

DGE–CRED Practical Session 1: Model comparison

Andrej Drygalla, Katja Heinisch and Christoph Schult* | October 2022
Halle Institute for Economic Research



On behalf of:



of the Federal Republic of Germany

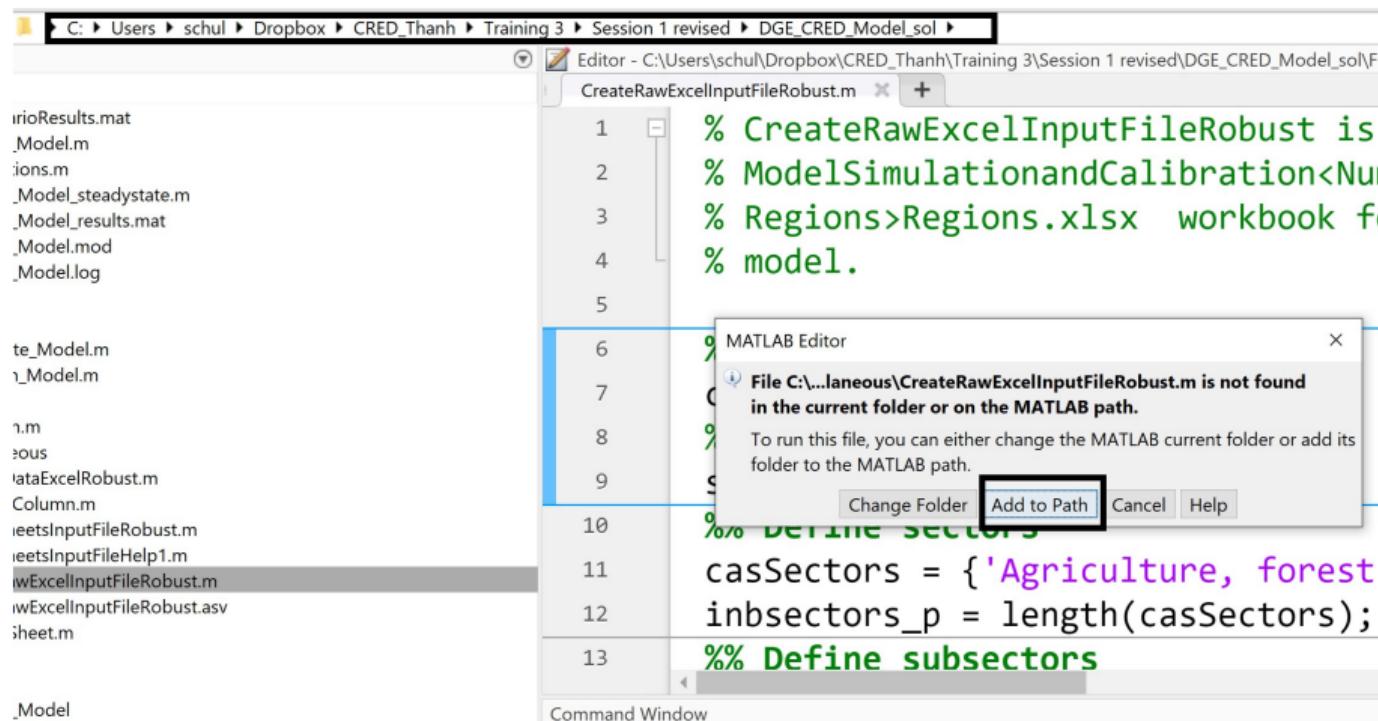
Task 1: Create the ModelSimulationandCalibration3Sectorsand1Region.xlsx File

- Use the CreateRawExcelInputFileRobust.m in the function folder under Miscellaneous
- Sectors and subsectors are: Agriculture, forestry and fishing; Industry; Services
- Region: Vietnam
- Climate variables regional: surface temperature (tas)
- Climate variables national: sea level (SL)

Task 1: Solution

```
CreateRawExcelInputFileRobust.m +  
8 % define working directory path  
9 sPathWD = pwd();  
10 % Define sectors  
11 casSectors = {'Agriculture, forestry and fishing'; 'Industry'; 'Services'};  
12 inbsectors_p = length(casSectors);  
13 % Define subsectors  
14 casSubSectors = {'Agriculture, forestry and fishing'; 'Industry'; 'Services'};  
15 inbsubsectors_p = length(casSubSectors);  
16 % Define regions  
17 casRegions = {'Vietnam'};  
18 inbregions_p = length(casRegions);  
19  
20 % Define regional climate variables  
21 casClimateVarsRegionalName = {'surface temperature (Celsius)'};  
22 casClimateVarsRegional = {'tas'};  
23  
24 % Define national climate variables  
25 casClimateVarsNationalName = {'Sea level'};  
26 casClimateVarsNational = {'SL'};  
27 casClimateVars = [casClimateVarsRegional casClimateVarsNational];  
28
```

Task 1: Make sure you run the script in the right directory and use addpath



Task 2: Calibrate the value-added shares of the model

- Use the Vietnam IO Table.xlsx to compute value-added shares for different sectors in Vietnam.
- For agriculture, forestry and fishery, use the value added stated in the IO Table row 57 for agriculture, forestry plus fishing and aquaculture.
- For industry, use all sectors from Mining and Quarrying (column E) to Construction (column AA)
- For services, use all sectors after construction (column AB) to the last column with value added (column AU).
- Check whether the sum is equal to one.

Task 2: Agriculture, forestry and fishery

=SUM([VietnamIOTable.xlsx]Sheet1!\$C\$57:\$D\$57)/SUM([VietnamIOTable.xlsx]Sheet1!\$C\$57:\$AU\$57)			
B	C	D	
Region	Initial Value Added Shares (phiY0)	Initial Employment Shares (phiN0)	Labour
Vietnam	0.158321065	enter value here	enter va
Vietnam	0.422561374	enter value here	enter va
Vietnam	0.419117561	enter value here	enter va

A
TTL_61: Telecommunications
TTL_62T63: IT and other information services
TTL_64T66: Financial and insurance activities
TTL_68: Real estate activities
TTL_69T75: Professional, scientific and technical services
TTL_77T82: Administrative and support services
TTL_84: Public administration and defence; compulsory social security
TTL_85: Education
TTL_86T88: Human health and social work and welfare activities
TTL_90T93: Arts, entertainment and recreation; hotels and restaurants
TTL_94T96: Other service activities
TTL_97T98: Activities of households as employers and services-producing activities of households for own use
TXS_IMP_FNL: Taxes less subsidies on imports (paid in foreign countries)
TXS_INT_FNL: Taxes less subsidies on intermediate consumption (paid in domestic agencies, includes duty on imports)
TTL_INT_FNL: Total intermediate consumption
VALU: Value added at basic prices
OUTPUT: Output at basic prices

Task 2: Industry and construction

The screenshot shows two Microsoft Excel windows side-by-side.

Left Window (ModelSimulation...):

- Formula Bar:** =SUM([VietnamIOTable.xlsx]Sheet1!\$E\$57:\$AA\$57)/SUM([VietnamIOTable.xlsx]Sheet1!\$C\$57:\$AU\$57)
- Table Data:**

Sector	Region	Initial Value Added Shares (phiY0)	Initial Employment Shares (phiN0)	Labour
Agriculture, forestry and fishing	Vietnam	0.158321065	enter value here	enter vi
Industry	Vietnam	0.476624471	enter value here	enter vi
Services	Vietnam	0.365054464	enter value here	enter vi

Right Window (VietnamIOTable):

- Cell Z58:** 2306.8
- List of Industry Codes and Descriptions:**

 - TTL_61: Telecommunications
 - TTL_62T63: IT and other information services
 - TTL_64T66: Financial and insurance activities
 - TTL_68: Real estate activities
 - TTL_69T75: Professional, scientific and technical activities
 - TTL_77T82: Administrative and support services
 - TTL_84: Public administration and defence; compulsory social security
 - TTL_85: Education
 - TTL_86T88: Human health and social work activities
 - TTL_90T93: Arts, entertainment and recreation
 - TTL_94T96: Other service activities
 - TTL_97T98: Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
 - TXS_IMP_FNL: Taxes less subsidies on intermediate and final products (paid in foreign countries)
 - TXS_INT_FNL: Taxes less subsidies on intermediate and final products (paid in domestic agencies, includes duty on imported products)
 - TTL_INT_FNL: Total intermediate consumption at purchasers' prices
 - VALU: Value added at basic prices
 - OUTPUT: Output at basic prices

Task 2: Services

The screenshot shows two Microsoft Excel windows side-by-side.

Left Window (ModelSimulation...):

- Formula Bar:** =SUM([VietnamIOTable.xlsx]Sheet1!\$AB\$57:\$AU\$57)/SUM([VietnamIOTable.xlsx]Sheet1!\$C\$57:\$AU\$57)
- Table Data:**

A	B	C	D
Sector	Region	Initial Value Added Shares (phiY0)	Initial Employment Shares (phiN0)
Agriculture, forestry and fishing	Vietnam	0.158321065	enter value here
Industry	Vietnam	0.476624471	enter value here
Services	Vietnam	0.365054464	enter value here

Right Window (VietnamIOTable.xlsx):

- Table Data:**

TTL_61: Telecommunications
TTL_62T63: IT and other information se
TTL_64T66: Financial and insurance act
TTL_68: Real estate activities
TTL_69T75: Professional, scientific and
TTL_77T82: Administrative and support
TTL_84: Public administration and defense
TTL_85: Education
TTL_86T88: Human health and social w
TTL_90T93: Arts, entertainment and re
TTL_94T96: Other service activities
TTL_97T98: Activities of households as
and services-producing activities of house
TXS_IMP_FNL: Taxes less subsidies on
(paid in foreign countries)
TXS_INT_FNL: Taxes less subsidies on
(paid in domestic agencies, includes dut
TTL_INT_FNL: Total intermediate consu
VALU: Value added at basic prices
OUTPUT: Output at basic prices

Task 3: Calibrate the employment shares

- Use the Employment.xlsx file to compute employment shares for different sectors in Vietnam.
- For industry, use all sectors from Mining and Quarrying to Construction
- For services, use the remaining ones.
- Check whether the sum is one.

Task 3: Agriculture, forestry and fishery

The image shows two Microsoft Excel windows side-by-side.

Left Window (Employment.xlsx):

- Sheet: Task 3: Agriculture, forestry and fishery
- Cell A1: SUM
- Cell A2: =[Employment.xlsx]Sheet1!\$B\$2
- Table Data:

Region	Initial Value Added Shares (phiY0)	Initial Employment Shares (phiN0)	Labour
Vietnam	0.158321065	\$3/[Employment.xlsx]Sheet1!\$B\$2	enter value
Vietnam	0.476624471	enter value here	enter value
Vietnam	0.365054464	enter value here	enter value

Right Window (Task 3: Agriculture, forestry and fishery):

- Sheet: Task 3: Agriculture, forestry and fishery
- Column A: List of economic activities:

 - 1 Economic activity
 - 2 TOTAL
 - 3 Agriculture, forestry and fishing
 - 4 Mining and quarrying
 - 5 Manufacturing
 - 6 Electricity, gas, steam and air conditioning supply
 - Water supply, sewerage, waste management and remediation activities
 - 7 Construction
 - Wholesale and retail trade; repair of motor vehicles and motorcycles
 - 9 Transportation and storage
 - 10 Accommodation and food service activities
 - 11 Information and communication
 - 12 Financial, banking and insurance activities
 - 13 Real estate activities
 - 14 Professional, scientific and technical activities
 - 15 Administrative and support service activities

Task 3: Industry

The screenshot shows a Microsoft Excel interface with two tables and a formula bar.

