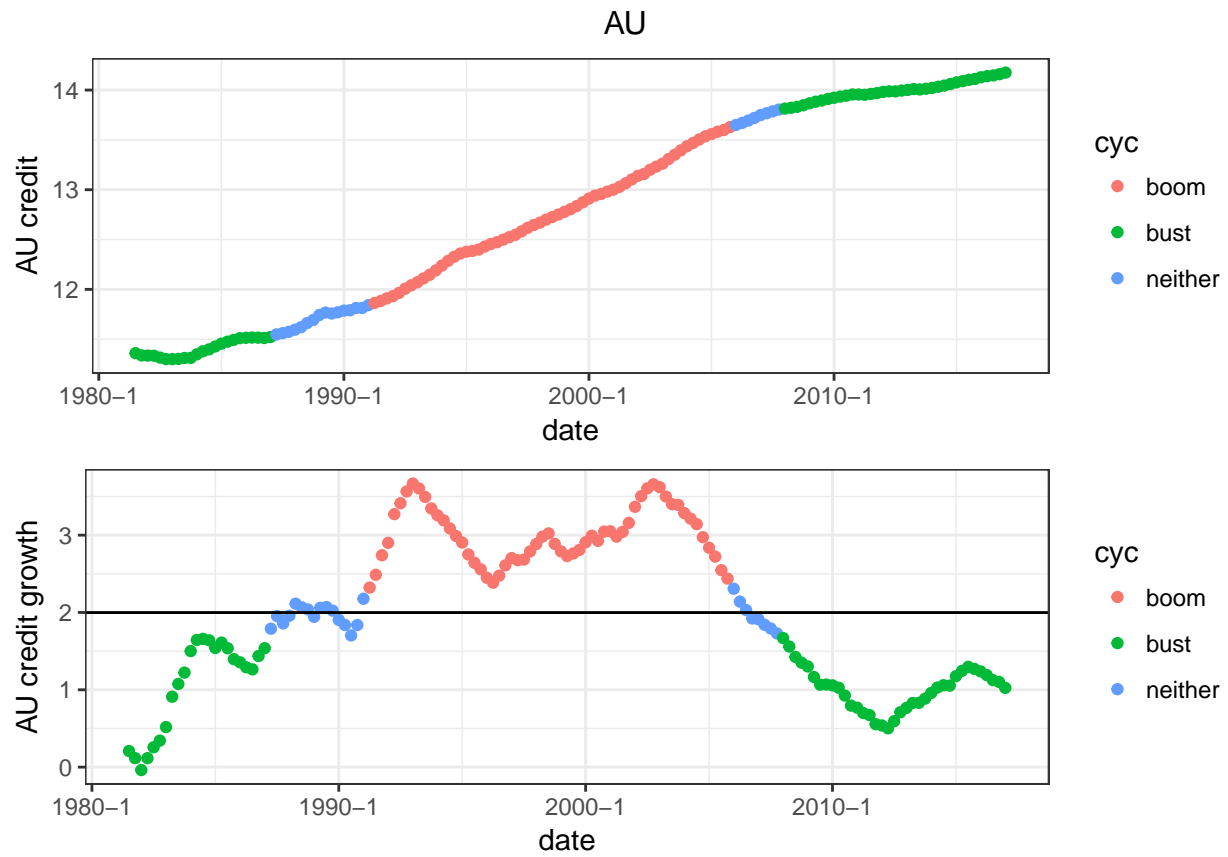
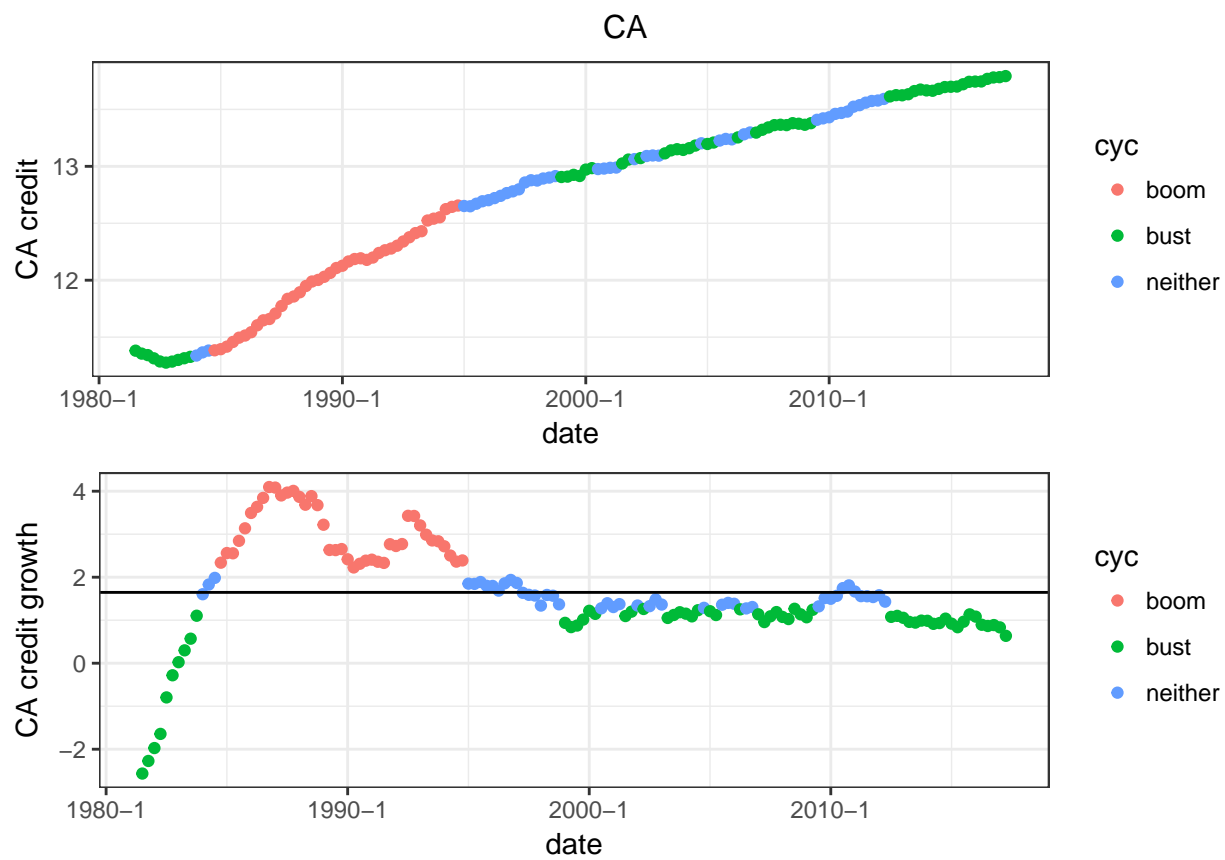


Business Cycle Dating

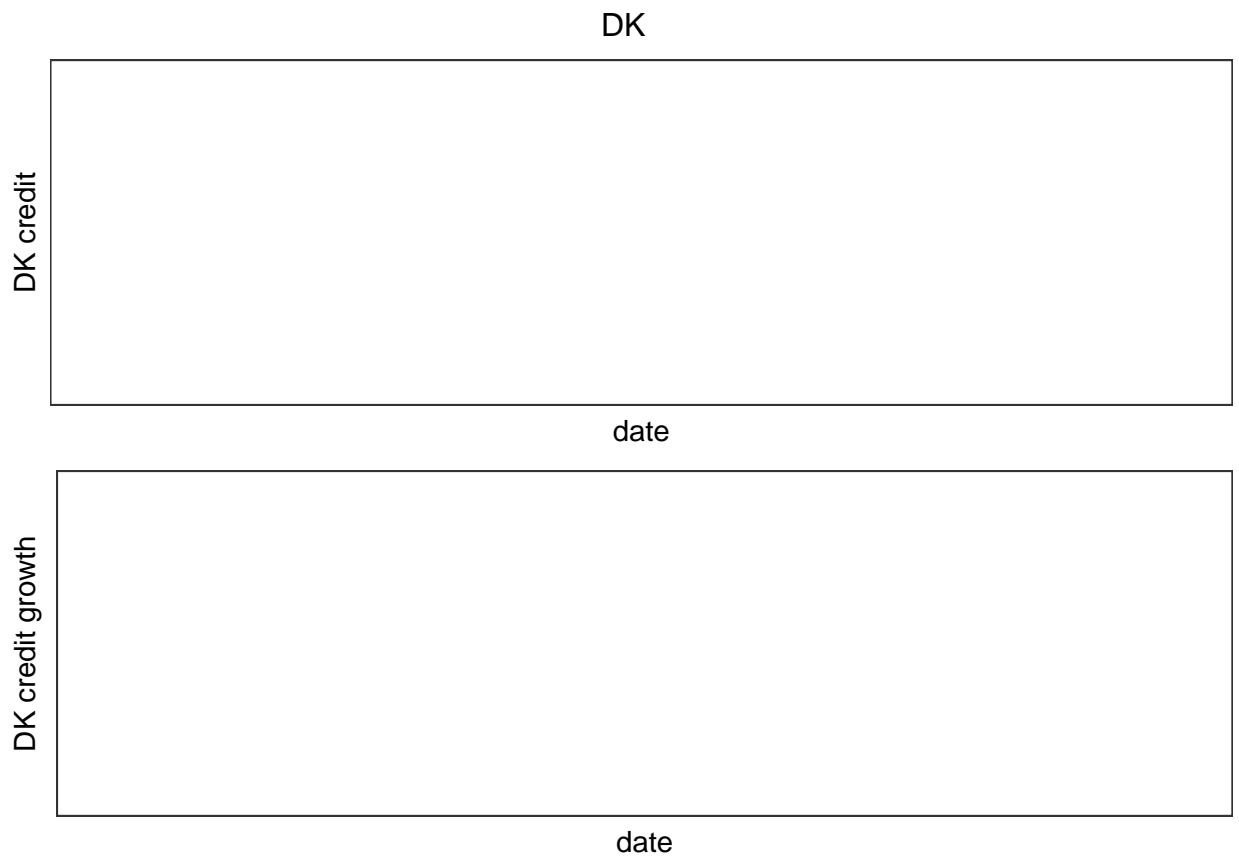
Haoyu Sheng

7/15/2019

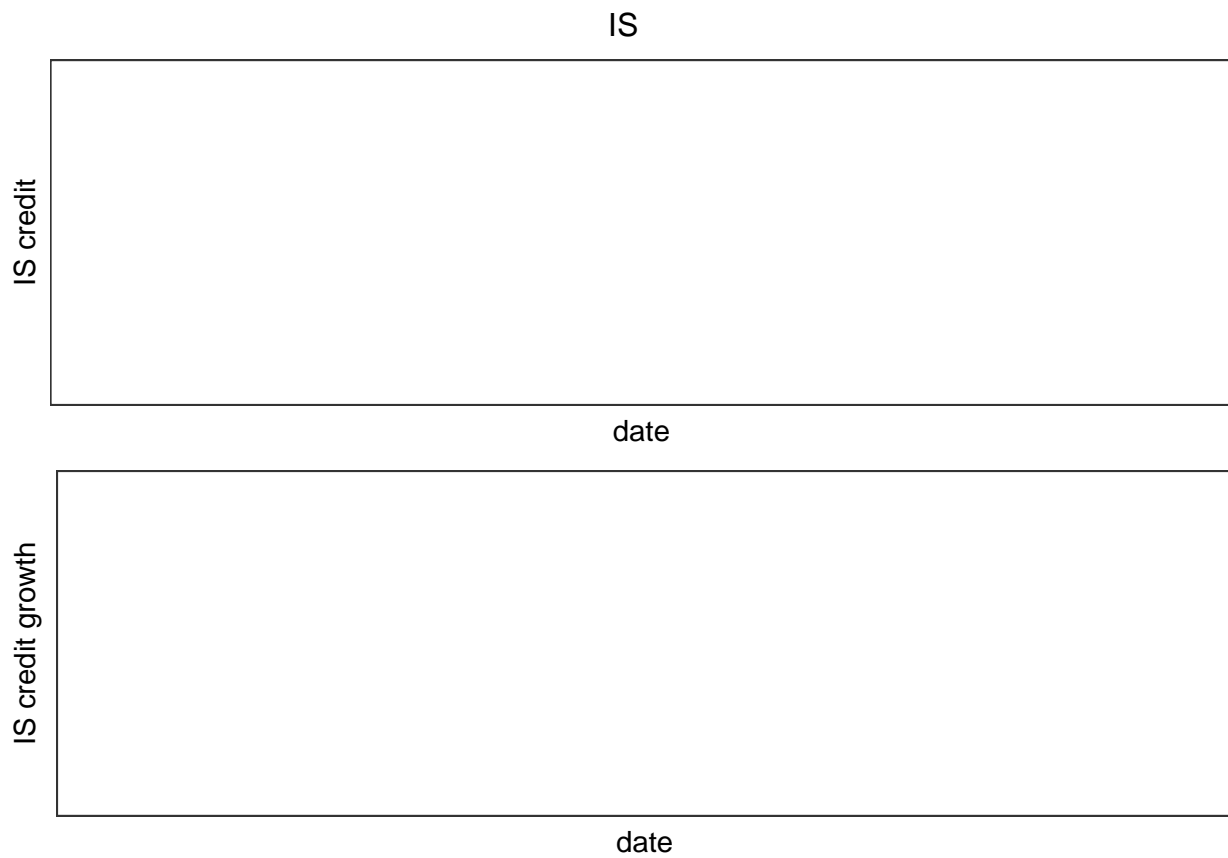




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Warning: Removed 1 rows containing missing values (geom_hline).



Warning: Removed 1 rows containing missing values (geom_hline).

