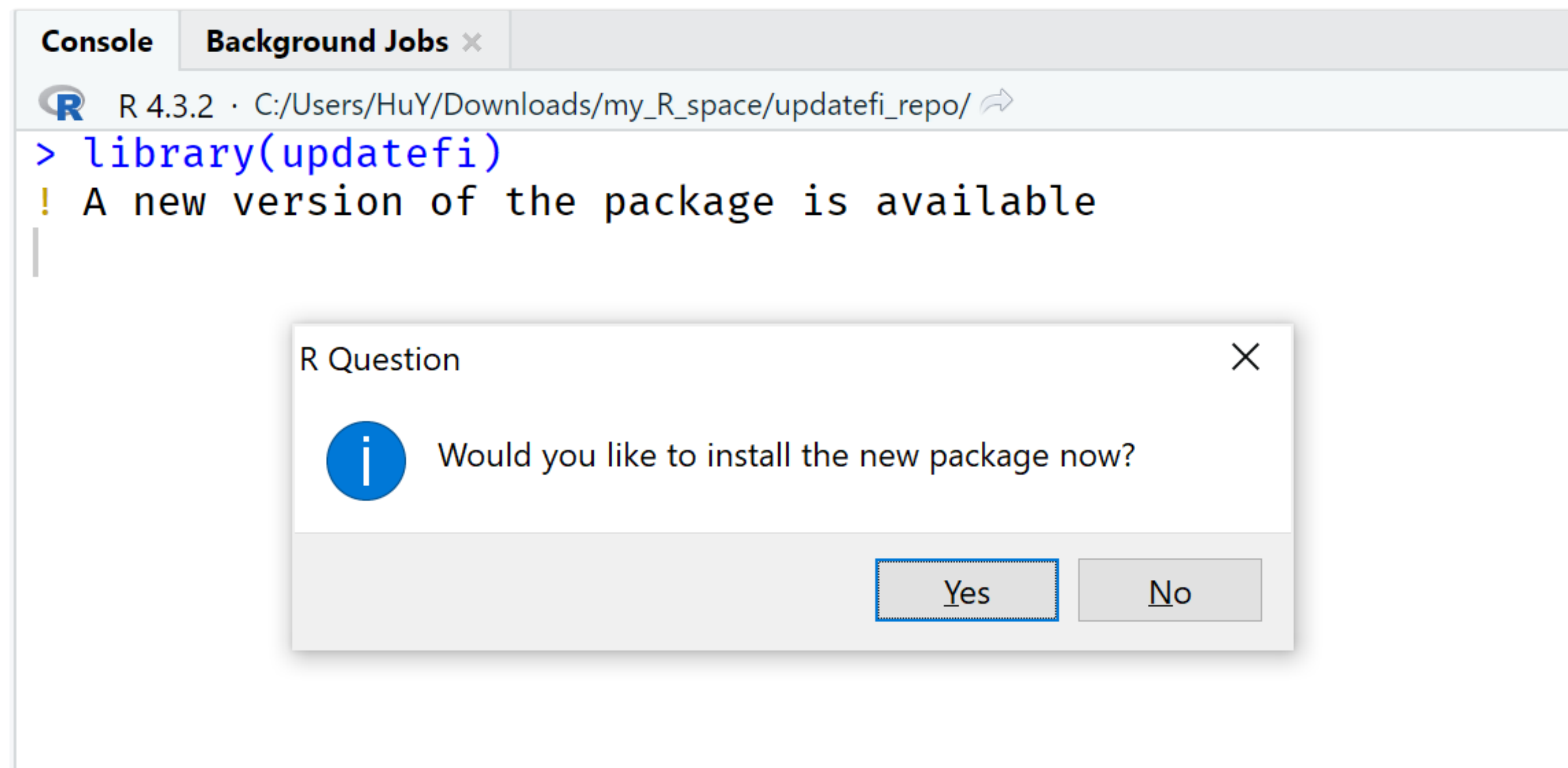
Inline Documentation



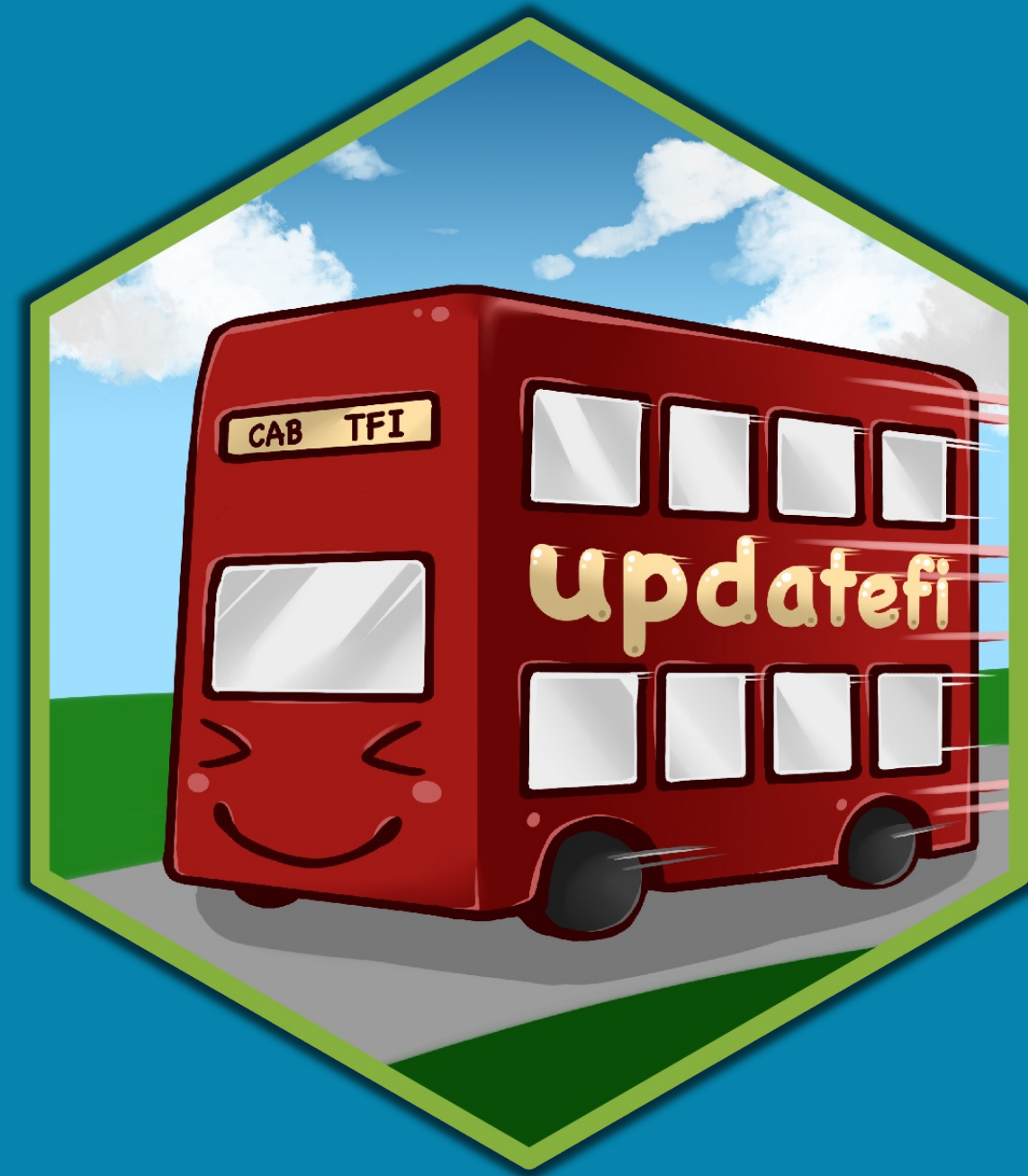


✓ Source Package

- **Internal Use:**
Inappropriate to upload it to CRAN
- **Rapid Iteration:**
Must use the latest version
- **When a newer version is available, user will receive a reminder after loading the package:**



- **The update can be installed to ensure the most recent features will be used in action.**



Illustrated by **Lara Swinley**



TE TAI ŌHANGA
THE TREASURY

 **RExchange**²⁰²⁴

The R community event