Formula Bar:

```
=SUM([Employment.xlsx]Sheet1!$B$4:$B$8)/  
[Employment.xlsx]Sheet1!$B$2
```

Table 1 (Left):

	B	C	D	Labour
hing	Region	Initial Value Added Shares (ϕ_{V0})	Initial Employment Shares (ϕ_{N0})	
	Vietnam	0.158321065	0.376176484	
	Vietnam	0.476624471	0.272378759	
	Vietnam	0.365054464	0.351444757	

Table 2 (Right):

B	Total (Thous. pers.) 2018
1	5428250
2	2041980
3	19870
4	999980
5	16710
6	
7	14660
8	427320
9	728560
10	176380

Task 3: Services

The screenshot shows a Microsoft Excel interface. The formula bar at the top contains the formula: `=SUM([Employment.xlsx]Sheet1!B9:B23)/[Employment.xlsx]Sheet1!B2`. The cell E7 is selected, showing the value 1. To the right of the formula bar is a vertical scroll bar with a blue circular trackball icon. Below the scroll bar is a table with three columns: Region, Initial Value Added Shares (phiY0), and Initial Employment Shares (phiNO). The table has three rows, all labeled 'Vietnam'. The last row (row 3) is highlighted with a green border. To the right of the table is a column of numbers labeled 'Total (Thous. pers.) 2018'.

B	C	D	
Region	Initial Value Added Shares (phiY0)	Initial Employment Shares (phiNO)	Labour
Vietnam	0.158321065	0.376176484	
Vietnam	0.476624471	0.272378759	
Vietnam	0.365054464	0.351444757	

Total (Thous. pers.) 2018

1	5428250
2	2041980
3	19870
4	999980
5	16710
6	
7	14660
8	427320
9	728560
10	176380
11	270510
12	30760

Task 4: Calibrate labour cost shares

- Use the LabourShare.xlsx file to calibrate labour costs relative to value-added.
- For agriculture, forestry and fishery, use row 10.
- For industry use row 74 and row 44 and weight them with the value added share of each sector.
- For services, use row 75.
- Divide the values by 100.

Task 4: Agriculture, forestry and fishery

= '[LabourShare.xlsx.xls]OECD.Stat export'!\$H\$10/100				H10
(phiN0)	Labour Cost Shares (phiW)	Sector	export share (phiX)	imp
0.176484	0.6575	Agriculture, forestry and fishing	enter value here	enter
0.378759	0.509357682	Industry	enter value here	enter
0.444757	0.509357682	Services	enter value here	enter

Task 4: Industry

= [VietnamIOTable.xlsx]Sheet1!\$AA\$57/SUM([VietnamIOTable.xlsx]Sheet1!\$E\$57:\$AA\$57)*'[LabourShare.xlsx.xls]OECD.Stat export'!\$H\$44/100+(1-[VietnamIOTable.xlsx]Sheet1!\$AA\$57/SUM([VietnamIOTable.xlsx]Sheet1!\$E\$57:\$AA\$57))*'[LabourShare.xlsx.xls]OECD.Stat export'!\$H\$74/100				
E	F	G	H	I
phiN0) Labour Cost Shares (phiW)	Sector	export share (phiX)	import share (phiI)	
76484	0.6575 Agriculture, forestry and fishing	enter value here	enter value here	
78759	0.509357682 Industry	enter value here	enter value here	
44757	0.509357682 Services	enter value here	enter value here	

Task 4: Services

:[= [VietnamIOTable.xlsx]Sheet1!\$AA\$57/SUM(
[VietnamIOTable.xlsx]Sheet1!\$E\$57:\$AA\$57)*
'[LabourShare.xlsx.xls]OECD.Stat export'!\$H\$44/100+(1-
[VietnamIOTable.xlsx]Sheet1!\$AA\$57/SUM(
[VietnamIOTable.xlsx]Sheet1!\$E\$57:\$AA\$57))*
'[LabourShare.xlsx.xls]OECD.Stat export'!\$H\$74/100

E	F	G	H
phiN0)	Labour Cost Shares (phiW)	Sector	export share (phiX)
L76484	0.6575	Agriculture, forestry and fishing	enter value here
\$78759	0.509357682	Industry	enter value here
I44757	0.509357682	Services	enter value here

H10 : X ✓ fx

D

2

3

4

5

6

7

8

9

10

11 restry

12

13

14 energy producing produc

15 non-energy producing pr

16 vities

ata Start Structural Parameters ... + < > OECD.Stat export

Task 5: Calibrate export shares

- Use the Vietnam IO Table.xlsx to compute export shares relative to the output of the respective sectors.
- Divide the individual cells in column BC by cells in row 58.
- Use the same sectoral classification as in task 1.

Task 5: Agriculture, forestry and fishery

```
=SUM([VietnamIOTable.xlsx]Sheet1!$BC$9:$BC$10)/SUM([VietnamIOTable.xlsx]Sheet1!$C$58:$D$58)
```

	G	H	I	
ing	export share (phiX) 0.130530763	import share (phiM) enter value here	intermediate products (phiQI) enter value here	subsectors for enter value he
	enter value here	enter value here	enter value here	enter value he
	enter value here	enter value here	enter value here	enter value he

	F	G	H
0	205.100	76.900	316.700
0	1.700	8.400	34.500
0	3.000	0.100	38.300
0	3.500	4.700	3.800
0	0.400	0.000	6.300
0	0.100	0.200	1.800
0	1.100	0.100	6.600
0	0.000	0.000	0.000
0	0.000	0.000	0.000
0	31.900	5.700	738.200
0	1,777.100	243.000	86,275.300
0	971.200	226.100	10,804.700

Task 5: Industry

```
=SUM([VietnamIOTable.xlsx]Sheet1!$BC$11:$BC$33)/SUM( [VietnamIOTable.xlsx]Sheet1!$E$58:$AA$58)
```

G	H	I	J
export share (phiX)	import share (phiM)	intermediate products (phiQI)	subsectors for
0.130530763	enter value here	enter value here	enter value he
0.39929387	enter value here	enter value here	enter value he
enter value here	enter value here	enter value here	enter value he

Q	R	S	T
4.200	17.600	5.400	1.
58.800	163.400	139.700	8
12.400	34.100	25.600	3
2.700	41.600	13.100	
1.000	10.600	11.200	
1.700	3.300	2.400	
0.300	0.600	1.200	
4.500	10.100	27.200	1
0.000	0.000	0.000	
0.000	0.000	0.000	
185.400	180.100	1,155.700	25
16,780.800	16,577.800	24,693.600	16,00
3,037.500	3,266.000	4,885.100	4.97

Task 5: Services

G H I J K L M N O P Q R S T							
shing	export share (phiX)	import share (phiM)	intermediate products (phiQI)	subsectors for	Q	R	S
	0.130530763	enter value here	enter value here	enter value he	4.200	17.600	
	0.39929387	enter value here	enter value here	enter value he	58.800	163.400	13
	0.132592629	enter value here	enter value here	enter value he	12.400	34.100	2
					2.700	41.600	1
					1.000	10.600	1
					1.700	3.300	
					0.300	0.600	
					4.500	10.100	2
					0.000	0.000	
					0.000	0.000	
					185.400	180.100	1,15
					16,780.800	16,577.800	24,6%
					3,037.500	3,266.000	4,8%
					19,818.300	19,843.800	29,57

Task 6: Calibrate import shares

- Use the Vietnam IO Table.xlsx to compute import shares relative to total imports for each sector.
- Use the values in column BD.
- Use the same sectoral classification as in task 1.

Task 6: Agriculture, forestry and fishery

=SUM([VietnamIOTable.xlsx]Sheet1!\$BD\$9:\$BD\$10)/SUM([VietnamIOTable.xlsx]Sheet1!\$BD\$9:\$BD\$53)

	G	H	I	J
share (phiX)	export share (phiX)	import share (phiM)	intermediate products (phiQI)	subsectors for
ning	0.130530763	0.045583395	enter value here	enter value he
	0.39929387	enter value here	enter value here	enter value he
	0.132592629	enter value here	enter value here	enter value he

AT	AU	AV	A'
53.500	0.000	9,096.800	
44.000	0.000	2,602.200	
3.400	0.000	623.400	
7.900	0.000	575.100	
5.000	0.000	8,478.400	11
1.800	0.000	5,149.600	17
12.200	0.000	2,804.300	5
19.300	0.000	2,096.700	27
0.000	0.000	250.300	
0.000	0.000	0.000	
113.700	0.000	7,206.000	1
1,964.800	0.000	161,520.300	82
1,349.100	250.300	0.000	

Task 6: Industry and construction

=SUM([VietnamIOTable.xlsx]Sheet1!\$BD\$11:\$BD\$33)/SUM([VietnamIOTable.xlsx]Sheet1!\$BD\$9:\$BD\$53)

	G	H	I	J
	export share (phiX)	import share (phiM)	intermediate products (phiQI)	subsectors for
ing	0.130530763	0.045583395	enter value here	enter value here
	0.39929387	0.775479703	enter value here	enter value here
	0.132592629	enter value here	enter value here	enter value here

AT	AU	AV
53.500	0.000	9,096.800
44.000	0.000	2,602.200
3.400	0.000	623.400
7.900	0.000	575.100
5.000	0.000	8,478.400
1.800	0.000	5,149.600
12.200	0.000	2,804.300
19.300	0.000	2,096.700
0.000	0.000	250.300
0.000	0.000	0.000
113.700	0.000	7,206.000

Task 6: Services

```
=SUM([VietnamIOTable.xlsx]Sheet1!$BD$34:$BD$53)/SUM(  
[VietnamIOTable.xlsx]Sheet1!$BD$9:$BD$53)
```

	G	H	I	
ing	export share (phiX)	import share (phiM)	intermediate products (phiQI)	subsectors for
	0.130530763	0.045583395	enter value here	enter value he
	0.39929387	0.775479703	enter value here	enter value he
	0.132592629	0.178936902	enter value here	enter value he

AT	AU	AV
53.500	0.000	9,096.800
44.000	0.000	2,602.200
3.400	0.000	623.400
7.900	0.000	575.100
5.000	0.000	8,478.400
1.800	0.000	5,149.600
12.200	0.000	2,804.300
19.300	0.000	2,096.700
0.000	0.000	250.300
0.000	0.000	0.000
113.700	0.000	7,206.000
1,964.800	0.000	161,520.300
1,349.100	250.300	0.000
3,313.900	250.300	0.000

Task 7: Calibrate intermediate input shares.

- Use the Vietnam IO Table.xlsx to compute intermediate input shares relative to the total output of each sector.
- Use the values in rows 56 and 58.
- Use the same sectoral classification as in task 1.

Task 7: Agriculture, forestry and fishery

=SUM([VietnamIOTable.xlsx]Sheet1!\$C\$56:\$D\$56)/SUM([VietnamIOTable.xlsx]Sheet1!\$C\$58:\$D\$58)

mediate products (phiQI)	subsectors for adaptation measures (iGA)	subsectors for private ad
0.658532569	enter value here	enter value here
0.791687203	enter value here	enter value here
0.554970574	enter value here	enter value here

Q	R	S
4.200	17.600	5.
58.800	163.400	139.
12.400	34.100	25.
2.700	41.600	13.
1.000	10.600	11.
1.700	3.300	2.
0.300	0.600	1.
4.500	10.100	27.
0.000	0.000	0.
0.000	0.000	0.
185.400	180.100	1,155.
16.780.800	16.577.800	24.693.

Task 7: Industry and construction

=SUM([VietnamIOTable.xlsx]Sheet1!\$E\$56:\$AA\$56)/SUM([VietnamIOTable.xlsx]Sheet1!\$E\$58:\$AA\$58)

I	J	K
Intermediate products (phiQI)	subsectors for adaptation measures (iGA)	subsectors for private ad-
0.658532569	enter value here	enter value here
0.791687203	enter value here	enter value here
0.554970574	enter value here	enter value here

Q	R	S
4.200	17.600	5.4
58.800	163.400	139.7
12.400	34.100	25.6
2.700	41.600	13.1
1.000	10.600	11.2
1.700	3.300	2.4
0.300	0.600	1.2
4.500	10.100	27.2
0.000	0.000	0.0
0.000	0.000	0.0
185.400	180.100	1,155.7

Task 7: Services

The screenshot shows a Microsoft Excel interface with the following details:

- Formula Bar:** Displays the formula `=SUM([VietnamIOTable.xlsx]Sheet1!AB56:AU56)/SUM([VietnamIOTable.xlsx]Sheet1!AB58:AU58)`.
- Table Data:** A table with columns I, J, and K. Row 1 contains column headers: "Intermediate products (phiQI)", "subsectors for adaptation measures (iGA)", and "subsectors for private ad". Rows 2, 3, and 4 contain numerical values: 0.658532569, 0.791687203, and 0.554970574 respectively, followed by the placeholder text "enter value here".
- Sidebar:** On the right side, there is a vertical pane labeled "D" at the top. It lists several items:
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7
 - 8
 - 9
 - 10
 - 11 restry
 - 12
 - 13
 - 14 energy producing produ
 - 15 non-energy producing p
 - 16 vities
- Bottom Navigation:** Shows tabs for "ata", "Start", "Structural Parameters", and "OECD.Stat export".
- Page Number:** "p.27" is visible in the bottom left corner.