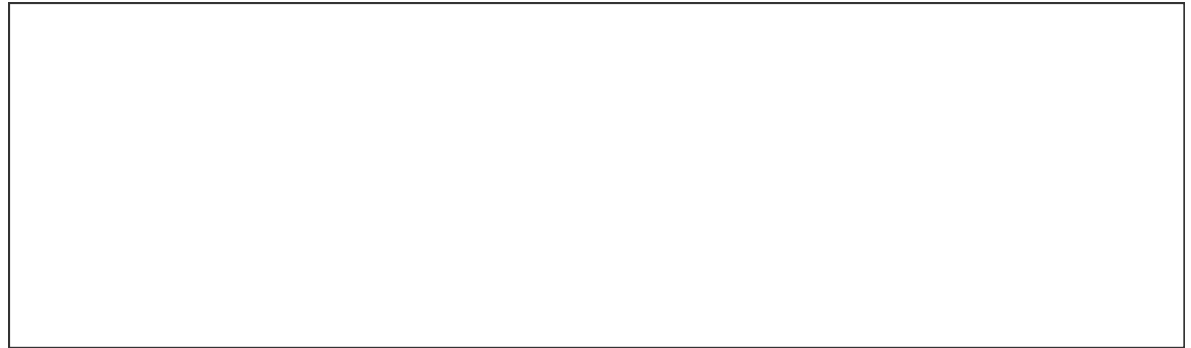
JP

JP credit



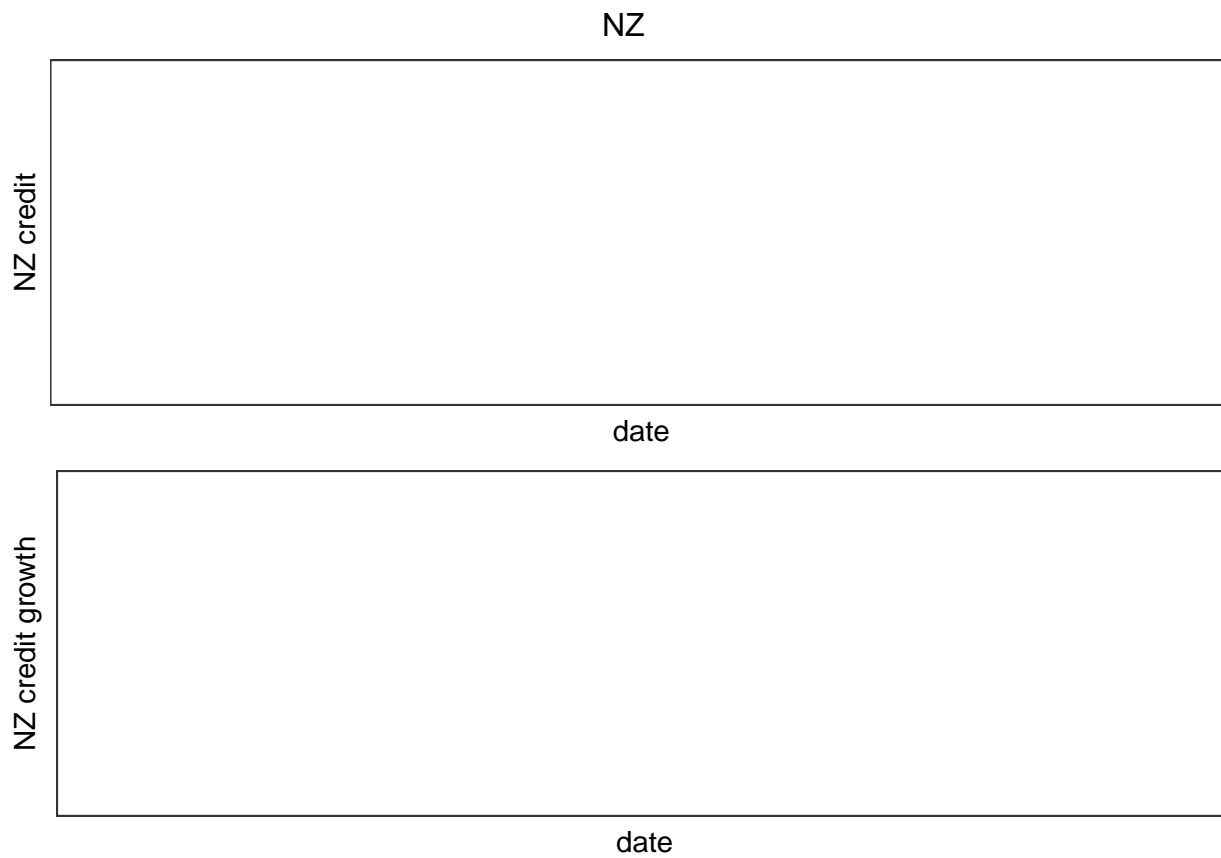
date

JP credit growth



date

Warning: Removed 1 rows containing missing values (geom_hline).



Warning: Removed 1 rows containing missing values (geom_hline).

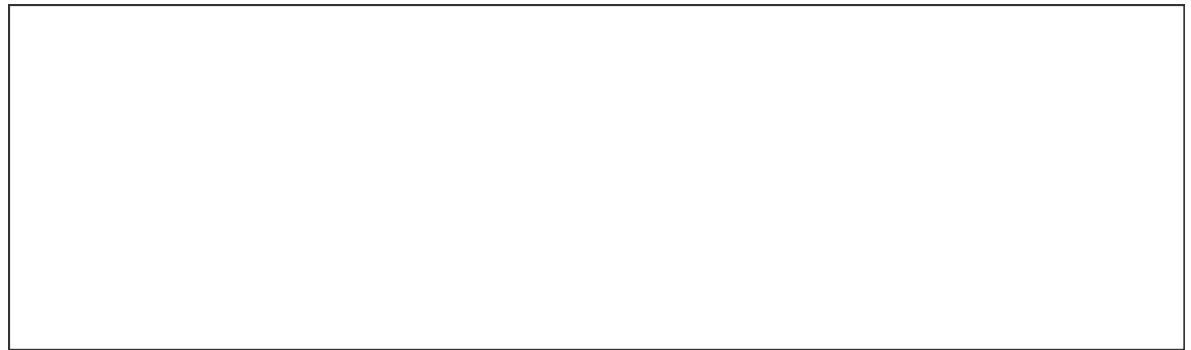
NO

NO credit



date

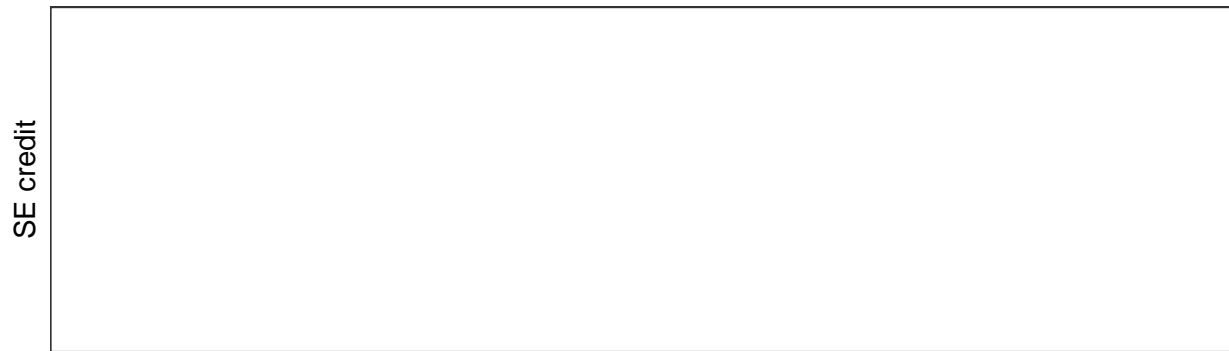
NO credit growth



date

Warning: Removed 1 rows containing missing values (geom_hline).

SE



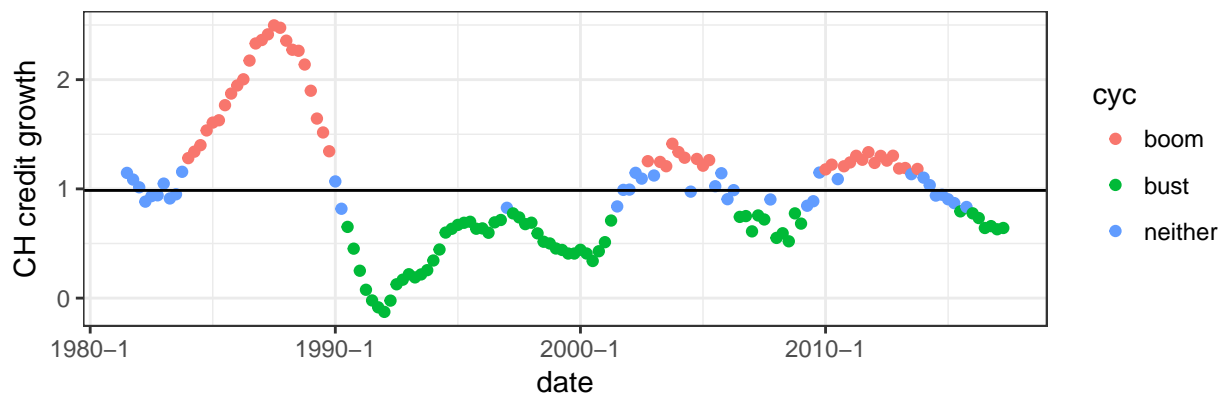
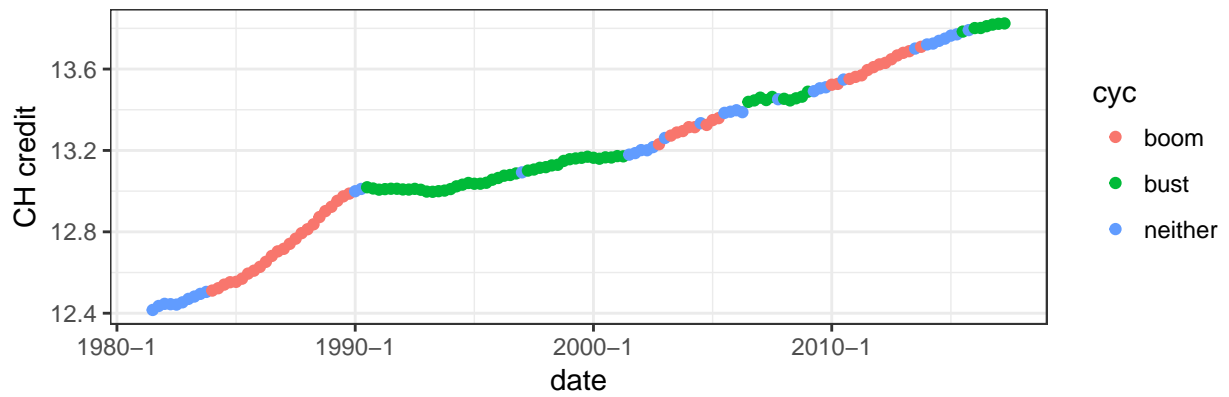
SE credit

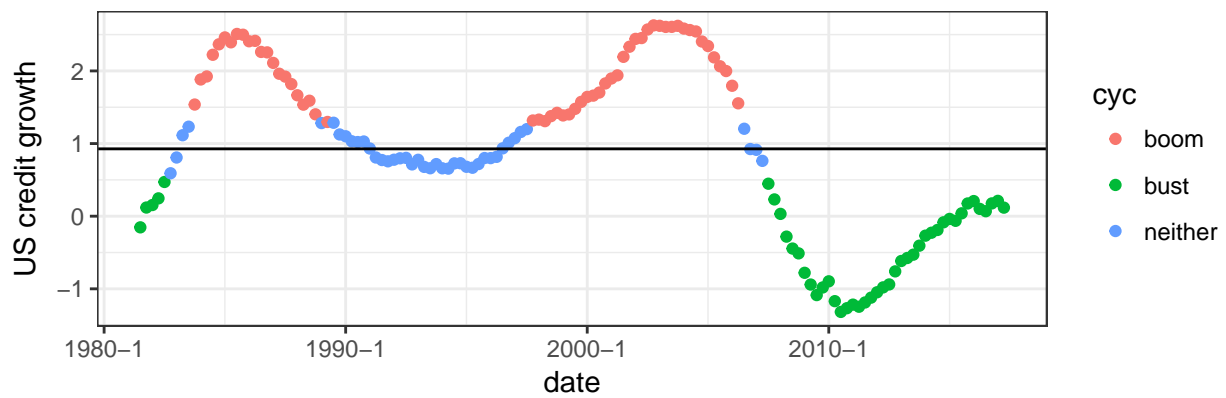
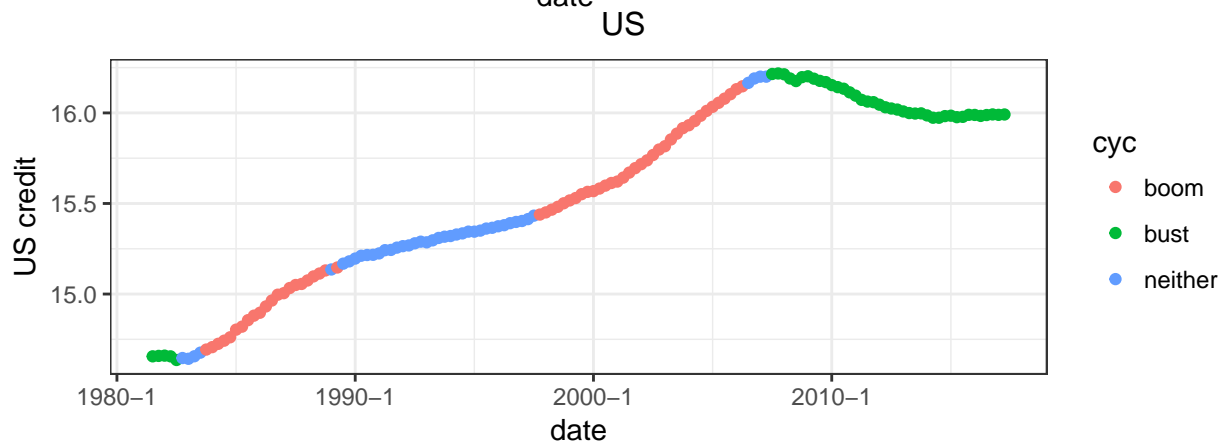
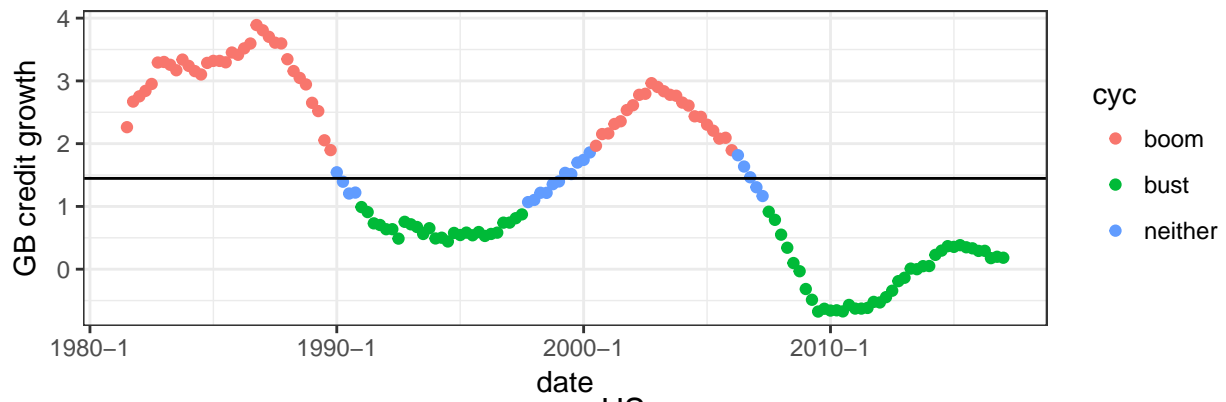
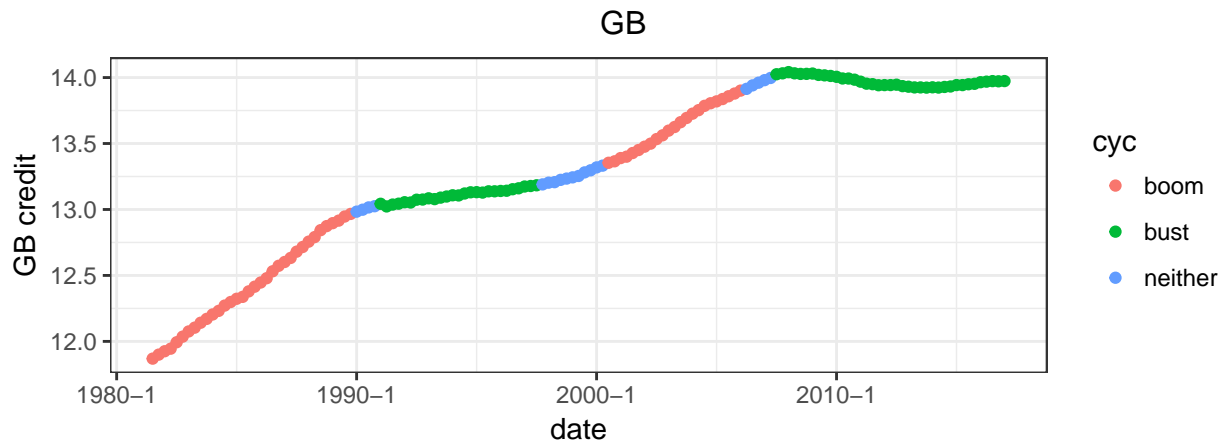
date



SE credit growth

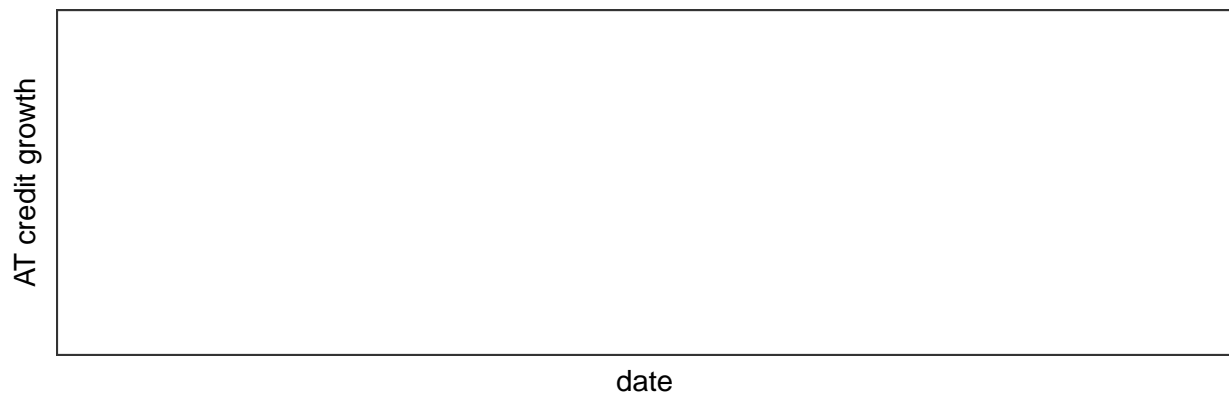
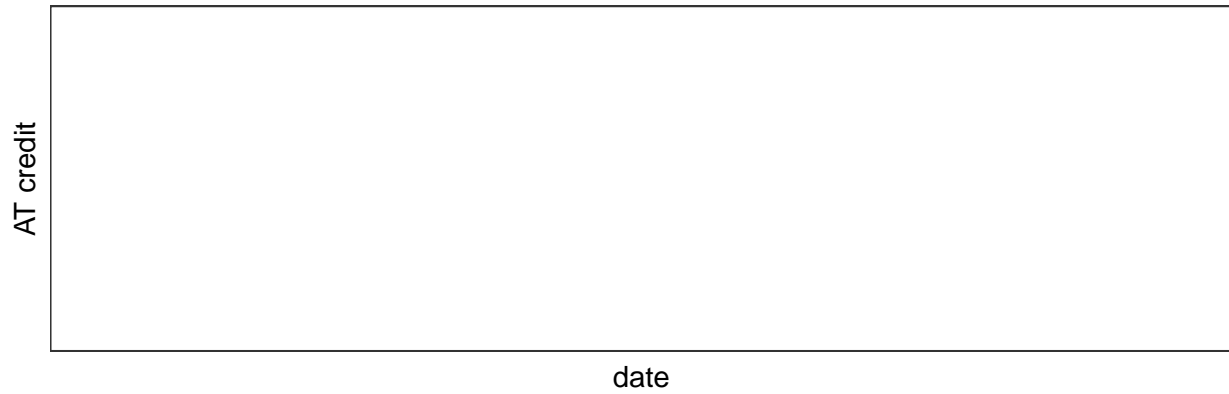
date
CH

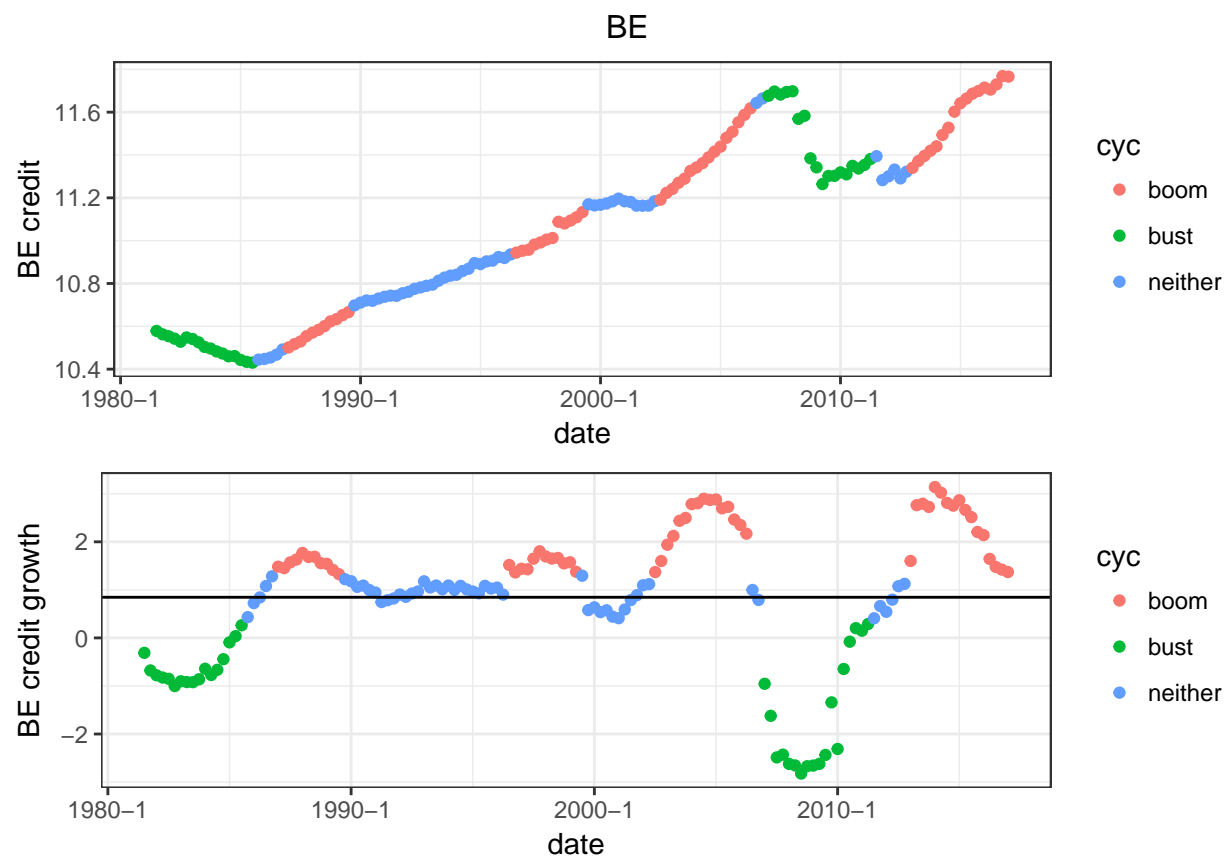




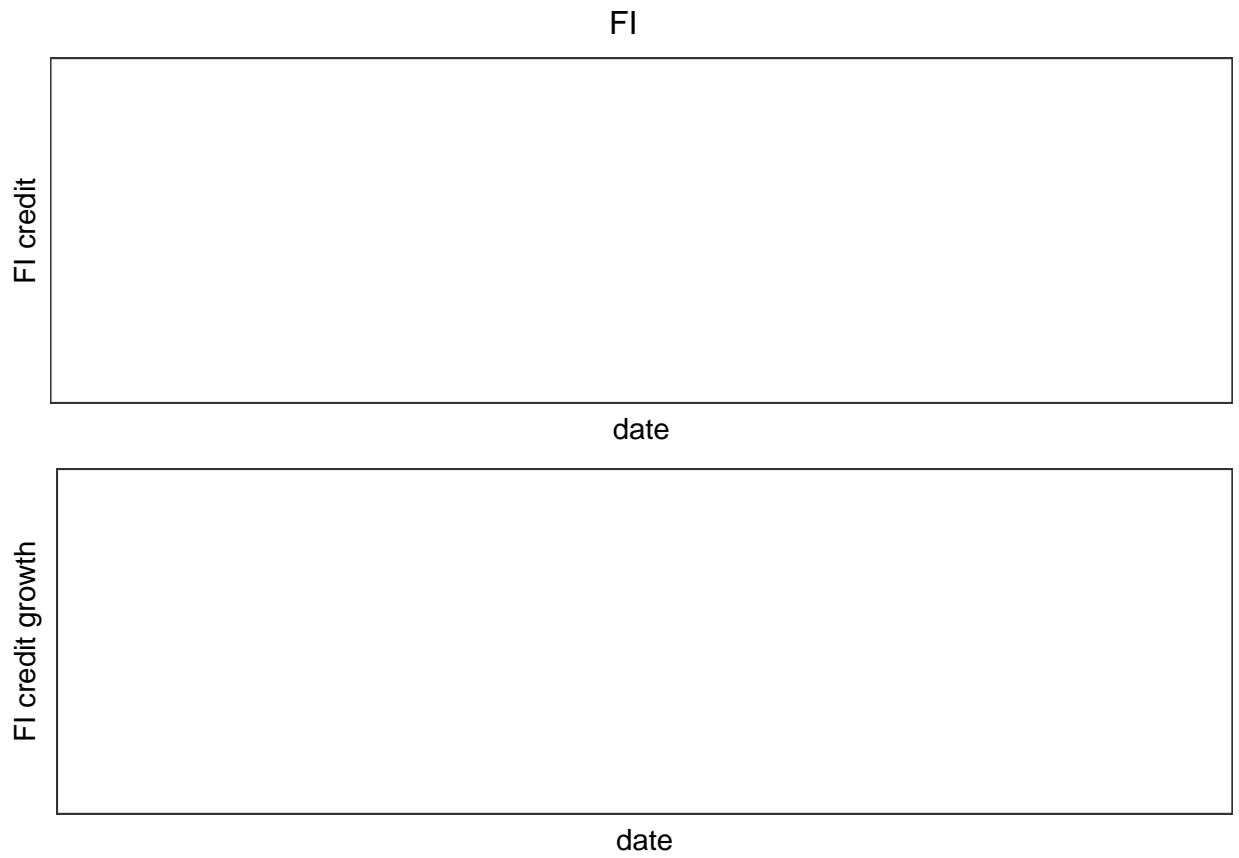
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AT