Task 8: Calibrate initial population, GDP, import share, housing to population ratio and investments in residential buildings.

- Set initial population to $\frac{97340000}{100000000}$.
- Initial GDP is 1.
- Import share is the absolute value of the sum of the range BD9 to BD55 in VietnamIOTable.xlsx.
- Housing to population ratio is 23.
- Investments in residential buildings is 0.01.

Task 8: Solution

P	Q	R	F	G	H	I
ation (PoP)	Value 0.9734		1.200	0.300	14.100	41.500
added (Y0)	1		205.100	76.900	316.700	122.000
e (phiM)	0.299574569		1.700	8.400	34.500	144.500
population ratio (H0)	23		3.000	0.100	38.300	53.000
s in residential building relative to GDP (sH)	0.01		3.500	4.700	3.800	8.800
or adaptation measures in the housing sector (iGAH)	enter value here		0.400	0.000	6.300	19.900
or private adaptation measures in the housing sector (iIAPH)	enter value here		0.100	0.200	1.800	2.700
payment (N0)	enter value here		1.100	0.100	6.600	23.900
			0.000	0.000	0.000	0.000
			0.000	0.000	0.000	0.000
			31.900	5.700	738.200	1.439.600
			1.777.100	243.000	86.275.300	54.477.600
			971.200	226.100	10.804.700	16.671.500
			2.748.400	469.100	97.080.100	71.149.100

Task 9: Run UpdateDataExcelFileRobust.m

- Modify line with `inbsubsectors_p` and `inbregions_p` such that you have 3 sectors and 1 region.

Task 9: Solution

The screenshot shows a MATLAB Editor window with the title bar "Editor - C:\Users\schul\Dropbox\CRED_Thanh\Training 3\Session 1\DGECRED_Model_sol\Functions\Miscellaneous\UpdateDataExcelRobu". The menu bar includes "EDITOR", "PUBLISH", and "VIEW". The toolbar contains icons for "New", "Open", "Save", "Compare", "Print", "Go To", "Find", "Bookmark", "Refactor", "Profiler", "Analyze", "Run Section", "Section Break", "Run and Advance", and "Run to End". Below the toolbar, tabs for "CreateRawExcelInputFileRobust.m", "UpdateDataExcelRobust.m", "RunSimulations.m", "ComputeAggregates.m", and "DGE_CI" are visible. The main code area displays the following script:

```
% UpdateDataExcel is a Matlab script to update the
% ModelSimulationandCalibration<Number of Subsectors>Sector
% Regions>Regions.xlsx workbook for parameter and scenario
% model. It writes the information in the data sheet to the
% Structural parameters and Start.

%% User Input
clearvars;
% define working directory path
sPathWD = pwd();
% define number of total subsectors
inbsubsectors_p = 3;
% define number of regions
inbregions_p = 1;

%% Update the excel file
% define name of excel workbook for input of model
```

Task 10: Create the Baseline scenario for simulation.

- In the Baseline worksheet, define growth paths for value-added and employment for the different sectors.
- For agriculture, forestry and fishery use an annual growth rate of 2.8 per cent for value-added and -5.2 per cent for employment.
- For industry, use an annual growth rate of 7.4 percent for value-added and 5.7 percent for employment.
- For services use an annual growth rate of 8.3 percent for value-added and 2.7 percent for employment.
- Assume a factor of decay of 0.95.

Task 10: Solution

The screenshot shows a Microsoft Excel interface with the following details:

- Top Bar:** AutoSave Off, ModelSimulationandCalibration3Sectorsand1Regions • Saved.
- Home Tab:** Selected, showing the ribbon menu.
- Clipboard Group:** Undo, Paste, Format Painter.
- Font Group:** Calibri, 11pt, Bold, Italic, Underline.
- Font Size:** 11.
- Font Style:** A⁺, A⁻.
- Wrap Text:** Wrap.
- Alignment Group:** Horizontal, Vertical, Wrap, Merge.
- Formula Bar:** C3, =(1 + (C2-1)*0.95)
- Table:** A range from A1 to J8 containing numerical data.

	A	B	C	D	E	F	G	H	I	J
1	Time	exo_Pop	gY_1_1	gY_2_1	gY_3_1	gN_1_1	gN_2_1	gN_3_1		
2	2		0 1.028	1.074	1.083	0.948	1.057	1.027		
3	3		0 1.027	1.07	1.079	0.951	1.054	1.026		
4	4		0 1.025	1.067	1.075	0.953	1.051	1.024		
5	5		0 1.024	1.063	1.071	0.955	1.049	1.023		
6	6		0 1.023	1.06	1.068	0.958	1.046	1.022		
7	7		0 1.022	1.057	1.064	0.96	1.044	1.021		
8	8		0 1.021	1.054	1.061	0.962	1.042	1.02		

Task 11: Run the Baseline scenario.

- Open RunSimulation.m file in Matlab.
- Check whether you add the right dynare version.
- Check whether you have the correct number of sectors and subsectors specified (1,2,3).
- Check whether you have the correct number of regions specified (1).
- Run the script.

Task 11: Solution

The screenshot shows the MATLAB IDE interface. The menu bar includes EDITOR, PUBLISH, and VIEW. The toolbar has icons for Find, Refactor, Profiler, Analyze, Run, Run and Advance Section, Run to End, Run, Step, and Stop. The current file is 'RunSimulations.m' located at 'C:\Users\schul\Dropbox\CRED_Thanh\Training 3\Session 1\GDE_CRED_Model.sol\RunSimulations.m'. The code in the editor is as follows:

```
% RunSimulations is a Matlab script to run different scenarios stroed in
% ModelSimulationandCalibration>Number of Subsectors>Sectorsand<Number of
% Regions>Regions.xlsx  workbook. The GDE_CRED_Model.mod file is changed
% in the script.

addpath('C:\dynare\4.6.4\matlab')
%% Specify scenario names
casScenarioNames = {...,
    'Baseline',...
};

%% Define sector strucutre
sSubsecstart = '[1, 2, 3]';
sSubsecend = '[1, 2, 3]';

%% Define number of regions
sRegions = '1';

%% Define additonal specification ofthe version of the module for sensitivity analysis.
sSensitivity = '';

%% Execute dynare to run the model
```

The Command Window output is:

```
Perfect foresight solution found.

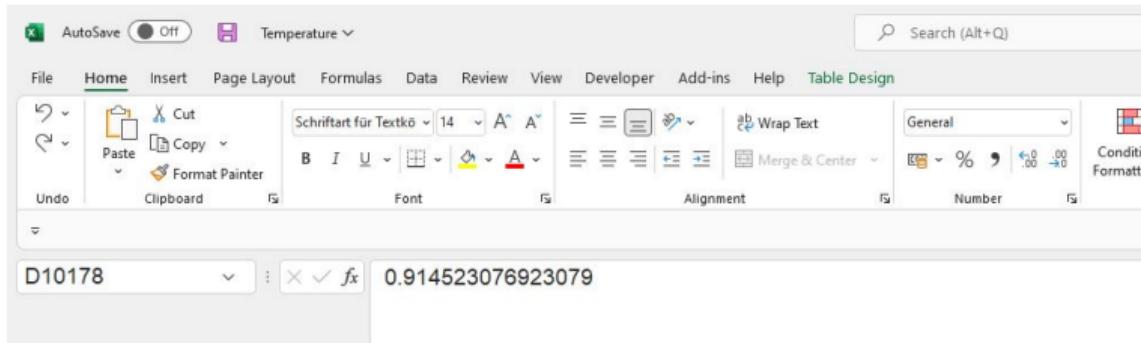
Total computing time : 0h00m39s
time for computation 0.66313 minutes
```

The right side of the interface shows a 'Works' pane with a tree view of files and a 'Name-' column.

Task 12: Create the SSP 585 scenario.

- Copy the Scenario sheet in the ModelSimulationandCalibration3Sectorsand1Region.xlsx file and name the copy SSP585.
- Please open the Temperature.xlsx file.
- Select the model MIROC6 and copy the change in temperature
- Delete all rows after row 81.
- Assume that a 1°C leads to a decline in TFP by 3.6 percent

Task 12: Select the right scenario and model



The screenshot shows a Microsoft Excel interface with a table of data. The table has columns labeled A through G. Column A contains scenario IDs, column B contains years, column C contains models, and column D contains delta temperatures. The data is sorted by scenario ID.

	A	B	C	D	E	F	G
1	Scenario	Year	Model	Delta Temperature			
10178	ssp585	2020	MIROC6	0.914523076923079			
10225	ssp585	2021	MIROC6	1.221523077			
10239	ssp585	2022	MIROC6	0.253523077			
10295	ssp585	2023	MIROC6	0.036523077			
10320	ssp585	2024	MIROC6	0.502523077			
10371	ssp585	2025	MIROC6	0.935523077			
10408	ssp585	2026	MIROC6	1.225523077			
10438	ssp585	2027	MIROC6	0.716523077			
10471	ssp585	2028	MIROC6	1.123523077			
10515	ssp585	2029	MIROC6	1.834523077			
10564	ssp585	2030	MIROC6	1.785523077			
10599	ssp585	2031	MIROC6	0.236523077			
10624	ssp585	2032	MIROC6	-0.059476923			
10674	ssp585	2033	MIROC6	0.212523077			
10710	ssp585	2034	MIROC6	0.034523077			
10751	ssp585	2035	MIROC6	1.263523077			
10781	ssp585	2036	MIROC6	1.971523077			
10822	ssp585	2037	MIROC6	1.774523077			
10861	ssp585	2038	MIROC6	0.678523077			

Task 12: Copy to SSP 585 sheet and delete unnecessary rows

The screenshot shows a Microsoft Excel spreadsheet titled "ModeSimulationandCalibration3Sectorand1Regions". The data is organized into columns A through S and rows 66 through 99. The first few rows contain numerical values, while subsequent rows are mostly zeros. A "Delete" dialog box is open at the bottom center, with the "Entire row" option selected. The Excel ribbon is visible at the top, showing tabs like File, Home, Insert, Page Layout, Formulas, Data, Review, View, Developer, Add-ins, and Help.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
66	66	0	2.4515231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
67	67	0	3.0015231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
68	68	0	3.3255231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69	69	0	3.0755231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
70	70	0	3.0005231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71	71	0	4.0905231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	72	0	4.3385231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
73	73	0	3.0465231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
74	74	0	3.3485231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75	75	0	3.3525231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
76	76	0	5.0245231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
77	77	0	4.8425231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78	78	0	3.2895231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	79	0	3.7635231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	80	0	4.2885231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81	81	0	3.7755231	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82	82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
83	83	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
84	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
85	85	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
86	86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
87	87	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
89	89	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
90	90	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
91	91	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
92	92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
93	93	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94	94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
95	95	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
96	96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
97	97	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98	98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
99	99	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Task 12: Define damages on TFP for all sectors

=0.036*\$C2

D	E	F	G	H	I	J	K	L	M
exo_SL	exo_GA_1_1	exo_GA_2_1	exo_GA_3_1	exo_IAP_1_1	exo_IAP_2_1	exo_IAP_3_1	exo_D_1_1	exo_D_2_1	exo_D_3_1
0	0	0	0	0	0	0	0.0332079	0.0332079	0.0332079
0	0	0	0	0	0	0	0.0437396	0.0437396	0.0437396
0	0	0	0	0	0	0	0.0090101	0.0090101	0.0090101
0	0	0	0	0	0	0	0.0019567	0.0019567	0.0019567
0	0	0	0	0	0	0	0.0183191	0.0183191	0.0183191
0	0	0	0	0	0	0	0.033653	0.033653	0.033653
0	0	0	0	0	0	0	0.0443297	0.0443297	0.0443297
0	0	0	0	0	0	0	0.0263218	0.0263218	0.0263218
0	0	0	0	0	0	0	0.0401301	0.0401301	0.0401301
0	0	0	0	0	0	0	0.0660563	0.0660563	0.0660563
0	0	0	0	0	0	0	0.0645197	0.0645197	0.0645197
0	0	0	0	0	0	0	0.0084913	0.0084913	0.0084913