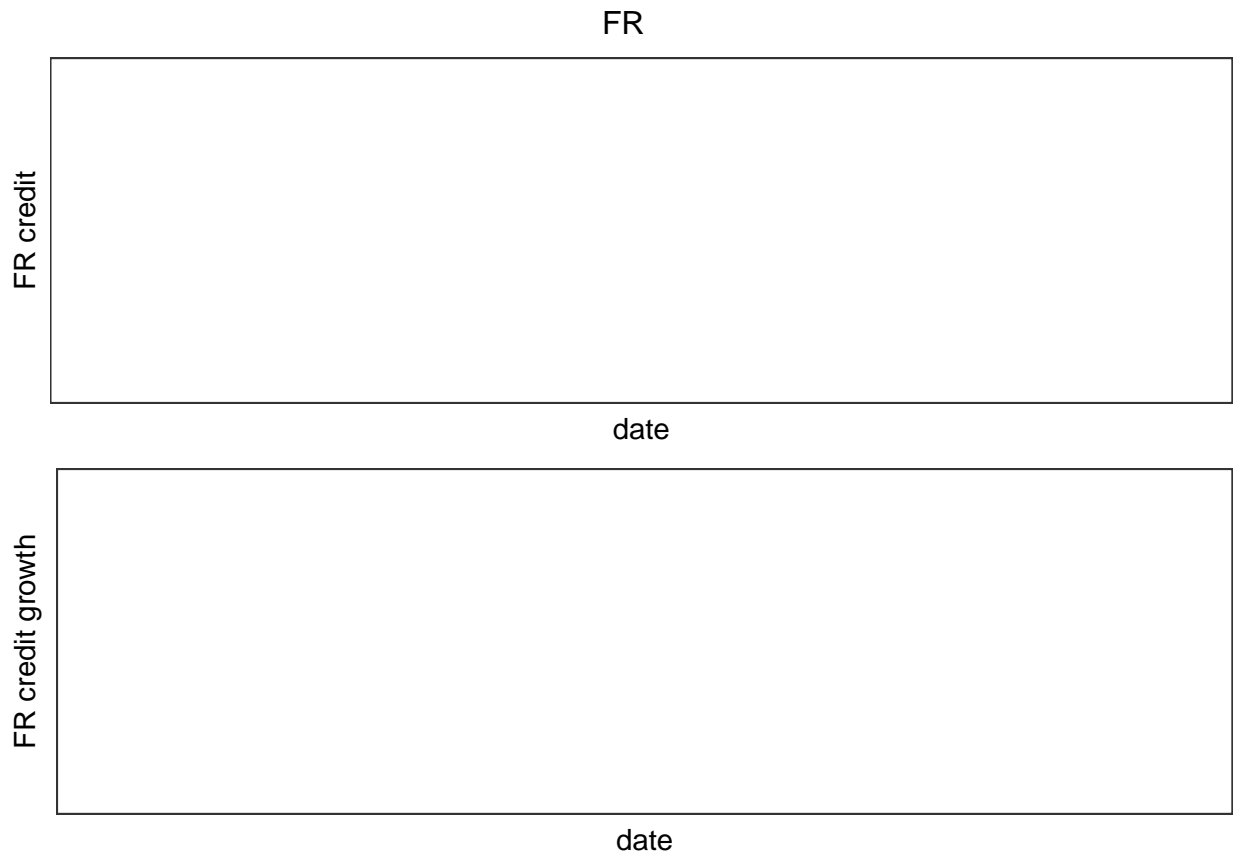




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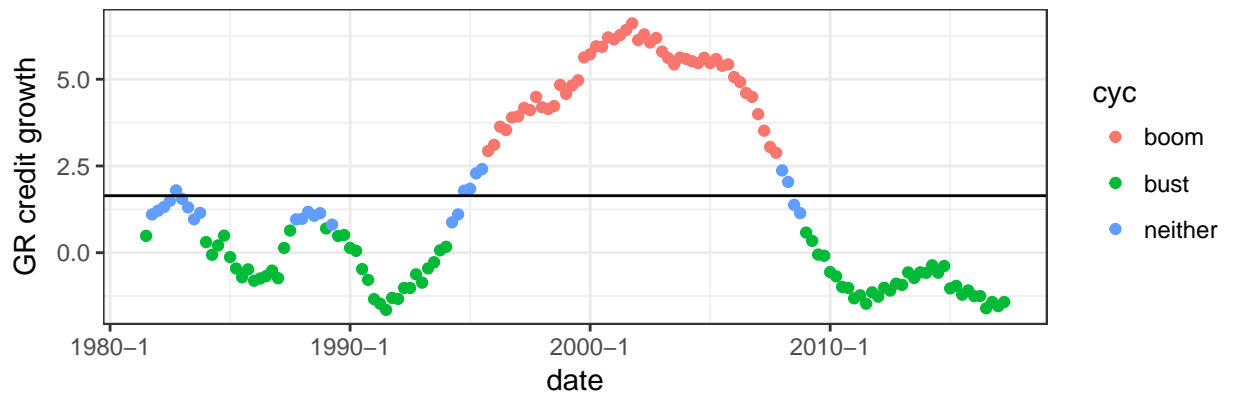
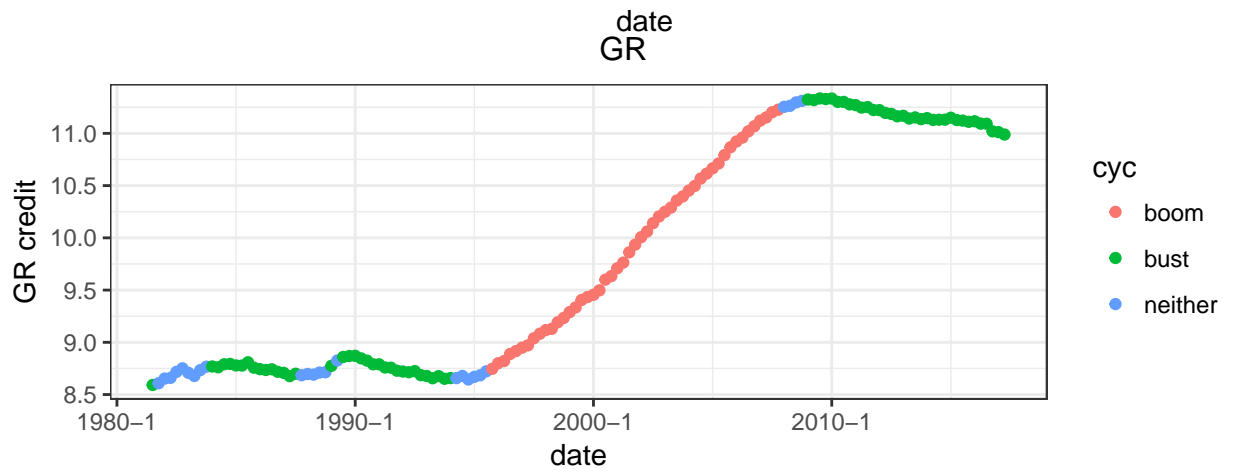
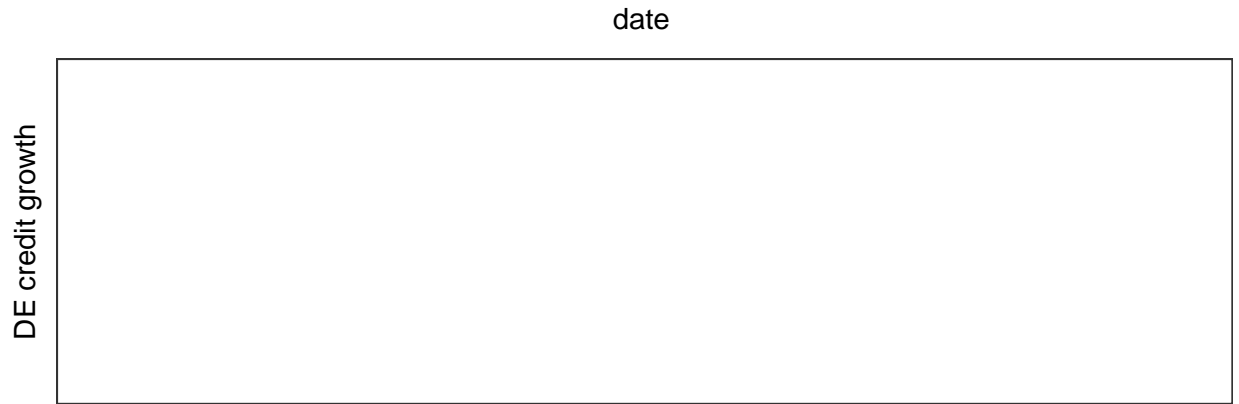


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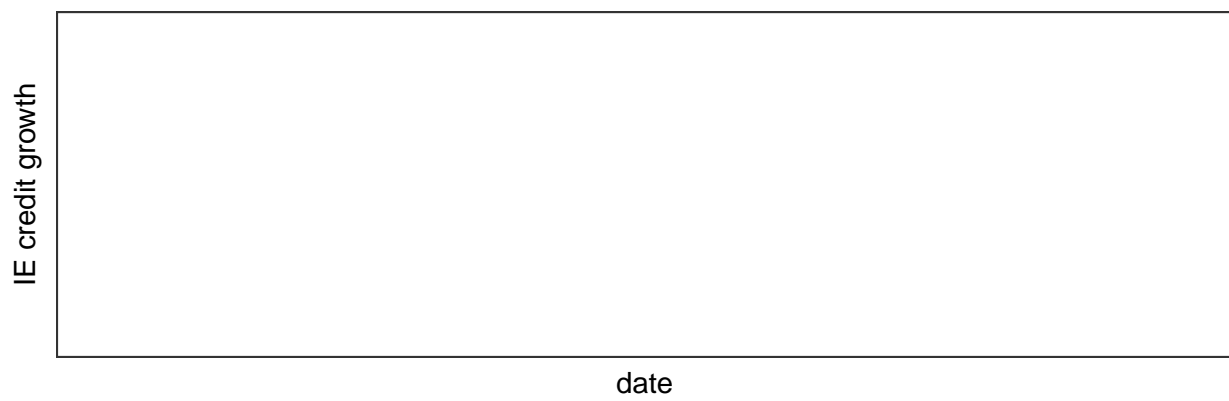
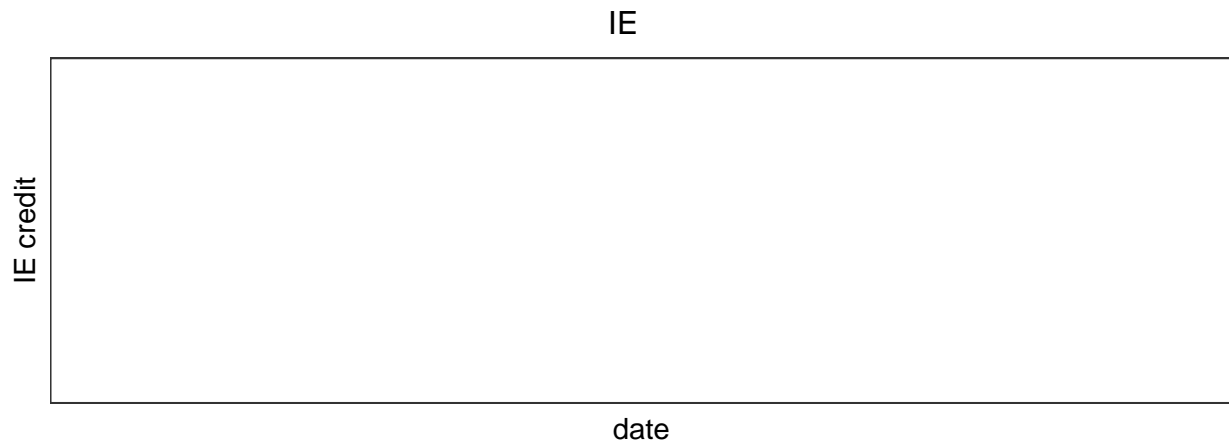


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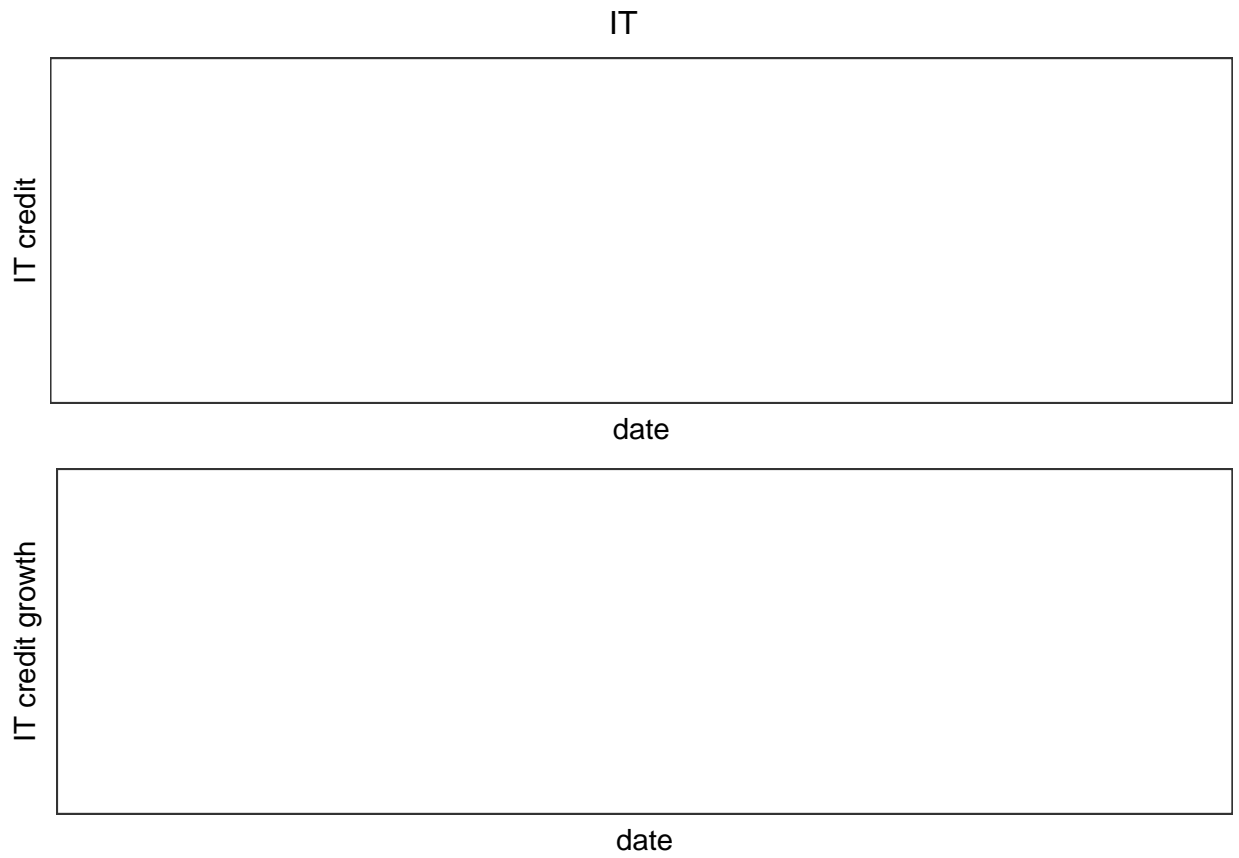
DE



Warning: Removed 1 rows containing missing values (geom_hline).



Warning: Removed 1 rows containing missing values (geom_hline).

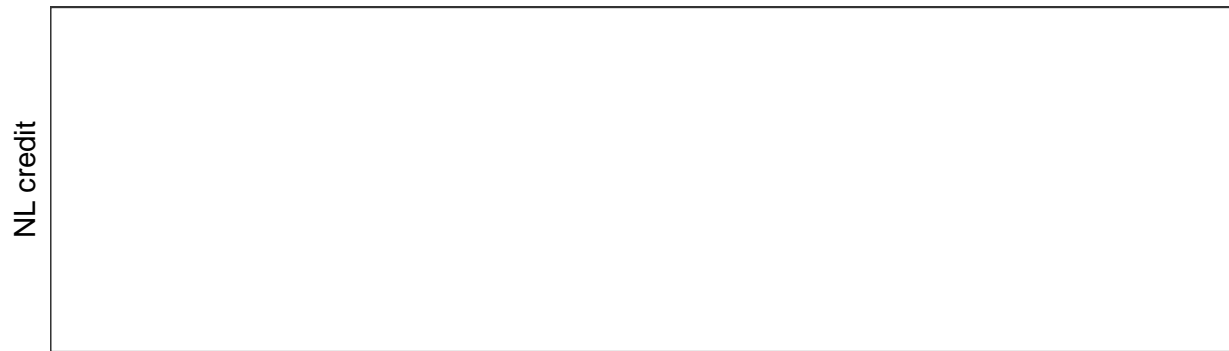


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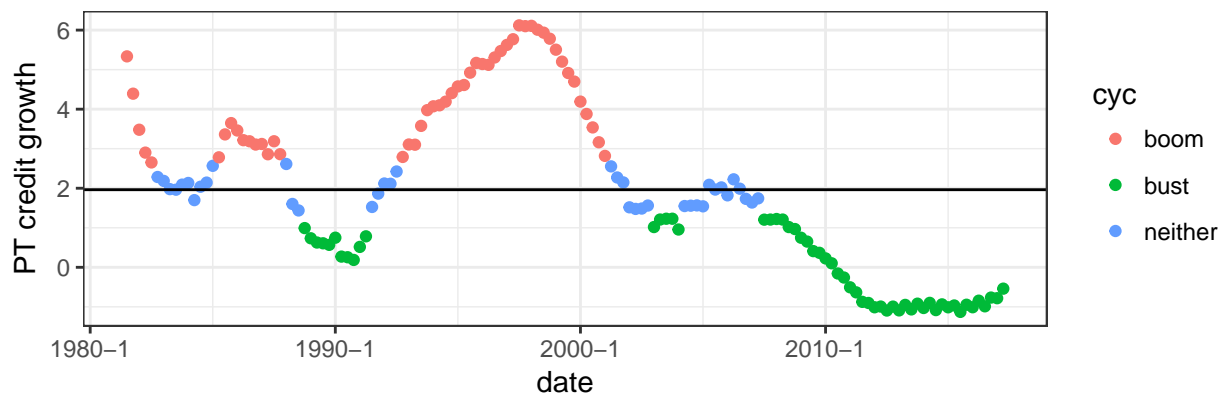
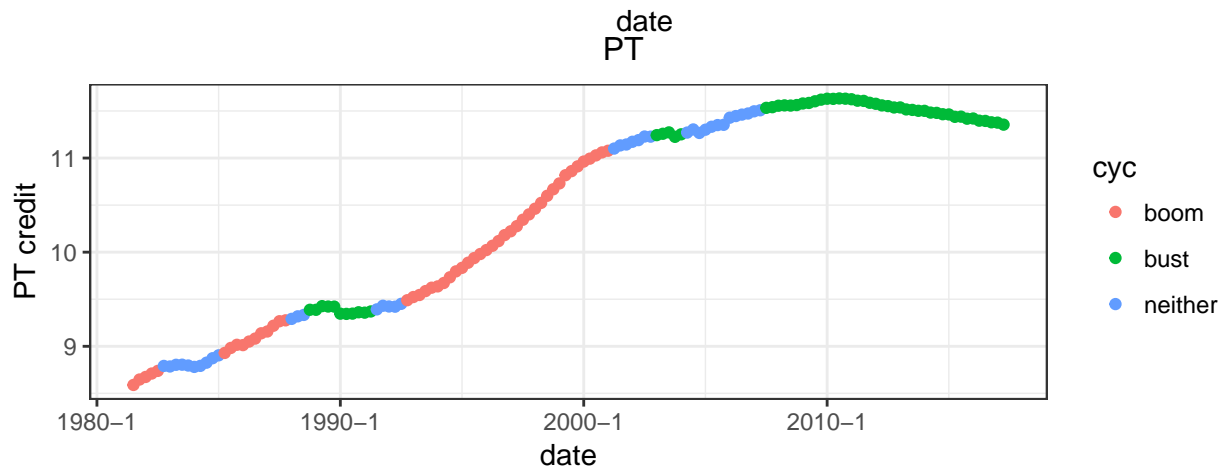


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NL

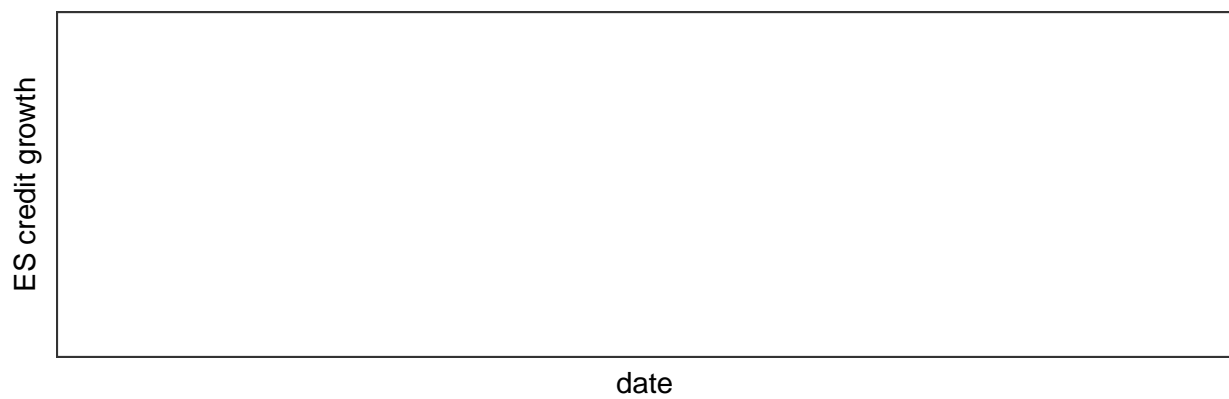
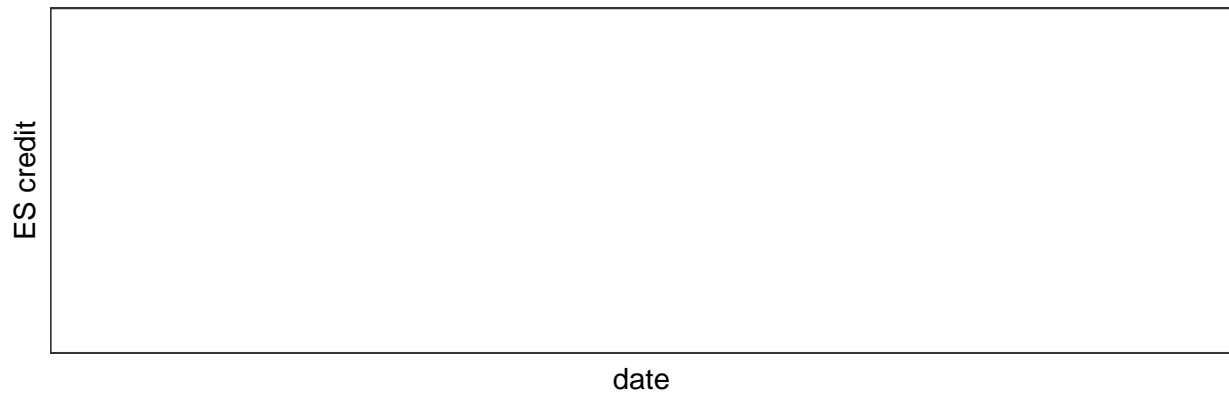


date

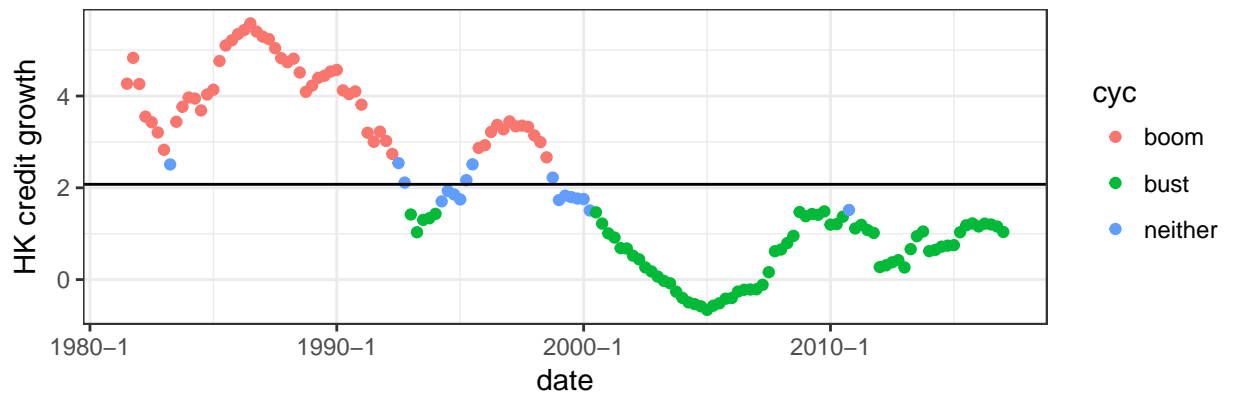
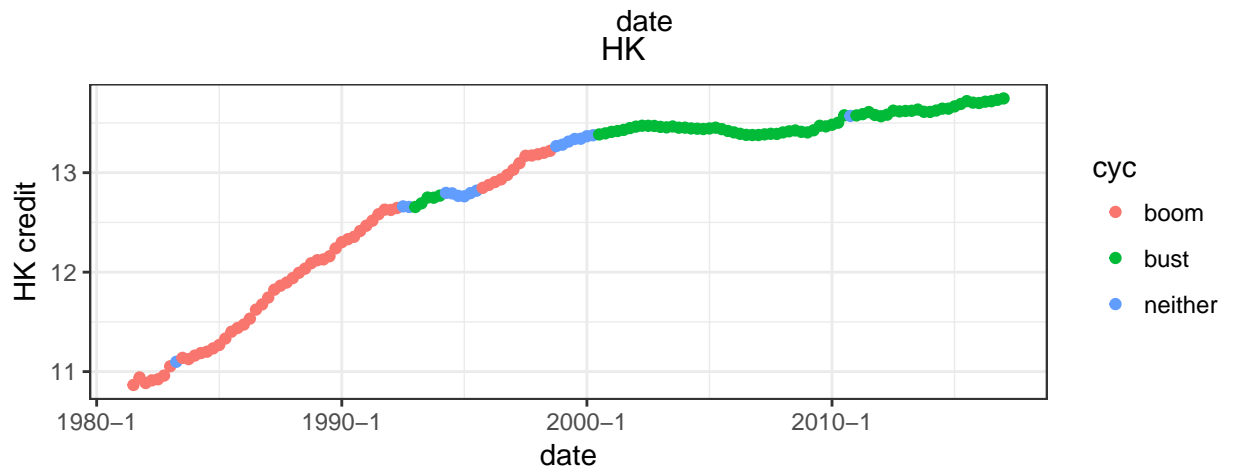
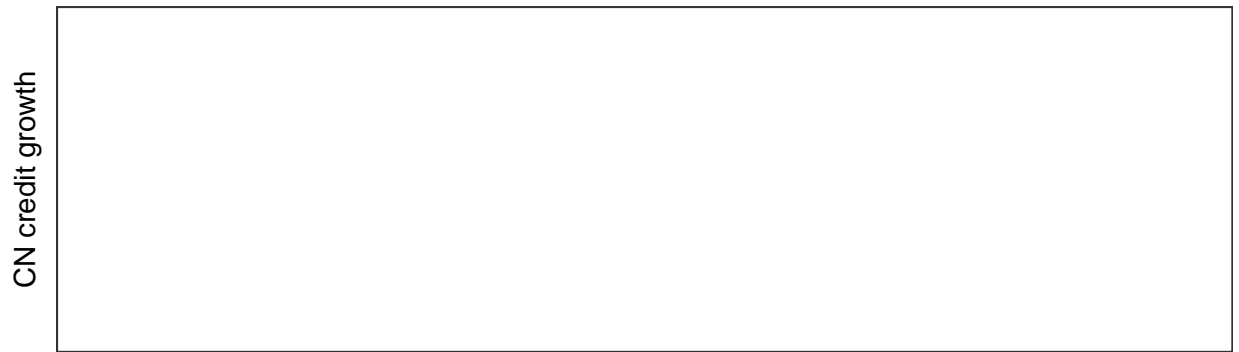
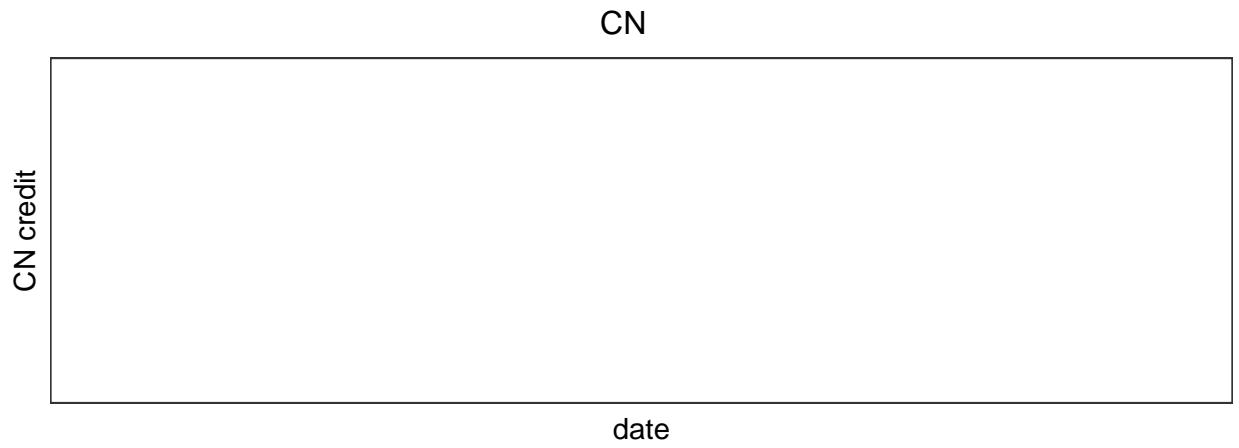


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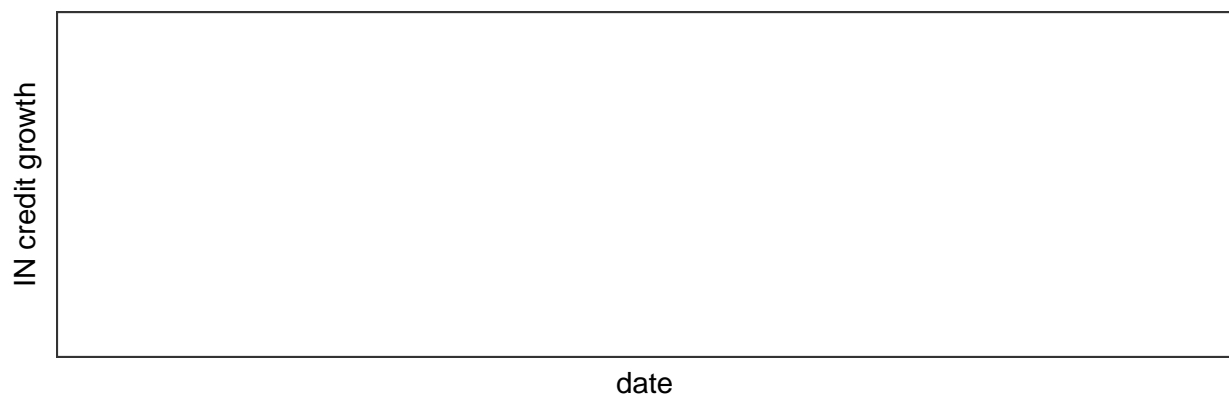
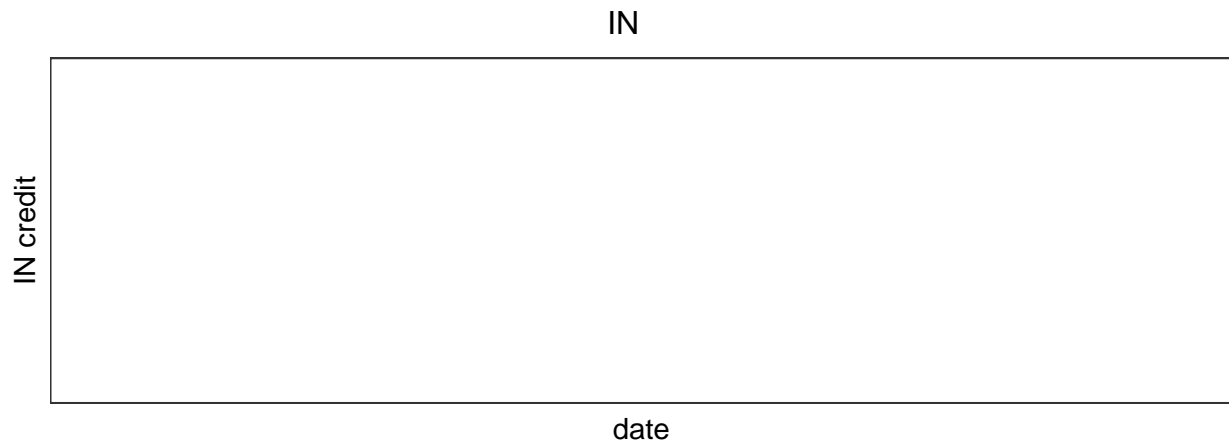
ES