Task 12: Run the SSP 585 scenario

The screenshot shows the MATLAB IDE interface. The menu bar includes PUBLISH, VIEW, and various toolbars for Refactor, CODE, ANALYZE, SECTION, and RUN. The current workspace contains numerous variables and functions, many starting with 'A' or 'alpha'. The central Editor window displays the code for 'RunSimulations.m'.

```
% RunSimulations is a Matlab script to run different scenarios stored in % ModelSimulationandCalibration<Number of Subsectors>Sectorsand<Number of % Regions>Regions.xlsx workbook. The DGE_CRED_Model.mod file is changed % in the script.

addpath('C:\dynare\4.6.4\matlab')
%% Specify scenario names
casScenarioNames = ...
    'SSP585',...
    ];

%% Define sector structure
sSubsecstart = '[1, 2, 3]';
sSubsecend = '[1, 2, 3]';

%% Define number of regions
sRegions = '1';

%% Define additional specification of the version of the module for sensitivity analysis.
sSensitivity = '';

%% Execute dynare to run the model
```

The Command Window below shows the results of running the script:

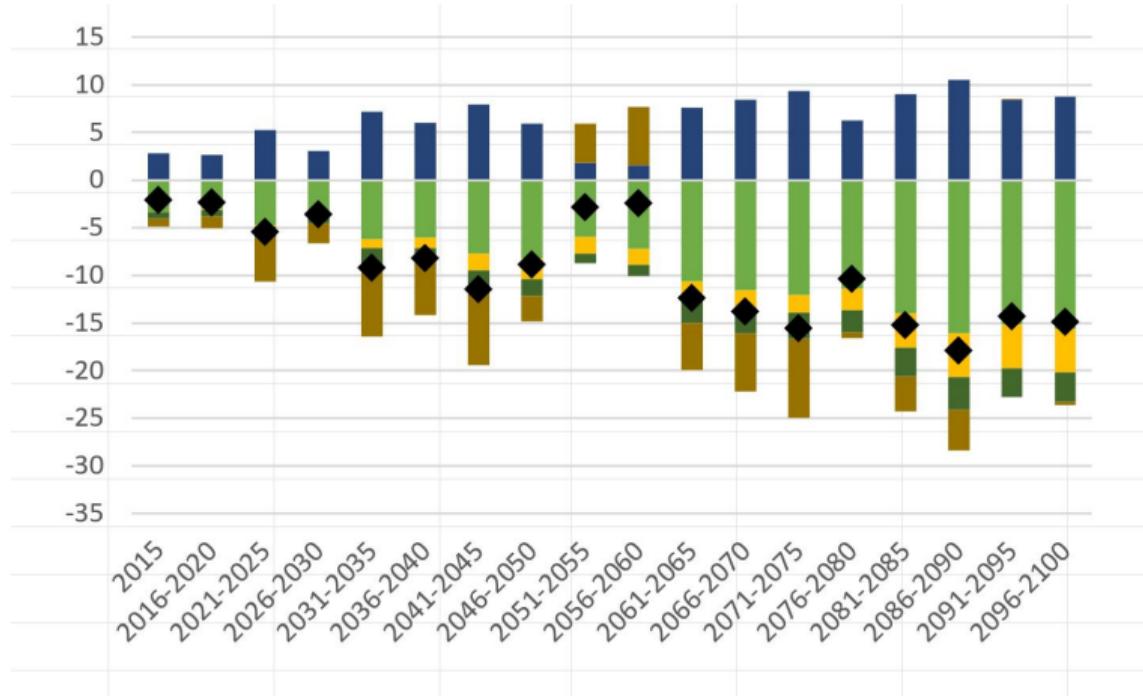
```
Perfect foresight solution found.

Total computing time : 0h00m16s
```

Task 13: Create a Figure to illustrate the impact of climate change on GDP and its components.

- Use the Figures.xlsx file to illustrate the differences between GDP, consumption, investment and net exports in the Baseline and the SSP 585 scenario.
- Make sure the ResultsScenarios3Sectorsand1Regions.xlsx file is open.
- Change the cell value A2 in sheet Var to ResultsScenarios3Sectorsand1Regions.
- Further adapt the names of the variables you want to illustrate for GDP (Y), consumption (C), investment (I), Net exports (NX) and Housing Expenditures.
- Interpret the results.

Task 13: Figure for GDP and its components



Task 13: Interpretation

- Impact on GDP mainly follows the damages on TFP.
- GDP components react differently to TFP shock.
- Consumption, investment, government and housing expenditure decline, while net exports increase.

Task 14: Add Damages to labour productivity, crop yields and mortality.

- Assume that labour productivity declines with 1°C by 2.7 percent.
- Crop yields decline by 6.9 percent for 1°C.
- Assume that the mortality rate in Vietnam is 0.6 percent, and for each 1°C increase, the mortality rate increases by 4 percent.
- Include the damages into the SSP 585 scenario and rerun it.
- Take a look at the impact of climate change on GDP and its components.

Task 14: Labour productivity

The screenshot shows a Microsoft Excel interface with the following details:

- Top Bar:** AutoSave (Off), ModelSimulationandCalibration3Sectorsand1Regions, Search (Alt+Q).
- Menu Bar:** File, Home, Insert, Page Layout, Formulas, Data, Review, View, Developer, Add-ins, Help.
- Toolbar:** Undo, Paste, Font, Alignment, Number, Conditional Formatting.
- Formula Bar:** SUM =0.027*\$C2
- Table:** A grid of data from row 1 to 12. The columns are labeled N through V. Row 1 contains labels like exo_D_N_1_1, exo_D_N_2_1, etc. Row 2 contains the formula =0.027*\$C2. Rows 3 through 12 contain numerical values (e.g., 0.024692123, 0.032981123, etc.).

	N	O	P	Q	R	S	T	U	V
1	exo_D_N_1_1	exo_D_N_2_1	exo_D_N_3_1	exo_D_K_1_1	exo_D_K_2_1	exo_D_K_3_1	exo_DH	exo_I_A_DH	exo_I_AP_DH
2	=0.027*\$C2	0.024692123	0.024692123	0	0	0	0	0	0
3	0.032981123	0.032981123	0.032981123	0	0	0	0	0	0
4	0.006845123	0.006845123	0.006845123	0	0	0	0	0	0
5	0.000986123	0.000986123	0.000986123	0	0	0	0	0	0
6	0.013568123	0.013568123	0.013568123	0	0	0	0	0	0
7	0.025259123	0.025259123	0.025259123	0	0	0	0	0	0
8	0.033089123	0.033089123	0.033089123	0	0	0	0	0	0
9	0.019346123	0.019346123	0.019346123	0	0	0	0	0	0
10	0.030335123	0.030335123	0.030335123	0	0	0	0	0	0
11	0.049532123	0.049532123	0.049532123	0	0	0	0	0	0
12	0.048209123	0.048209123	0.048209123	0	0	0	0	0	0

Task 14: Crop yields

The screenshot shows a Microsoft Excel interface with the following details:

- Top Bar:** AutoSave Off, ModelSimulationandCalibration3Sectorsand1Regions.
- Menu Bar:** File, Home, Insert, Page Layout, Formulas, Data, Review, View, Developer, Add.
- Clipboard Tab:** Undo, Paste (with dropdown for Cut, Copy, Format Painter), Clipboard.
- Font Tab:** Calibri, 11pt, Bold, Italic, Underline, Alignment, Font Color (red).
- Formula Bar:** B2, fx, =-0.006*0.04*C2*Start!\$B\$3.
- Table:** A screenshot of a table starting from row 1. Row 1 contains column headers: Time, exo_PoP, exo_tas_1, exo_SL, exo_GA_1_1, exo_GA_2_1, exo_GA_3_1, exo_IAP_1_1, exo. Row 2 contains values: 2, -0.00021, 0.9145231, 0, 0, 0, 0, 0, 0. Rows 3 through 8 show zero values across all columns.

Task 14: Mortality (I)

The screenshot shows a spreadsheet interface with a formula bar at the top and a data table below it.

Formula Bar:

- Value: 32
- Buttons: dropdown, clear, checkmark, fx
- Text: =-0.006*0.04*C2*Start!\$B\$3

Data Table:

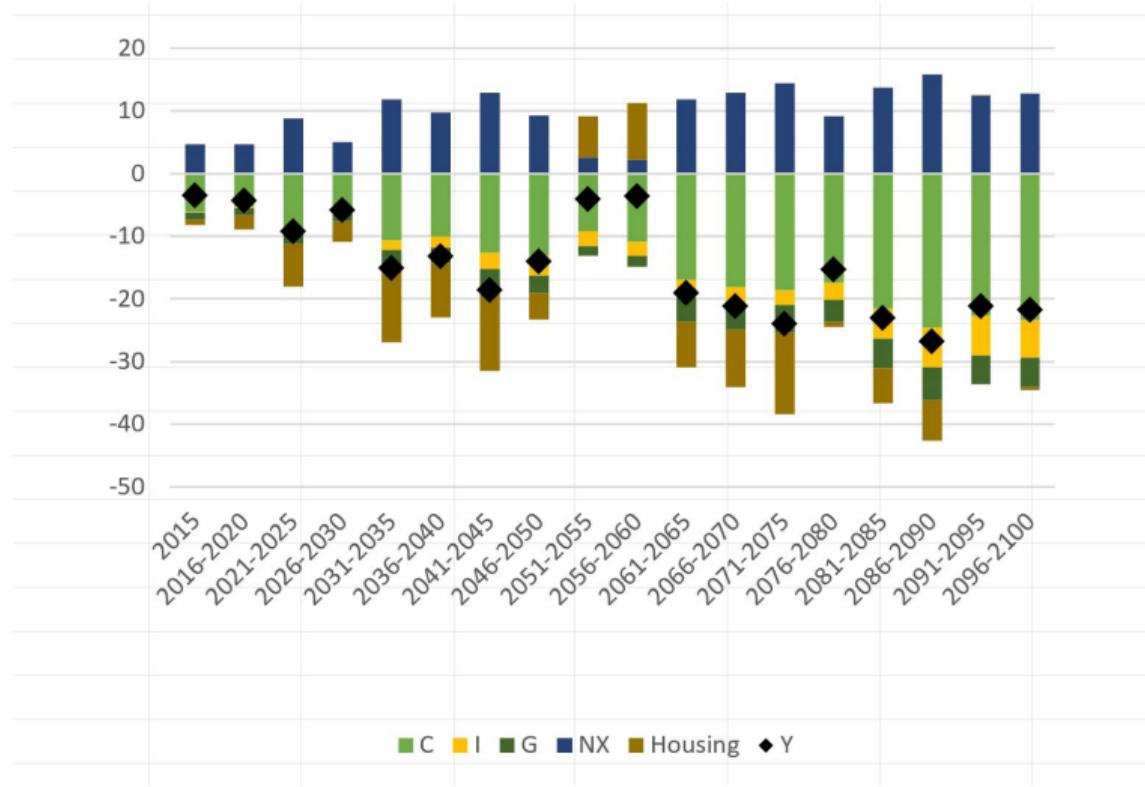
A	B	C	D	E	F	G	H
Time	exo_PoP	exo_tas_1	exo_SL	exo_GA_1_1	exo_GA_2_1	exo_GA_3_1	exo_IA
2	-0.0002	0.922442	0	0	0	0	0
3	-0.0003	1.214989	0	0	0	0	0
4	-6E-05	0.250281	0	0	0	0	0
5	-1E-05	0.054353	0	0	0	0	0
6	-0.0001	0.508863	0	0	0	0	0
7	-0.0002	0.934806	0	0	0	0	0
8	-0.0003	1.231381	0	0	0	0	0
9	-0.0002	0.731162	0	0	0	0	0

Task 14: Mortality (II)

B3 \downarrow : $\times \checkmark f_x$ $=-0.006*0.04*C3*(Start!$B$3+SUM(B$2:B2))$

A	B	C	D	E	F	G	H	I	
1	Time	exo_PoP	exo_tas_1	exo_SL	exo_GA_1_1	exo_GA_2_1	exo_GA_3_1	exo_IAP_1_1	exo_IAP_2
2	2	-0.0002	0.922442	0	0	0	0	0	
3	3	-0.0003	1.214989	0	0	0	0	0	
4	4	-6E-05	0.250281	0	0	0	0	0	
5	5	-1E-05	0.054353	0	0	0	0	0	
6	6	-0.0001	0.508863	0	0	0	0	0	
7	7	-0.0002	0.934806	0	0	0	0	0	
8	8	-0.0003	1.231381	0	0	0	0	0	
9	9	-0.0002	0.731162	0	0	0	0	0	
10	10	-0.0003	1.114725	0	0	0	0	0	
11	11	-0.0004	1.834898	0	0	0	0	0	

Task 14: GDP Components



Task 15: Create scenarios to compare the impact of the different damage types.