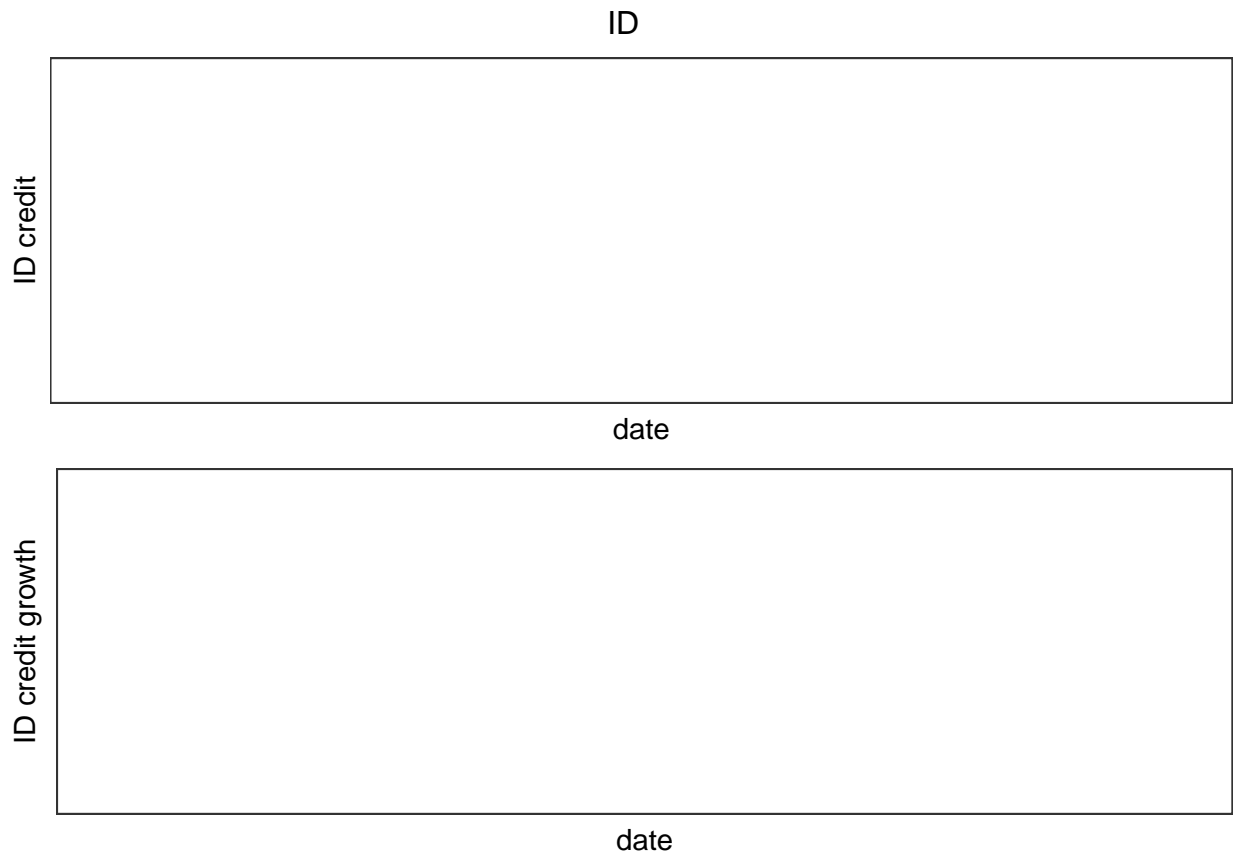
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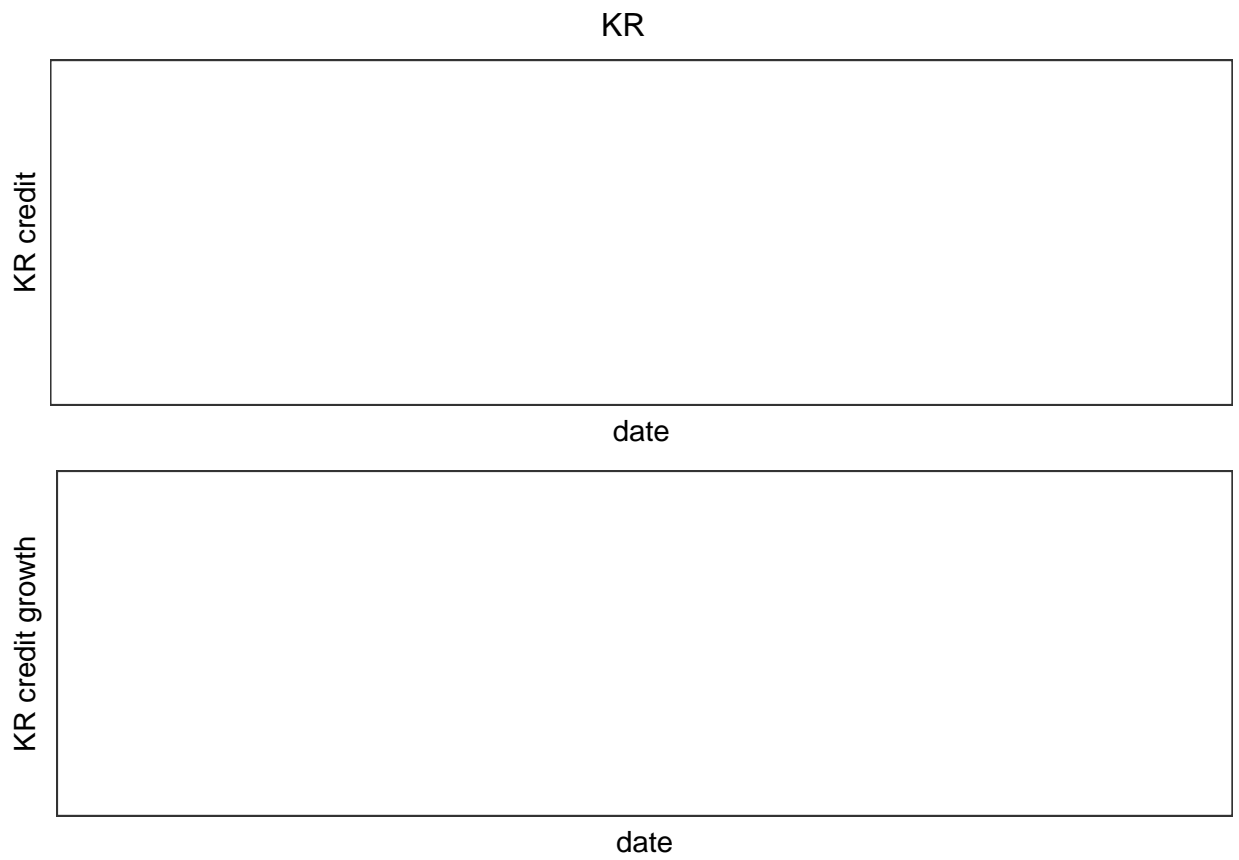
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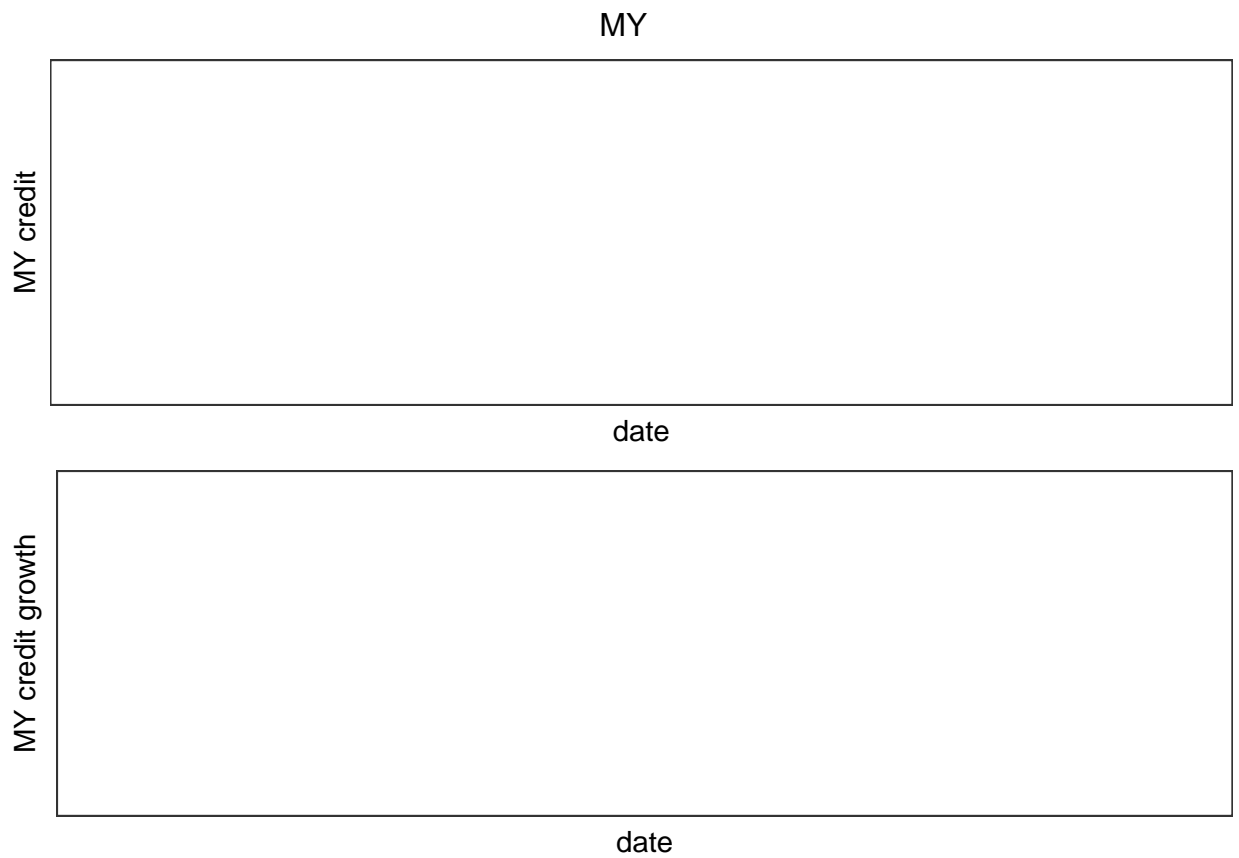
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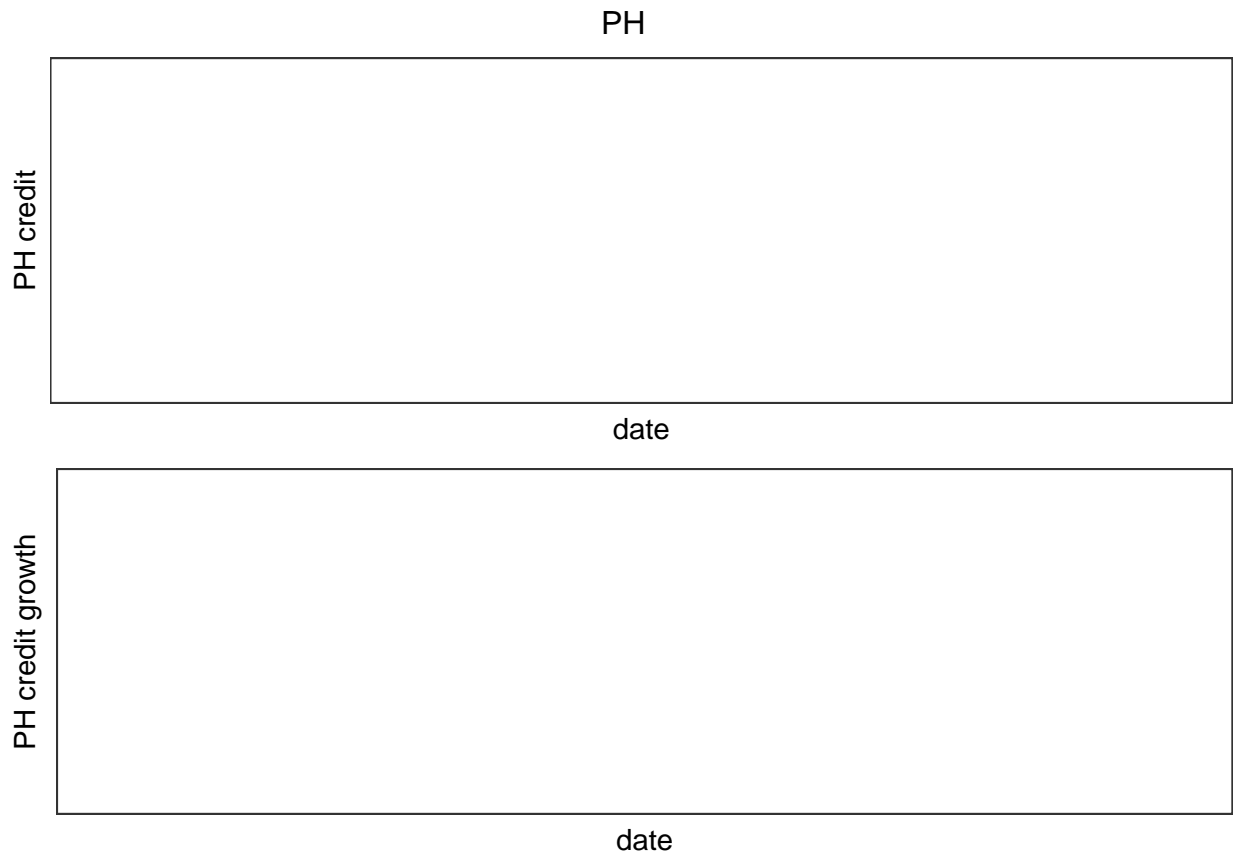
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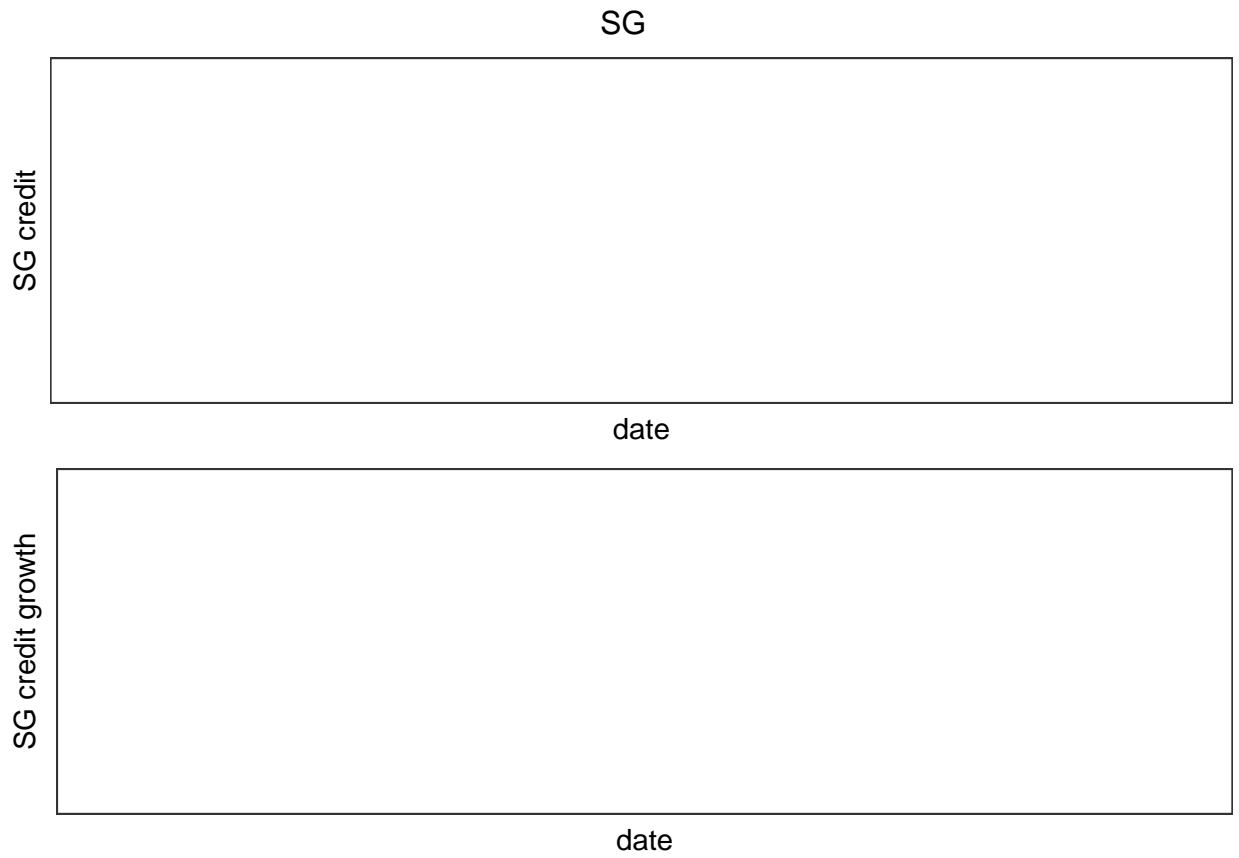
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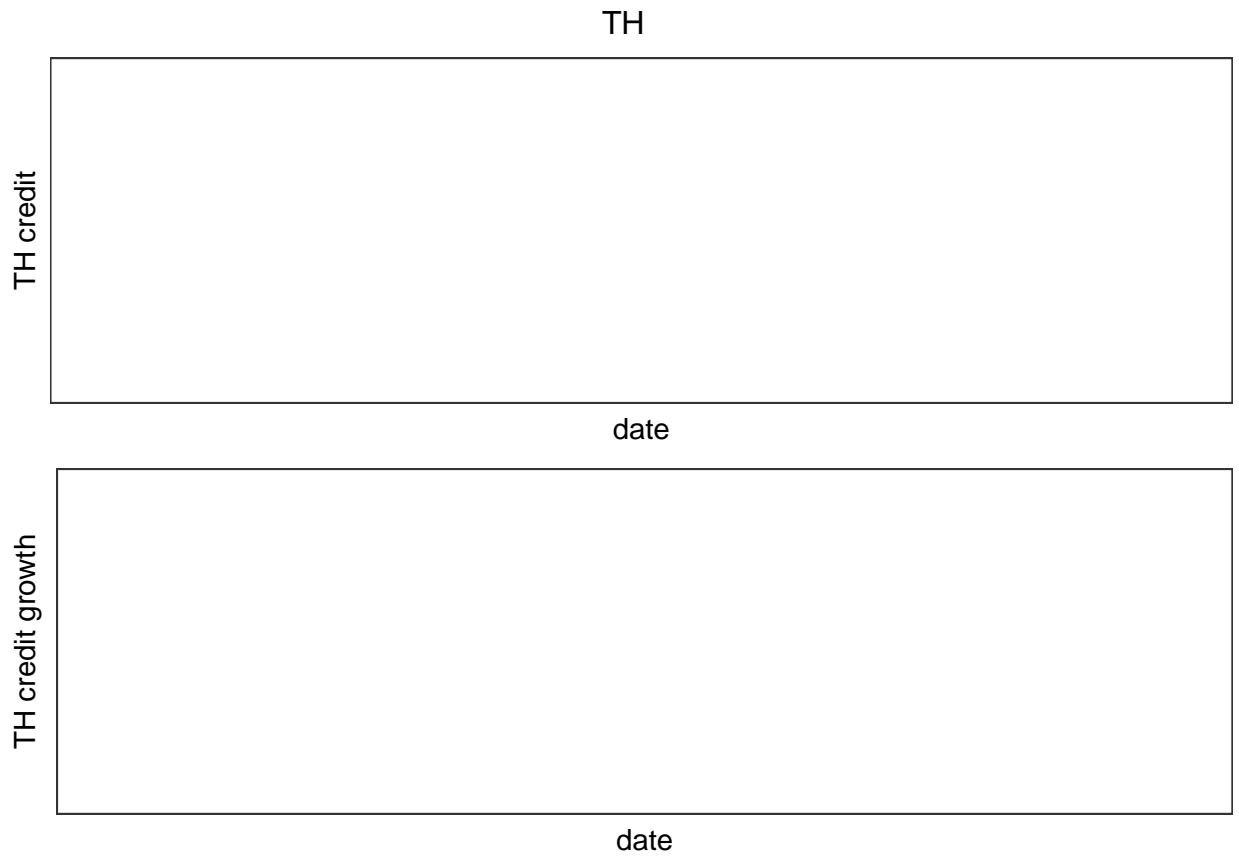
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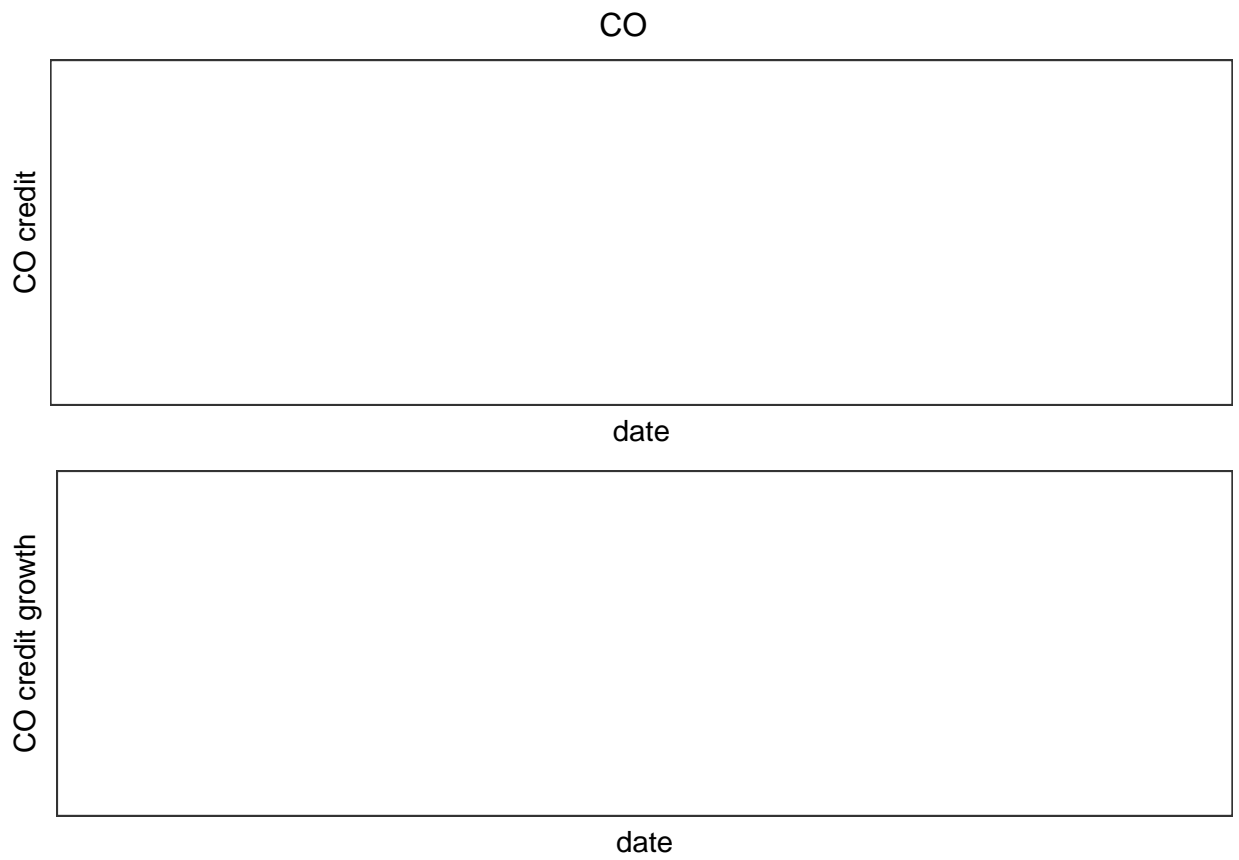
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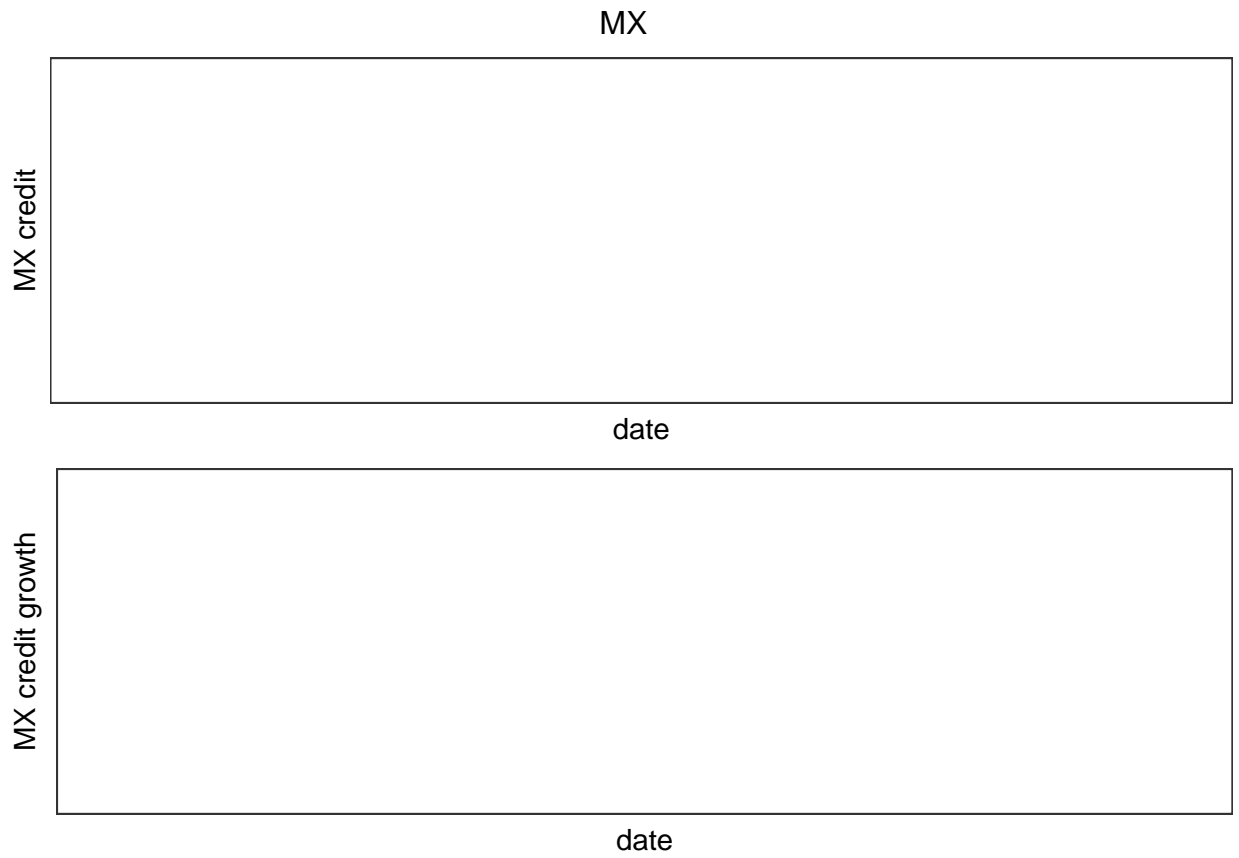
Warning: Removed 1 rows containing missing values (geom_hline).



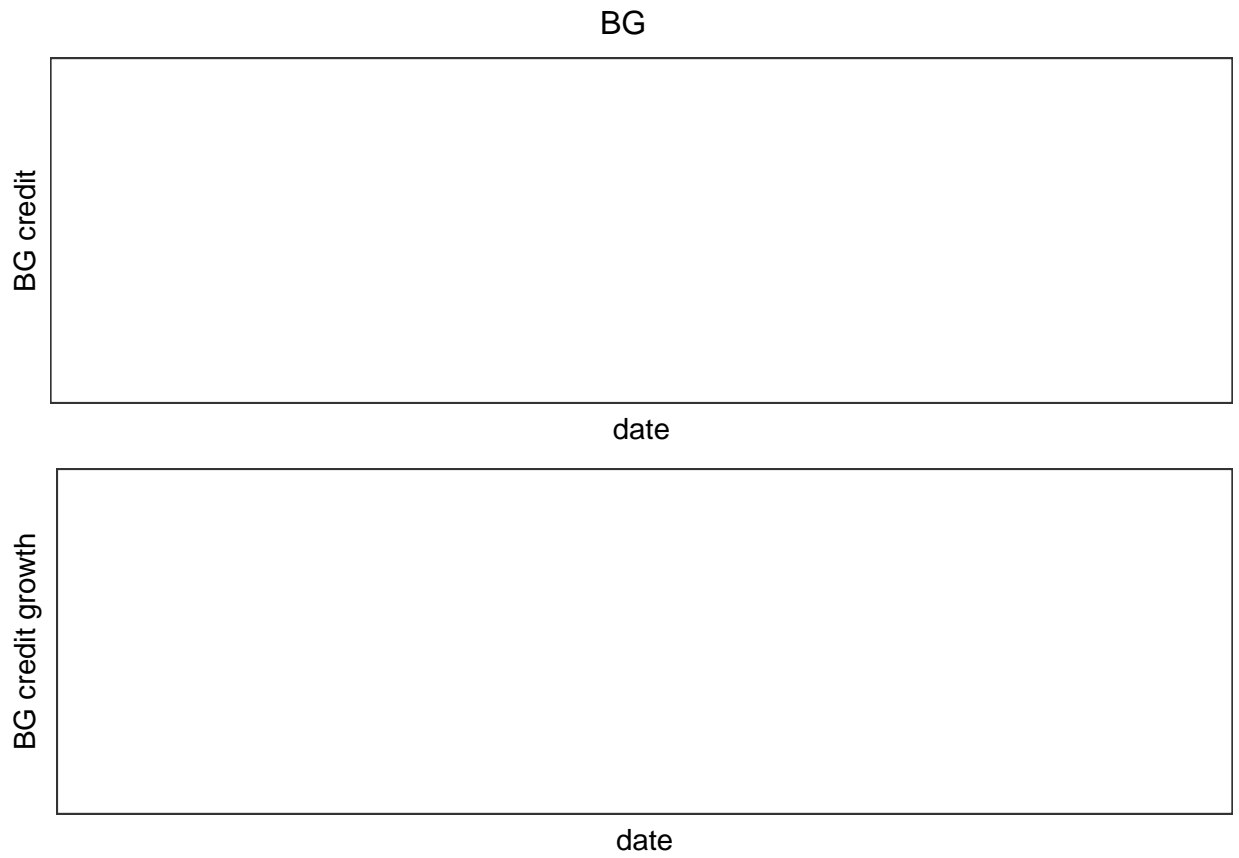
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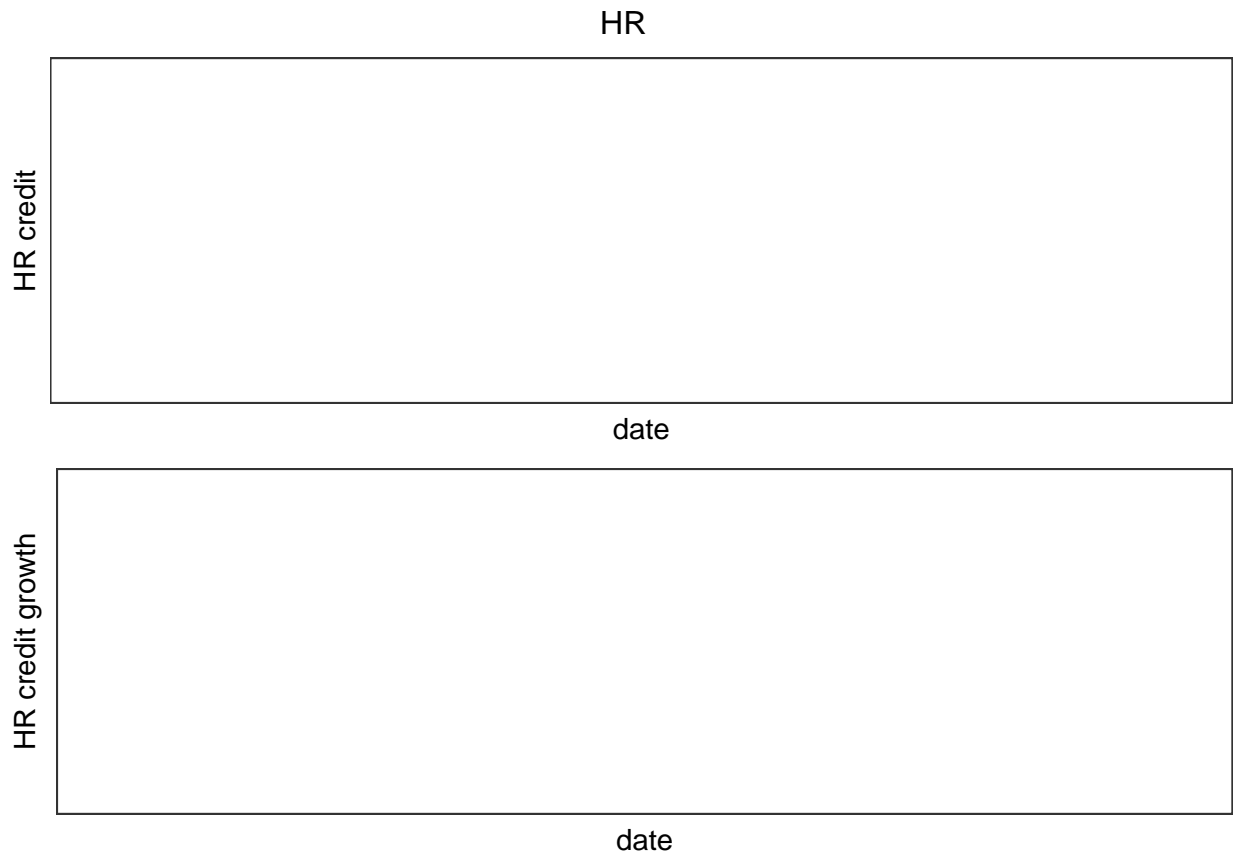
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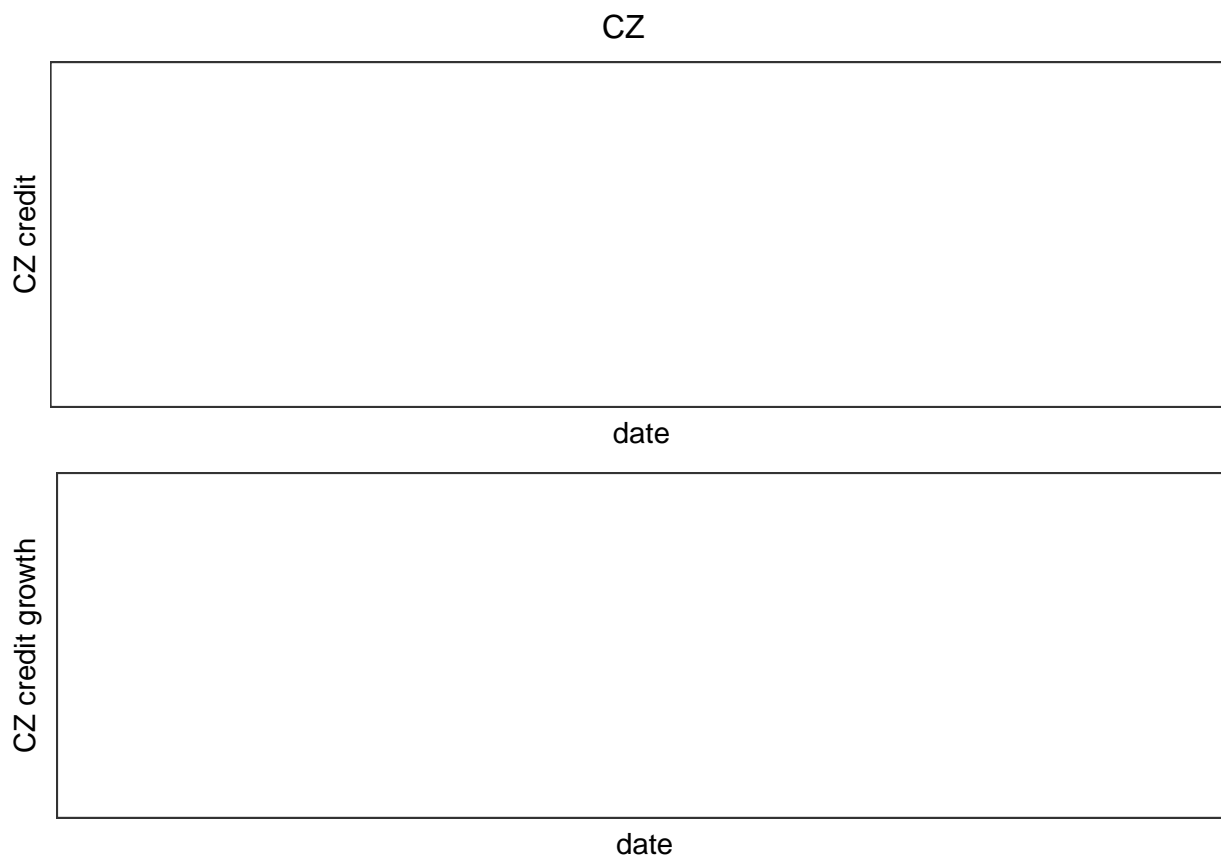
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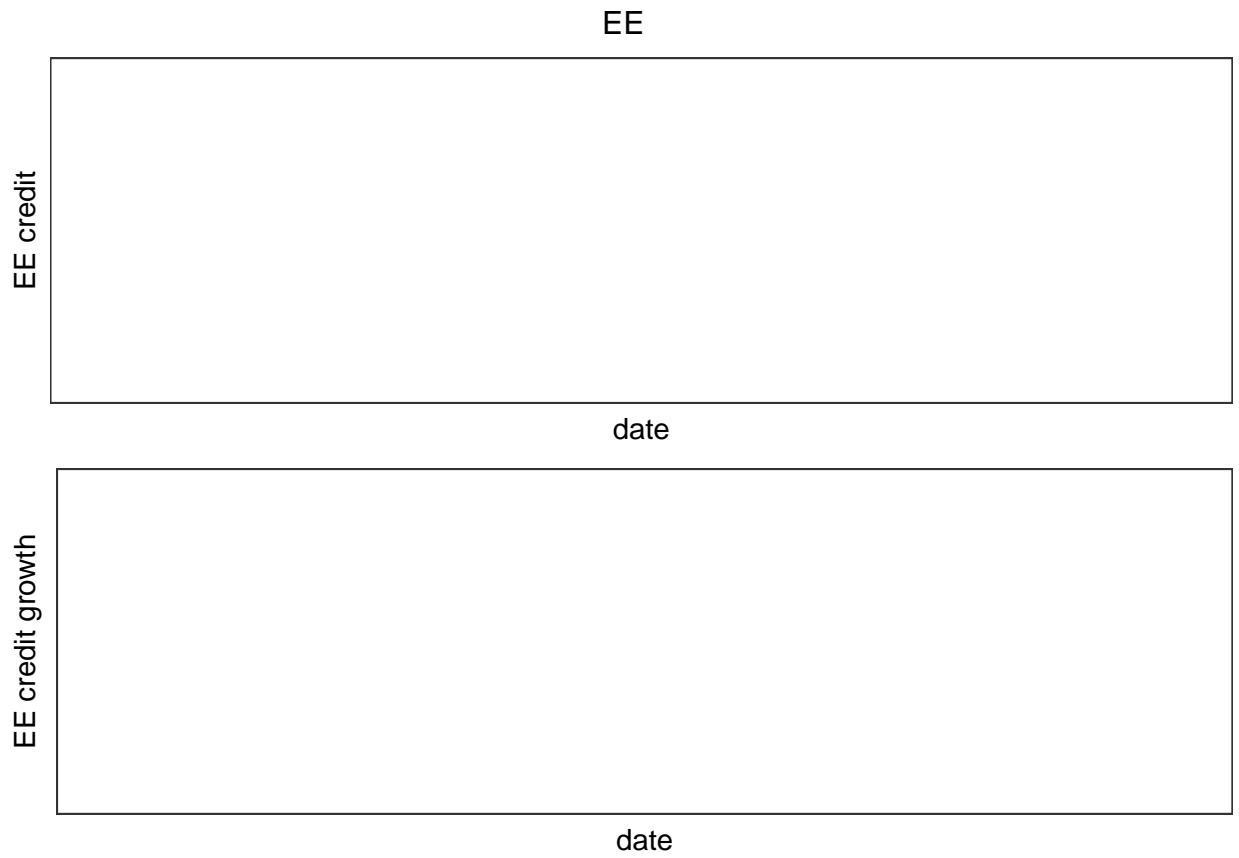
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Warning: Removed 1 rows containing missing values (geom_hline).