- Create SSP585TFP, SSP585Lab, SSP585Mort, SSP585Crop.
- SSP585TFP, only TFP shocks are turned on.
- SSP585Lab only labour productivity shocks are turned on.
- SSP585Mort only mortality shocks are turned on.
- SSP585Crop only crop yield shocks are turned on.

Task 15: Copy SSP585 sheet and rename the copies to SSP585TFP, SSP585Lab, SSP585Mort, SSP585Crop

0	0	0	0	0.1926249	0.0666
0	0	0	0	0.1874799	0.0642
0	0	0	0	0.0248349	0.0085
0	0	0	0	-0.006245	-0.002
0	0	0	0	0.0223149	0.0076
0	0	0	0	0.0036249	0.0012
0	0	0	0	0.1326699	0.0454
0	0	0	0	0.2070099	0.0709
0	0	0	0	0.1863249	0.0638
0	0	0	0	0.0710349	0.0243
0	0	0	0	0.1504149	0.0515
0	0	0	0	0.2852349	0.0977
0	0	0	0	0.1877949	0.0643
0	0	0	0	0.0566499	0.0194

SSP585Crop | SSP585Mort | SSP585Lab | SSP585TFP | **SSP585** | +

Task 15: SSP585TFP

M : X ✓ fx =0.036*\$C2

A	B	C	D	E	F	G	H	I	J	K
ime	exo_PoP	exo_tas_1	exo_SL	exo_GA_1_1	exo_GA_2_1	exo_GA_3_1	exo_IAP_1_1	exo_IAP_2_1	exo_IAP_3_1	exo_D_1_1
2	0	0.922442	0	0	0	0	0	0	0	=0.036*\$C2
3	0	1.214989	0	0	0	0	0	0	0	0.0437396
4	0	0.250281	0	0	0	0	0	0	0	0.0090101
5	0	0.054353	0	0	0	0	0	0	0	0.0019567
6	0	0.508863	0	0	0	0	0	0	0	0.0183191
7	0	0.934806	0	0	0	0	0	0	0	0.033653
8	0	1.231381	0	0	0	0	0	0	0	0.0443297
9	0	0.731162	0	0	0	0	0	0	0	0.0263218
10	0	1.114725	0	0	0	0	0	0	0	0.0401301
11	0	1.834898	0	0	0	0	0	0	0	0.0660563
12	0	1.792214	0	0	0	0	0	0	0	0.0645197
13	0	0.235869	0	0	0	0	0	0	0	0.0084913
14	0	-0.06226	0	0	0	0	0	0	0	-0.002241

Task 15: SSP585Lab

fx =0.027*\$C2

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Time exo_PoP exo_tas_1 exo_SL exo_GA_1_1 exo_GA_2_1 exo_GA_3_1 exo_IAP_1_1 exo_IAP_2_1 exo_IAP_3_1 exo_D_1_1 exo_D_2_1 exo_D_3_1 exo_D_N_1_1 exo_D_N_2_1 exo_D_N_3_1															
2	0	0.922442	0	0	0	0	0	0	0	0	0	0	0.024905927	0.024905927	0.024905927
3	0	1.214989	0	0	0	0	0	0	0	0	0	0	0.032804691	0.032804691	0.032804691
4	0	0.250281	0	0	0	0	0	0	0	0	0	0	0.006757587	0.006757587	0.006757587
5	0	0.054353	0	0	0	0	0	0	0	0	0	0	0.001467533	0.001467533	0.001467533
6	0	0.508863	0	0	0	0	0	0	0	0	0	0	0.013739311	0.013739311	0.013739311
7	0	0.934806	0	0	0	0	0	0	0	0	0	0	0.025239756	0.025239756	0.025239756
8	0	1.231381	0	0	0	0	0	0	0	0	0	0	0.03324729	0.03324729	0.03324729
9	0	0.731162	0	0	0	0	0	0	0	0	0	0	0.019741368	0.019741368	0.019741368
10	0	1.114725	0	0	0	0	0	0	0	0	0	0	0.030097578	0.030097578	0.030097578
11	0	1.834898	0	0	0	0	0	0	0	0	0	0	0.049542246	0.049542246	0.049542246
12	0	1.792214	0	0	0	0	0	0	0	0	0	0	0.048389791	0.048389791	0.048389791
13	0	0.235869	0	0	0	0	0	0	0	0	0	0	0.006368453	0.006368453	0.006368453
14	0	-0.06226	0	0	0	0	0	0	0	0	0	0	-0.00168099	-0.00168099	-0.00168099
15	0	0.195392	0	0	0	0	0	0	0	0	0	0	0.005275595	0.005275595	0.005275595
16	n	nnn471Ra	0	0	0	0	0	0	0	0	0	0	nnn12773979	nnn12773979	nnn12773979

Task 15: SSP585Mort

The screenshot shows a Microsoft Excel interface with a formula bar at the top containing the text `=0.069*$C2`. Below the formula bar is a large matrix table. The columns are labeled with category names: PoP, exo_tas_1, exo_SL, exo_GA_1_1, exo_GA_2_1, exo_GA_3_1, exo_IAP_1_1, exo_IAP_2_1, exo_IAP_3_1, exo_D_1_1, and e. The rows are labeled with numerical values: 0.922442, 1.214989, 0.250281, 0.054353, 0.508863, 0.934806, 1.231381, 0.731162, 1.114725, 1.834898, 1.792214, 0.235869, and -0.06226. The cell at the intersection of the first row and the last column contains the formula `=0.069*$C2`.

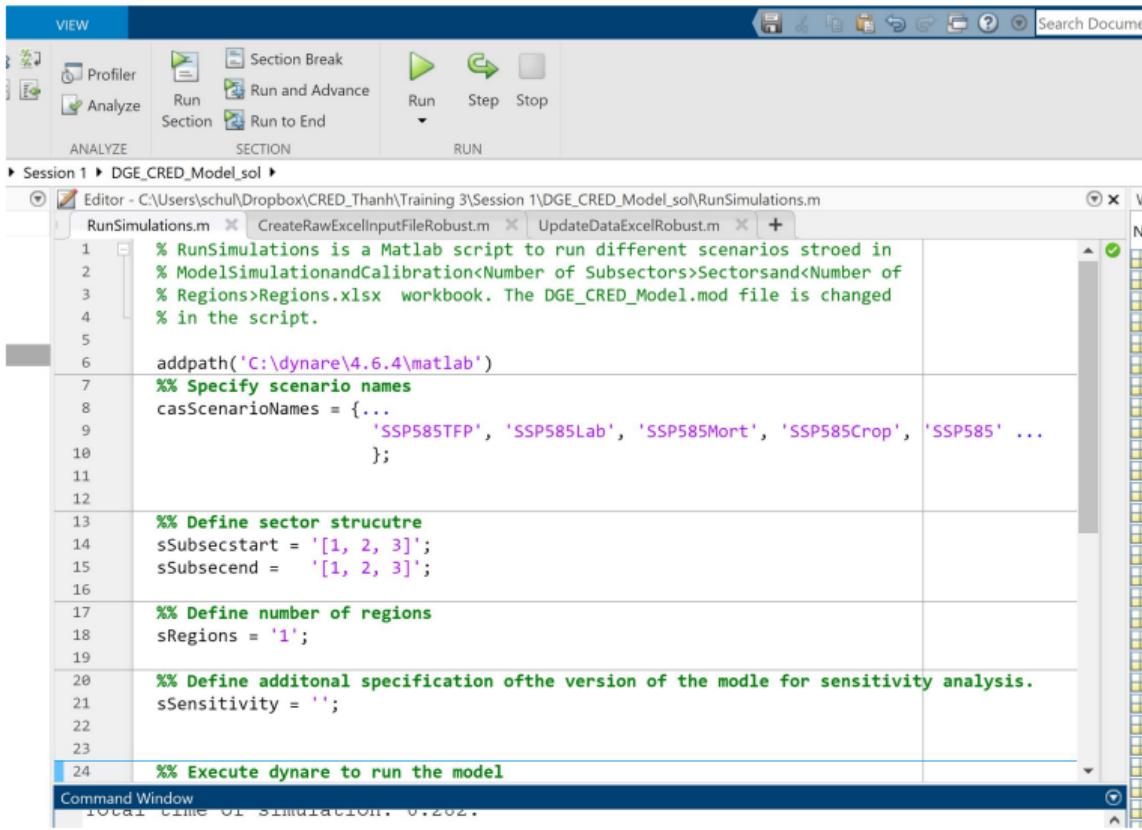
B	C	D	E	F	G	H	I	J	K	
PoP	exo_tas_1	exo_SL	exo_GA_1_1	exo_GA_2_1	exo_GA_3_1	exo_IAP_1_1	exo_IAP_2_1	exo_IAP_3_1	exo_D_1_1	e
0	0.922442	0	0	0	0	0	0	0	0=0.069*\$C2	
0	1.214989	0	0	0	0	0	0	0	0 0.0838342	
0	0.250281	0	0	0	0	0	0	0	0 0.0172694	
0	0.054353	0	0	0	0	0	0	0	0 0.0037504	
0	0.508863	0	0	0	0	0	0	0	0 0.0351116	
0	0.934806	0	0	0	0	0	0	0	0 0.0645016	
0	1.231381	0	0	0	0	0	0	0	0 0.0849653	
0	0.731162	0	0	0	0	0	0	0	0 0.0504502	
0	1.114725	0	0	0	0	0	0	0	0 0.076916	
0	1.834898	0	0	0	0	0	0	0	0 0.126608	
0	1.792214	0	0	0	0	0	0	0	0 0.1236628	
0	0.235869	0	0	0	0	0	0	0	0 0.0162749	
0	-0.06226	0	0	0	0	0	0	0	0 -0.004296	

Task 15: SSP585Crop

33	▼	:	X ✓	fx	=-0.006*0.04*C3*(Start!\$B\$3+SUM(B\$2:B2))

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Time	exo_PoP	exo_tas_1	exo_SL	exo_GA_1_1	exo_GA_2_1	exo_GA_3_1	exo_IAP_1_1	exo_IAP_2_1	exo_IAP_3_1	exo_IAP_4_1	exo_IAP_5_1	exo_IAP_6_1	exo_IAP_7_1	exo_IAP_8_1	exo_IAP_9_1	exo_IAP_10_1	exo_IAP_11_1	exo_IAP_12_1	exo_IAP_13_1	exo_IAP_14_1	exo_IAP_15_1	exo_IAP_16_1	exo_IAP_17_1	exo_IAP_18_1	exo_IAP_19_1
2	-0.0002	0.922442	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	-0.0003	1.214989	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	-6E-05	0.250281	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	-1E-05	0.054353	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	-0.0001	0.508863	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	-0.0002	0.934806	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	-0.0003	1.231381	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	-0.0002	0.731162	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	-0.0003	1.114725	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	-0.0004	1.834898	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	-0.0004	1.792214	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	-5E-05	0.235869	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	1E-05	-0.06226	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	-5E-05	0.195392	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Task 15: RunSimulation.m



The screenshot shows the MATLAB interface with the following details:

- Toolbar:** Includes buttons for Profiler, Analyze, Run, Step, and Stop.
- Session Area:** Session 1 > DGE_CRED_Model.sol >
- Editor:** Editor - C:\Users\schul\Dropbox\CRED_Thanh\Training 3\Session 1\GDE_CRED_Model.sol\RunSimulations.m
- Script Content:** RunSimulations.m

```
% RunSimulations is a Matlab script to run different scenarios stored in
% ModelSimulationandCalibration<Number of Subsectors>Sectorsand<Number of
% Regions>Regions.xlsx  workbook. The GDE_CRED_Model.mod file is changed
% in the script.

addpath('C:\dynare\4.6.4\matlab')
%% Specify scenario names
casScenarioNames = ...
    'SSP585TFP', 'SSP585Lab', 'SSP585Mort', 'SSP585Crop', 'SSP585' ...

%% Define sector structure
sSubsecstart = '[1, 2, 3]';
sSubsecend = '[1, 2, 3]';

%% Define number of regions
sRegions = '1';

%% Define additional specification of the version of the model for sensitivity analysis.
sSensitivity = '';

%% Execute dynare to run the model
```

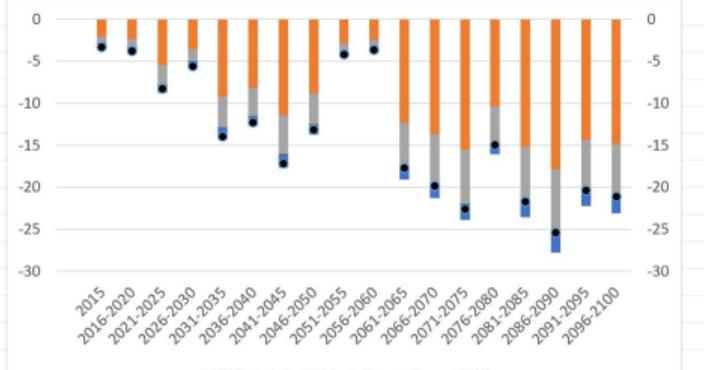
- Command Window:** Total time of simulation: 0.202.
- Page-Footer:** p.56 | giz Institut für Gesellschaft und
 Zukunft
Zukunftsinitiative der Universität Regensburg

Task 16: Create a figure to illustrate which impact channel matters the most for GDP.

- Use the figure for GDP components from Task 14 as a basis.
- Modify the figure such that you can see the GDP effect for each damage type as a stacked bar and all damage types simultaneously as a point.
- What impact channel is the most severe one?

Task 16: Figure

	Y	Y	Y	Y	Y	Y	Y
Year	Baseline	SSP585	SSP585TFP	SSP585Lab	SSP585Mo	SSP585Crop	
2014	1.333111	1.333111	1.333111	1.333111	1.333111	1.333111	
2015	1.426432	1.378381	1.396867	1.414414	1.42638	1.41827	
2020	1.91706	1.844086	1.871646	1.899105	1.916899	1.907294	
2025	2.422143	2.221357	2.290086	2.368041	2.421484	2.396221	
2030	2.911066	2.747038	2.806686	2.86996	2.911066	2.891472	
2035	3.361766	2.891998	3.052598	3.238594	3.361025	3.311232	
2040	3.761517	3.298015	3.454176	3.639044	3.760893	3.71395	
2045	4.105511	3.399249	3.6354	3.919274	4.104209	4.037336	
2050	4.394601	3.814728	4.004473	4.238397	4.393378	4.338397	
2055	4.633106	4.438234	4.5027	4.578577	4.63278	4.606488	
2060	4.82707	4.648383	4.710721	4.779053	4.825942	4.802117	
2065	4.983058	4.097713	4.368392	4.730903	4.980482	4.900013	
2070	5.10742	4.092178	4.403847	4.819434	5.104901	5.013204	
2075	5.205904	4.029898	4.396354	4.877907	5.203539	5.099124	
2080	5.283489	4.493204	4.73419	5.057764	5.281888	5.208566	
2085	5.344361	4.18029	4.531141	5.008945	5.341353	5.233686	
2090	5.391973	4.019262	4.42904	4.99234	5.388091	5.258361	



Task 17: Create scenarios SSP119 and 245 for the MIROC6 model and compare GDP effects with SSP585.

- Copy the sheet SSP 585 two times.
- Rename the copied sheets into SSP119 and SSP245.
- Copy the change in temperature from Temperature.xlsx into the respective sheets.

Task 17: Create SSP119

The screenshot shows a Microsoft Excel interface. The ribbon at the top includes tabs for File, Home, Insert, Page Layout, Formulas, Data, Review, View, Developer, Add-ins, Help, and Table Design. The Home tab is selected. The ribbon also displays "AutoSave Off" and "Temperature". A search bar at the top right says "Search (Alt+Q)". Below the ribbon, there are toolbars for Undo, Clipboard, Font, Alignment, and Number. The active cell is C6181, containing "MIROC6". The formula bar shows "C6181" and "MIROC6".

The screenshot shows a Microsoft Excel interface. The ribbon at the top includes tabs for File, Home, Insert, Page Layout, Formulas, Data, Review, Developer, Add-ins, Help, and Table Design. The Home tab is selected. The ribbon also displays "AutoSave Off" and "ModelSim... · Saved". A search bar at the top right says "Search (Alt+Q)". Below the ribbon, there are toolbars for Undo, Clipboard, Font, Alignment, and Number. The active cell is C2, containing "1.0". The formula bar shows "C2" and "1.0".

	A	B	C	D	E
1	Scenario	Year	Model	Delta Temperature	
4	ssp119	2020	MIROC6	1.093523077	
14	ssp119	2021	MIROC6	-0.824476923	
25	ssp119	2022	MIROC6	-0.351476923	
37	ssp119	2023	MIROC6	-0.078476923	
47	ssp119	2024	MIROC6	0.938523077	
59	ssp119	2025	MIROC6	1.085523077	
76	ssp119	2026	MIROC6	0.395523077	
85	ssp119	2027	MIROC6	0.646523077	
96	ssp119	2028	MIROC6	1.062523077	
112	ssp119	2029	MIROC6	1.733523077	
120	ssp119	2030	MIROC6	1.553523077	
136	ssp119	2031	MIROC6	0.241523077	
144	ssp119	2032	MIROC6	0.226523077	

1	A	B	C	D	E
2	Time	exo_PoP	exo_tas_1	exo_SL	exo_GA_1_1
2	2	-0.0066	1.093523	0	0
3	3	0.00497	-0.82448	0	0
4	4	0.00215	-0.35148	0	0
5	5	0.00048	-0.07848	0	0
6	6	-0.0057	0.938523	0	0
7	7	-0.0066	1.085523	0	0
8	8	-0.0024	0.395523	0	0
9	9	-0.0039	0.646523	0	0
10	10	-0.0064	1.062523	0	0
11	11	-0.0105	1.733523	0	0
12	12	-0.0093	1.553523	0	0
13	13	-0.0015	0.241523	0	0
14	14	-0.0014	0.229523	0	0
15	15	-0.0021	0.343523	0	0
16	16	-0.007	1.156523	0	0

Task 17: Create SSP245

AutoSave Off Temperature Search (Alt+Q)

Home Insert Page Layout Formulas Data Review View Developer Add-ins Help Table Design

Schriftart für Textkör 14 A⁺ A⁻ General

B I U Alignment Number

Clipboard Font

3 : X ✓ fx -0.0484769230769224

This screenshot shows a Microsoft Excel spreadsheet. At the top, the ribbon tabs are Home, Insert, Page Layout, Formulas, Data, Review, View, Developer, Add-ins, Help, and Table Design. The Home tab is selected. Below the ribbon, there are toolbars for Clipboard, Font, Alignment, and Number. The main table has columns for Scenario, Year, Model, Delta Temperature, and E. The rows show data for years 2081 through 2093, all using the MIROC6 model. The Delta Temperature values range from 1.1885 to 2.9345. The cell C2 contains the formula =-0.0484769230769224.

AutoSave Off ModelSimulations... Search

File Home Insert Page Layout Formulas Data Review

Undo Clipboard Font Alignment Number

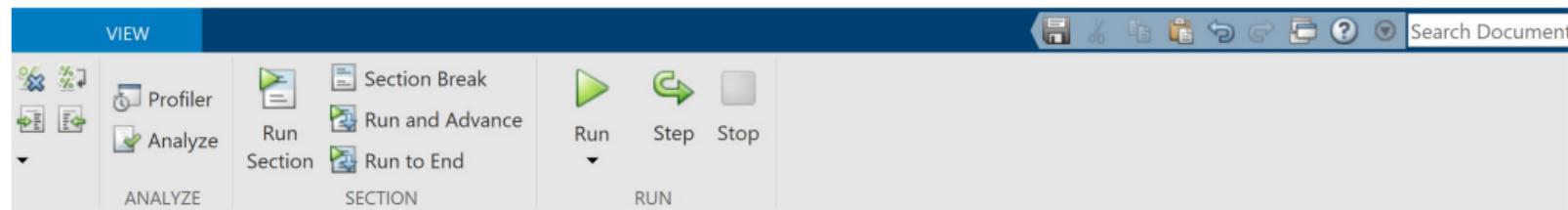
C2 : X ✓ fx -0.04847

This screenshot shows a Microsoft Excel spreadsheet. The ribbon tabs are File, Home, Insert, Page Layout, Formulas, Data, and Review. The Home tab is selected. Below the ribbon, there are toolbars for Clipboard, Font, Alignment, and Number. The table has columns A through F. Row 1 contains column headers: Time, exo_PoP, exo_tas_1, exo_SL, exo_GA_1_1, and exo_GA_2_1. Rows 2 through 16 contain data for each year from 2 to 15. The cell C2 contains the formula =-0.0484769230769224.

Scenario	Year	Model	Delta Temperature	E
ssp245	2081	MIROC6	2.379523077	
ssp245	2082	MIROC6	2.301523077	
ssp245	2083	MIROC6	2.282523077	
ssp245	2084	MIROC6	1.188523077	
ssp245	2085	MIROC6	0.466523077	
ssp245	2086	MIROC6	1.253523077	
ssp245	2087	MIROC6	2.761523077	
ssp245	2088	MIROC6	2.775523077	
ssp245	2089	MIROC6	0.906523077	
ssp245	2090	MIROC6	2.184523077	
ssp245	2091	MIROC6	1.257523077	
ssp245	2092	MIROC6	2.934523077	
ssp245	2093	MIROC6	2.290523077	

A	B	C	D	E	F
1	Time	exo_PoP	exo_tas_1	exo_SL	exo_GA_1_1
2	2	0.00029	-0.04848	0	0
3	3	-0.0002	0.026523	0	0
4	4	0.00108	-0.17748	0	0
5	5	-0.0038	0.627523	0	0
6	6	-0.0103	1.697523	0	0
7	7	-0.0036	0.599523	0	0
8	8	0.00061	-0.10148	0	0
9	9	0.00108	-0.17748	0	0
10	10	-0.0072	1.188523	0	0
11	11	-0.0117	1.941523	0	0
12	12	-0.004	0.662523	0	0
13	13	-0.001	0.162523	0	0
14	14	-0.0057	0.934523	0	0
15	15	-0.0129	2.140523	0	0
16	16	-0.0093	1.556523	0	0

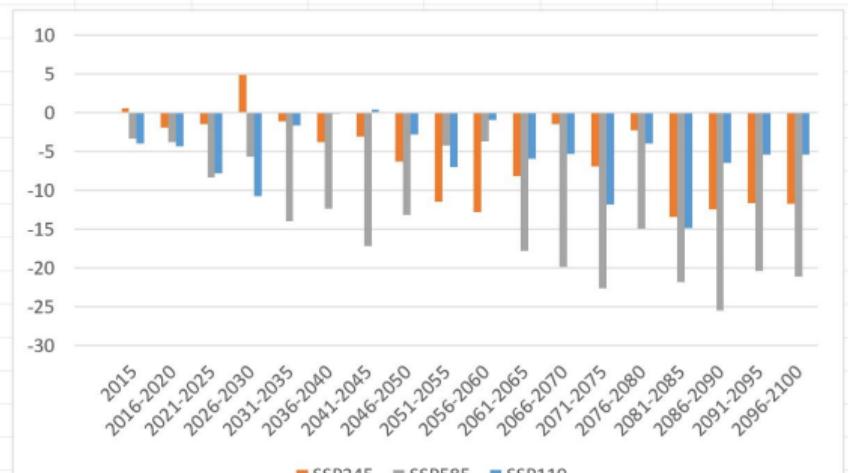
Task 17: RunSimulation.m



```
| 3 ▶ Session 1 ▶ DGE_CRED_Model_sol ▶
Editor - C:\Users\schul\Dropbox\CRED_Thanh\Training 3\Session 1\DGE_CRED_Model_sol\RunSimulations.m
RunSimulations.m × CreateRawExcelInputFileRobust.m × UpdateDataExcelRobust.m × + Nar
1 % RunSimulations is a Matlab script to run different scenarios stored in
2 % ModelSimulationandCalibration<Number of Subsectors>Sectorsand<Number of
3 % Regions>Regions.xlsx workbook. The DGE_CRED_Model.mod file is changed
4 % in the script.
5
6 addpath('C:\dynare\4.6.4\matlab')
7 % Specify scenario names
8 casScenarioNames = {
9     ...
10    'SSP119', 'SSP245'
11    ...
12
13 % Define sector structure
14 sSubsecstart = '[1, 2, 3]';
15 sSubsecend = '[1, 2, 3]';
16
17 % Define number of regions
18 sRegions = '1';
```

Task 17: Figure

ResultsScei	Year	Y	Y	Y	Y
		Baseline	SSP119	SSP245	SSP585
	2014	1.333111	1.333111	1.333111	1.333111
	2015	1.426432	1.370287	1.434927	1.378381
	2020	1.91706	1.834551	1.880656	1.844086
	2025	2.422143	2.234096	2.386631	2.221357
	2030	2.911066	2.599281	3.05414	2.747038
	2035	3.361766	3.305697	3.325036	2.891998
	2040	3.761517	3.756602	3.619803	3.298015
	2045	4.105511	4.12298	3.978832	3.399249
	2050	4.394601	4.272813	4.119044	3.814728
	2055	4.633106	4.310902	4.103508	4.438234
	2060	4.82707	4.784212	4.207886	4.648383
	2065	4.983058	4.687899	4.575768	4.097713
	2070	5.10742	4.837592	5.033524	4.092178
	2075	5.205904	4.590922	4.844872	4.029898
	2080	5.283489	5.073515	5.165842	4.493204
	2085	5.344361	4.549113	4.626368	4.18029
	2090	5.391973	5.043244	4.721489	4.019262



Task 18: Sensitivity Analysis SSP 585 effect for three different climate models.

- Create the following scenarios: SSP585FGOALSg3, SSP585CanESM5, SSP585MIROCES2L
- Each scenario is the SSP 585 scenario from a different climate model (FGOALS-g3, CanESM5, MIROC-ES2L).
- Note: I deleted special characters from the scenario names.
- Plot the range of results for GDP effects compared to the Baseline for the different climate models.

Task 18: Create SSP585CanESM5

Scenario	Year	Model	Delta Temperature
585	2020	CanESM5	0.401314285714286
585	2021	CanESM5	0.086314286
585	2022	CanESM5	0.234314286
585	2023	CanESM5	0.160314286
585	2024	CanESM5	0.422314286
585	2025	CanESM5	-0.249685714
585	2026	CanESM5	0.295314286
585	2027	CanESM5	0.580314286
585	2028	CanESM5	-0.001685714
585	2029	CanESM5	0.683314286
585	2030	CanESM5	0.436314286
585	2031	CanESM5	0.656314286
585	2032	CanESM5	0.202314286
585	2033	CanESM5	1.309314286
585	2034	CanESM5	0.661314286
585	2035	CanESM5	0.237314286
585	2036	CanESM5	0.655314286
585	2037	CanESM5	1.290314286
585	2038	CanESM5	0.950314286

A	B	C	D	E
Time	exo_PoP	exo_tas_1	t	
1				
2	2	-0.0024	0.401314	
3	3	-0.0005	0.086314	
4	4	-0.0014	0.234314	
5	5	-0.001	0.160314	
6	6	-0.0026	0.422314	
7	7	0.00151	-0.24969	
8	8	-0.0018	0.295314	
9	9	-0.0035	0.580314	
10	10	1E-05	-0.00169	
11	11	-0.0042	0.683314	
12	12	-0.0026	0.436314	
13	13	-0.004	0.656314	
14	14	-0.0012	0.202314	
15	15	-0.0079	1.309314	
16	16	-0.004	0.661314	
17	17	-0.0014	0.237314	
18	18	-0.004	0.655314	
19	19	-0.0078	1.290314	
20	20	-0.0057	0.950314	
21	21	-0.0068	1.120314	
22	22	-0.0082	1.356314	
23	23	-0.0078	1.303314	
24	24	-0.0063	1.045314	

Task 18: Create SSP585FGOALSg3

The image shows two Microsoft Excel windows side-by-side. The left window displays the 'cmip6_vietnam' sheet, which contains a table with columns: Scenario, Year, Model, Delta Temperature, and E. The right window displays the 'SSP585FGOALSg3' sheet, which contains a table with columns A through E.

cmip6_vietnam Sheet Data:

Scenario	Year	Model	Delta Temperature	E
12451	ssp585	2081	FGOALS-g3	1.636
12487	ssp585	2082	FGOALS-g3	2.279
12520	ssp585	2083	FGOALS-g3	2.288
12555	ssp585	2084	FGOALS-g3	2.478
12597	ssp585	2085	FGOALS-g3	2.124
12631	ssp585	2086	FGOALS-g3	2.132
12659	ssp585	2087	FGOALS-g3	2.071
12713	ssp585	2088	FGOALS-g3	2.292
12721	ssp585	2089	FGOALS-g3	2.567
12765	ssp585	2090	FGOALS-g3	2.041
12810	ssp585	2091	FGOALS-g3	2.629
12843	ssp585	2092	FGOALS-g3	2.391
12872	ssp585	2093	FGOALS-g3	2.637
12920	ssp585	2094	FGOALS-g3	2.715
12965	ssp585	2095	FGOALS-g3	2.423
12984	ssp585	2096	FGOALS-g3	2.81
13035	ssp585	2097	FGOALS-g3	2.564
13052	ssp585	2098	FGOALS-g3	3.163
13119	ssp585	2099	FGOALS-g3	2.943

SSP585FGOALSg3 Sheet Data:

Time	exo_PoP	exo_tas_1	exo_SL	exo_GA_1_1	e
1	2	0.00015	-0.024	0	0
3	3	-0.002	0.326	0	0
4	4	-0.0039	0.646	0	0
5	5	-0.0013	0.221	0	0
6	6	0.00386	-0.637	0	0
7	7	-0.0045	0.744	0	0
8	8	-0.0043	0.71	0	0
9	9	0.00321	-0.531	0	0
10	10	-0.0036	0.592	0	0
11	11	-0.0038	0.625	0	0
12	12	-0.0027	0.44	0	0
13	13	-0.0045	0.735	0	0
14	14	-0.0036	0.6	0	0
15	15	-0.0008	0.13	0	0
16	16	-0.0017	0.274	0	0
17	17	-0.0032	0.535	0	0
18	18	-0.005	0.834	0	0
19	19	-0.0013	0.209	0	0
20	20	0.00064	-0.105	0	0
21	21	-0.0021	0.344	0	0
22	22	-0.0049	0.811	0	0
23	23	-0.0058	0.967	0	0
24	24	-0.0055	0.904	0	0

Task 18: Create SSP585MIROCES2L

The image shows two Microsoft Excel windows side-by-side. The left window, titled 'cmip6_vietnam' and 'Sheet2', contains a table with columns: Scenario, Year, Model, Delta Temperature, and E. The right window, titled 'SSP585MIROCES2L' and 'Sheet1', contains a table with columns A through E.

cmip6_vietnam (Sheet2) Data:

Scenario	Year	Model	Delta Temperature	E
12444	ssp585	2081	MIROC-ES2L	2.22192
12476	ssp585	2082	MIROC-ES2L	1.99892
12516	ssp585	2083	MIROC-ES2L	2.64592
12531	ssp585	2084	MIROC-ES2L	3.00792
12568	ssp585	2085	MIROC-ES2L	1.97492
12611	ssp585	2086	MIROC-ES2L	1.99092
12652	ssp585	2087	MIROC-ES2L	1.79892
12693	ssp585	2088	MIROC-ES2L	3.17292
12742	ssp585	2089	MIROC-ES2L	2.77992
12775	ssp585	2090	MIROC-ES2L	2.03292
12800	ssp585	2091	MIROC-ES2L	2.72292
12842	ssp585	2092	MIROC-ES2L	3.57392
12874	ssp585	2093	MIROC-ES2L	2.41892
12917	ssp585	2094	MIROC-ES2L	2.52892
12957	ssp585	2095	MIROC-ES2L	3.25492
12980	ssp585	2096	MIROC-ES2L	4.00192
13047	ssp585	2097	MIROC-ES2L	3.52992
13072	ssp585	2098	MIROC-ES2L	3.12092
13094	ssp585	2099	MIROC-ES2L	3.31292

SSP585MIROCES2L (Sheet1) Data:

A	B	C	D	E	
1	Time	exo_Pop	exo_tas_1	exo_SL	exo_GA_1_1
2	2	-0.0055	0.96992	0	0
3	3	6.7E-05	-0.01108	0	0
4	4	0.00195	-0.32108	0	0
5	5	-0.0028	0.46292	0	0
6	6	-0.0047	0.76992	0	0
7	7	0.00017	-0.02808	0	0
8	8	-0.0044	0.72792	0	0
9	9	-0.0031	0.51592	0	0
10	10	6.1E-05	-0.01008	0	0
11	11	0.00061	-0.10108	0	0
12	12	-0.0053	0.87392	0	0
13	13	-0.003	1.31892	0	0
14	14	-0.0047	0.78092	0	0
15	15	-0.001	0.17292	0	0
16	16	-0.0009	0.15092	0	0
17	17	-0.006	1.05892	0	0
18	18	-0.0062	1.01992	0	0
19	19	-0.0019	0.31492	0	0
20	20	0.00011	-0.01808	0	0
21	21	-0.0003	0.04292	0	0
22	22	-0.0109	1.79692	0	0
23	23	-0.0066	1.05492	0	0
24	24	-0.0027	0.45492	0	0

Task 18: RunSimulation.m

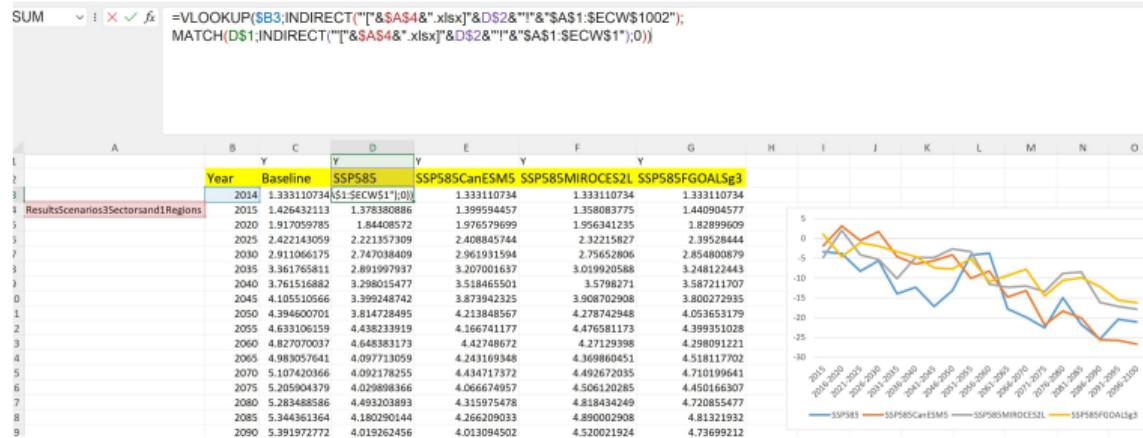
The screenshot shows a MATLAB IDE interface with the following details:

- Toolbar:** ANALYZE, SECTION, RUN.
- Session:** Session 1 ► DGE_CRED_Model_sol ►
- Editor:** Editor - C:\Users\schul\Dropbox\CRED_Thanh\Training 3\Session 1\DGE_CRED_Model_sol\RunSimulations.m
- Code Content:**

```
1 % RunSimulations is a Matlab script to run different scenarios stored in
2 % ModelSimulationandCalibration<Number of Subsectors>Sectorsand<Number of
3 % Regions>Regions.xlsx workbook. The DGE_CRED_Model.mod file is changed
4 % in the script.
5
6 addpath('C:\dynare\4.6.4\matlab')
7 %% Specify scenario names
8 casScenarioNames = {...,
9                 'SSP585MIROCES2l', 'SSP585FGOALsg3', 'SSP585CanESM5'...
10                };
11
12
13 %% Define sector structure
14 sSubsecstart = '[1, 2, 3]';
15 sSubsecend = '[1, 2, 3]';
16
17 %% Define number of regions
18 sRegions = '1';
19
20 %% Define additional specification of the version of the model for sensitivity analysis.
21 ssensitivity = '';
22
23
24 %% Execute dynare to run the model
```
- Command Window:** Student License -- for use by students to meet course requirements and perform academic research at degree granting institutions only.
- fx >>** (Input field)
- Workspace:** Shows variables like Name.

Task 18: Figure

- Copy the previous sheet in the Figure.xlsx file.
- Change the names of scenarios in row 2 and create a line plot.
- It is clear that quantitative results are susceptible to the respective climate scenario.

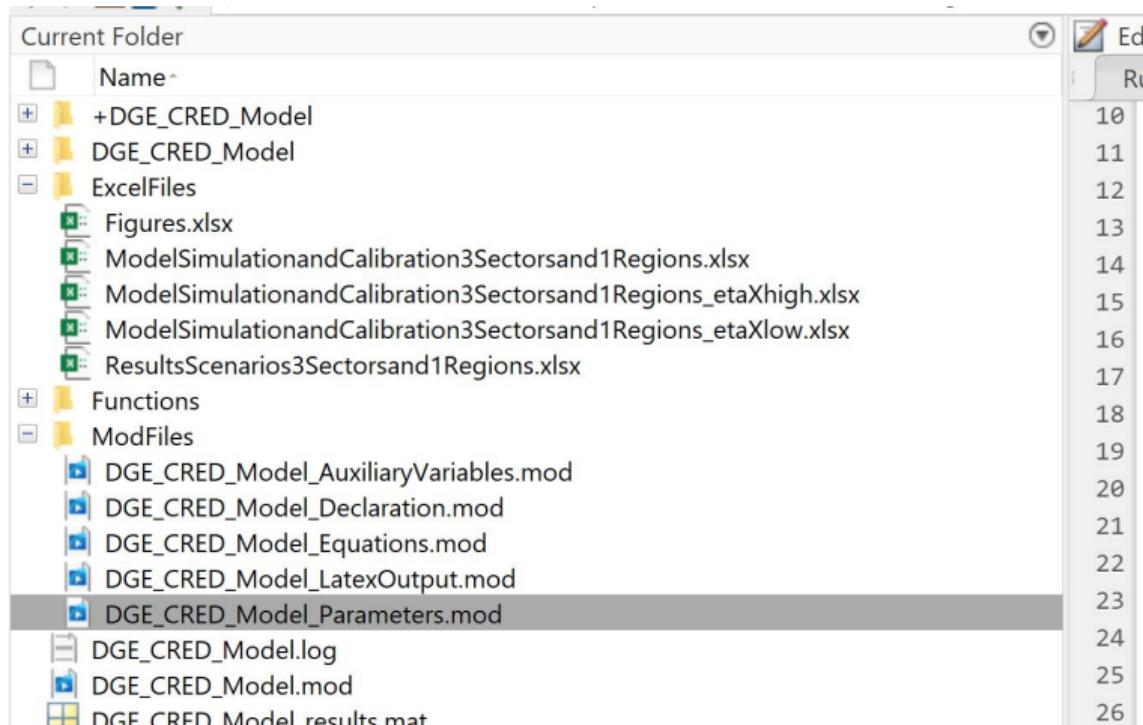


Task 19: Sensitivity Analysis SSP 585 effect for export price elasticity.

- Analyse the role of η^X for the simulation results. $X_{s,t} = D_s^X \left(\frac{P_{s,t}^D}{P_{s,t}^M} \right)^{-\eta^X}$
- What do you think will be the impact of an increase in η^X or decrease in η^X ?
- Copy the ModelSimulationandCalibration3Sectorsand1Regions.xlsx file two times.
- Rename the copies into
 - ModelSimulationandCalibration3Sectorsand1Regions_etaXhigh.xlsx and
 - ModelSimulationandCalibration3Sectorsand1Regions_etaXlow.xlsx
- Change the value of etaX_p to 1.5 and 0.3 for high and low, respectively. The parameter is listed in the StructuralParameters sheet.
- Execute the RunSimulation.m file. You need to change the sSensitivity in line 21 to _etaXhigh and _etaXlow. Further, you need to first run the Baseline scenario.

Task 19: Sensitivity Analysis SSP 585 effect for export price elasticity.

- Make sure the newly created files are in the right subfolder.



Task 19: Sensitivity Analysis SSP 585 effect for export price elasticity.

- set the value for η_{X_p} in the sheet Structural Parameters in cell B11 to 1.5 and 0.3, respectively.

	A	B
		Value Description
1	Parameter	
2	beta_p	0.9606 discount factor
3	delta_p	0.045 depreciation rate
4	sH_p	0.01 share of investments in residential b
5	phiB_p	10 foreign bond adjustment cost
6	phiK_p	10 investment adjustment cost
7	sigmal_p	0.5 inverse Frisch elasticity
8	sigmaC_p	1 intertemporal elasticity of substituti
9	etaQ_p	0.01 elasticity of substitution between se
10	etaF_p	1.83 elasticity of substitution between irr
11	etaX_p	1.5 supply price elasticity of exports
12	tauC_p	0.2 consumption tax rate
13	tauNH_p	0 tax rate on labour income
14	tauKH_p	0 tax rate on capital income
15	phiM_p	0.3 share of imports on total used domi

Task 19: RunSimulation.m

- Set the value for sSensitivity to _etaXlow and _etaXhigh.
- Make sure to always run Baseline and the SSP 585 scenario.

```
% RunSimulations is a Matlab script to run different scenarios stored in
% ModelSimulationandCalibration<Number of Subsectors>Sectorsand<Number of
% Regions>Regions.xlsx workbook. The DGE_CRED_Model.mod file is changed
% in the script.

addpath('C:\dynare\4.6.4\matlab')
%% Specify scenario names
casScenarioNames = {...  
    'Baseline', 'SSP585', ...  
};

%% Define sector structure
sSubsecstart = '[1, 2, 3]';
sSubsecend = '[1, 2, 3]';

%% Define number of regions
sRegions = '1';

%% Define additional specification of the version of the model for sensitivity analysis.
sSensitivity = '_etaXlow';

%% Execute dynare to run the model
addpath([pwd() '/Functions'])
addpath([pwd() '/Functions/Miscellaneous'])
```

Task 20: Create GDP component plots to identify the sensitivity of GDP effects on etaX_p.

- Are net exports higher or lower with an increase in etaX_p?

Task 20: Copy the sheet GDP in Figures.xlsx.

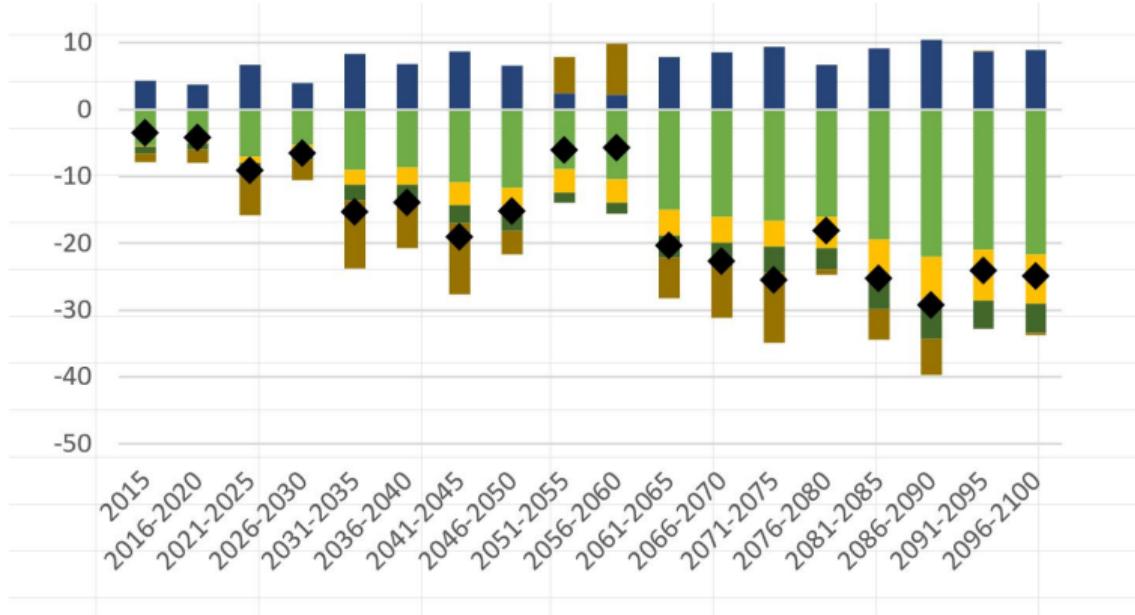
- Rename the file you refer to in A4 plots to
ResultsScenarios3Sectorsand1Regions_etaXhigh and
ResultsScenarios3Sectorsand1Regions_etaXlow.

The screenshot shows the Microsoft Excel interface with the 'Home' tab selected in the ribbon. The status bar at the bottom left indicates 'p.75 |'. The active cell is A4, which contains the text "'ResultsScenarios3Sectorsand1Regions_etaXhigh'". The table below has columns labeled A through J and rows labeled 1 through 12. The first few rows contain column headers and some numerical values. Row 4 is highlighted in yellow and contains the text 'ResultsScenarios3Sectorsand1Regions_etaXhigh'.

A	B	C	D	E	F	G	H	I	J
1	Y	Y	C	C	C	I	I	G	G
2	Year	Baseline	SSP585	Baseline	SSP585	Baseline	SSP585	Baseline	SSP585
4	ResultsScenarios3Sectorsand1Regions_etaXhigh								
5	2014	1.165338	1.1653	0.726204	0.726204	0.269084	0.269084	0.145796	0.14
6	2015	1.247481	1.2045	0.778723	0.702947	0.286435	0.285309	0.15634	0.1
7	2020	1.679994	1.6114	1.014928	0.92588	0.426828	0.425547	0.203761	0.18
8	2025	2.126184	1.9398	1.228267	1.04431	0.608551	0.599044	0.246592	0.20
9	2030	2.558817	2.4206	1.440145	1.28617	0.778647	0.780623	0.289129	0.25
10	2035	2.958148	2.5388	1.657551	1.341908	0.909094	0.870241	0.332777	0.25
11	2040	3.3127	2.9061	1.872029	1.538085	0.998828	0.95319	0.375836	0.29
12	2045	3.618043	2.9917	2.071791	1.614696	1.057804	0.978547	0.415941	0.29
	2050	3.874811	3.3802	2.24923	1.739893	1.095899	0.989572	0.451565	0.34
	2055	4.086752	3.9579	2.401593	2.028575	1.170158	1.040701	0.482154	0.42

Task 20: ResultsScenarios3Sectorsand1Regions_etaXlow

- For a high lowue of etaX_p = 0.3, we observe a decline in GDP by 25 percent.
- Net exports only increased by 9 percent at the end of the century.



Task 20: ResultsScenarios3Sectorsand1Regions_etaXhigh

- For a high value of $\text{etaX}_p = 1.5$, we observe a decline in GDP by 19 percent.
- Net exports only increased by 14 percent at the end of the century.