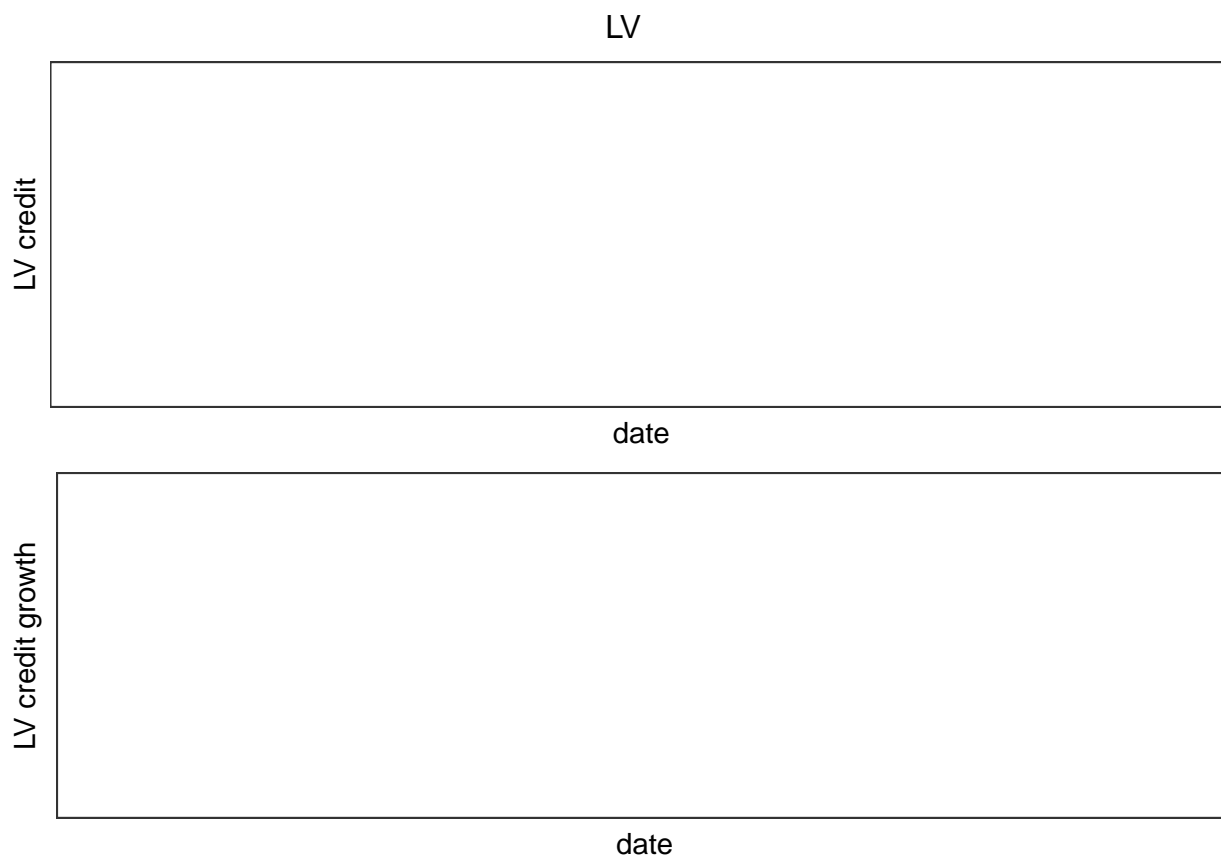
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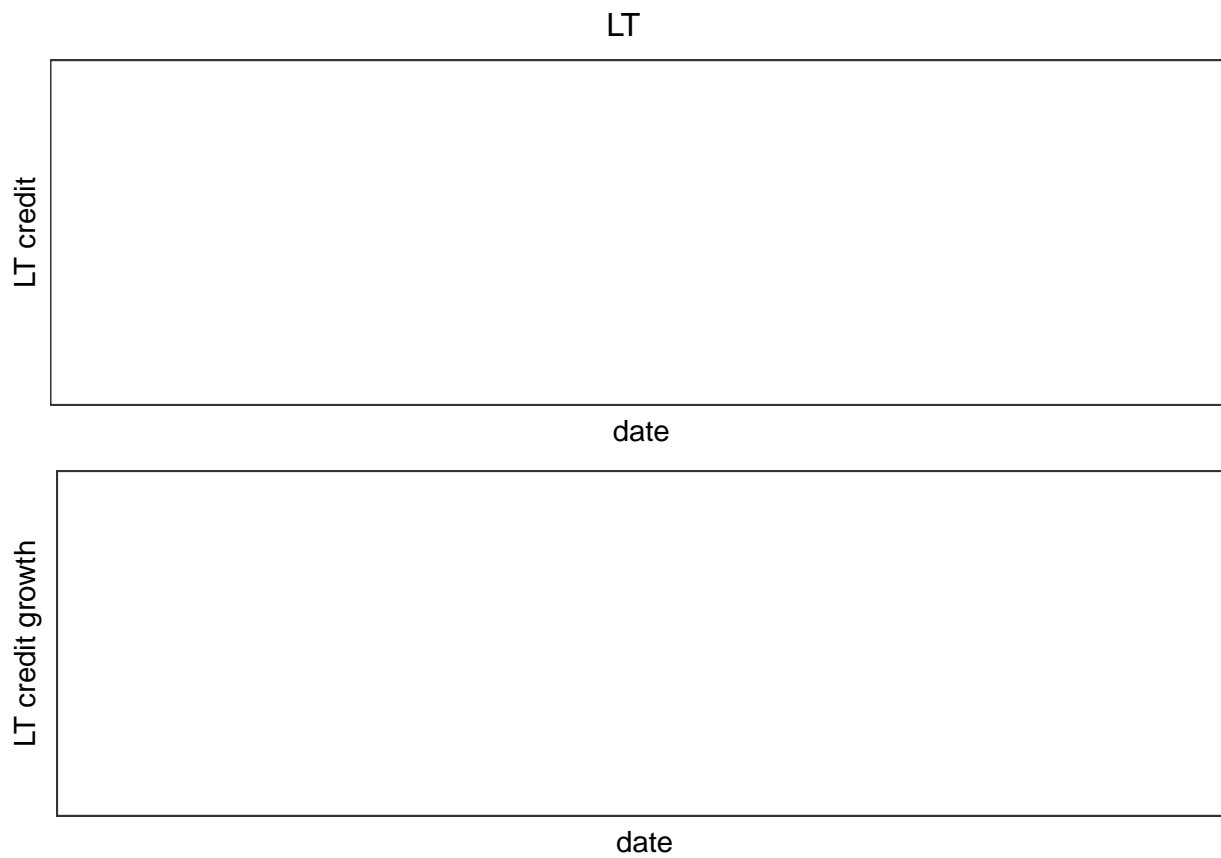
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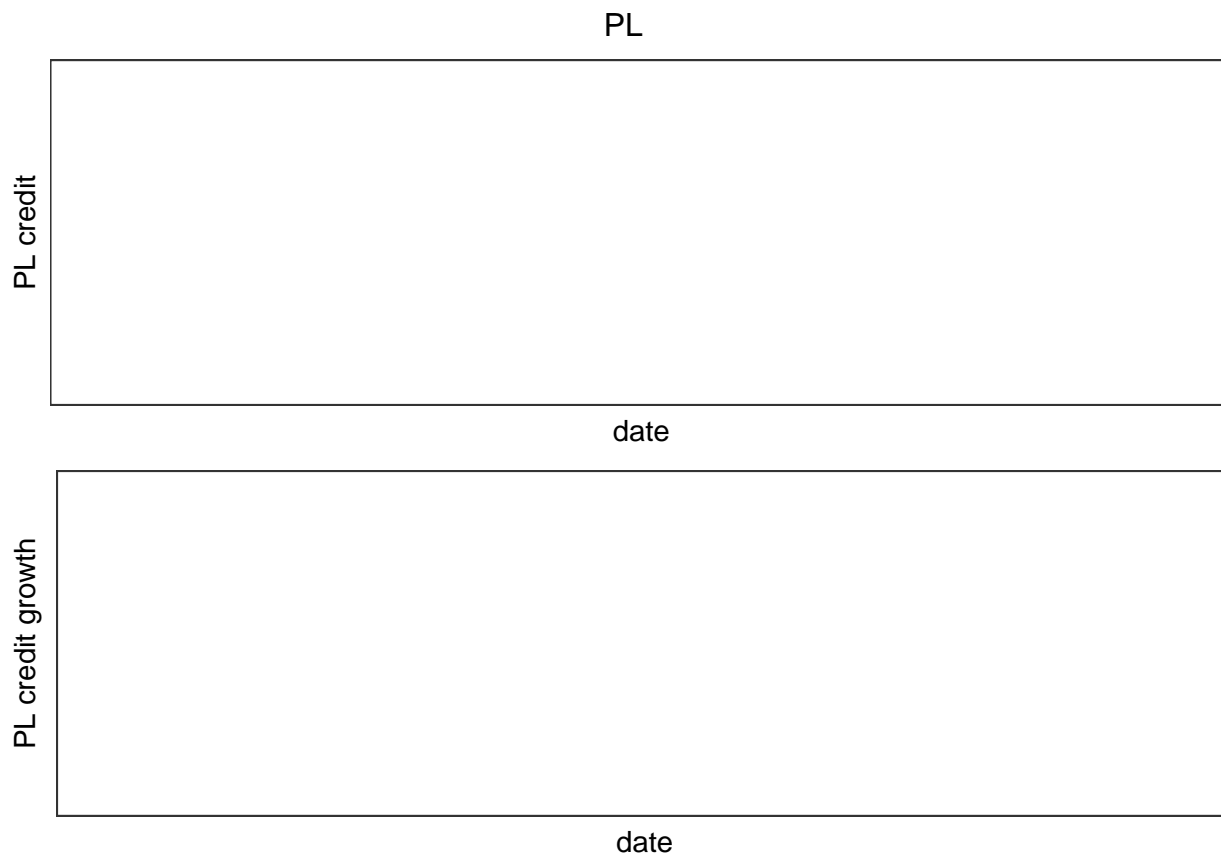
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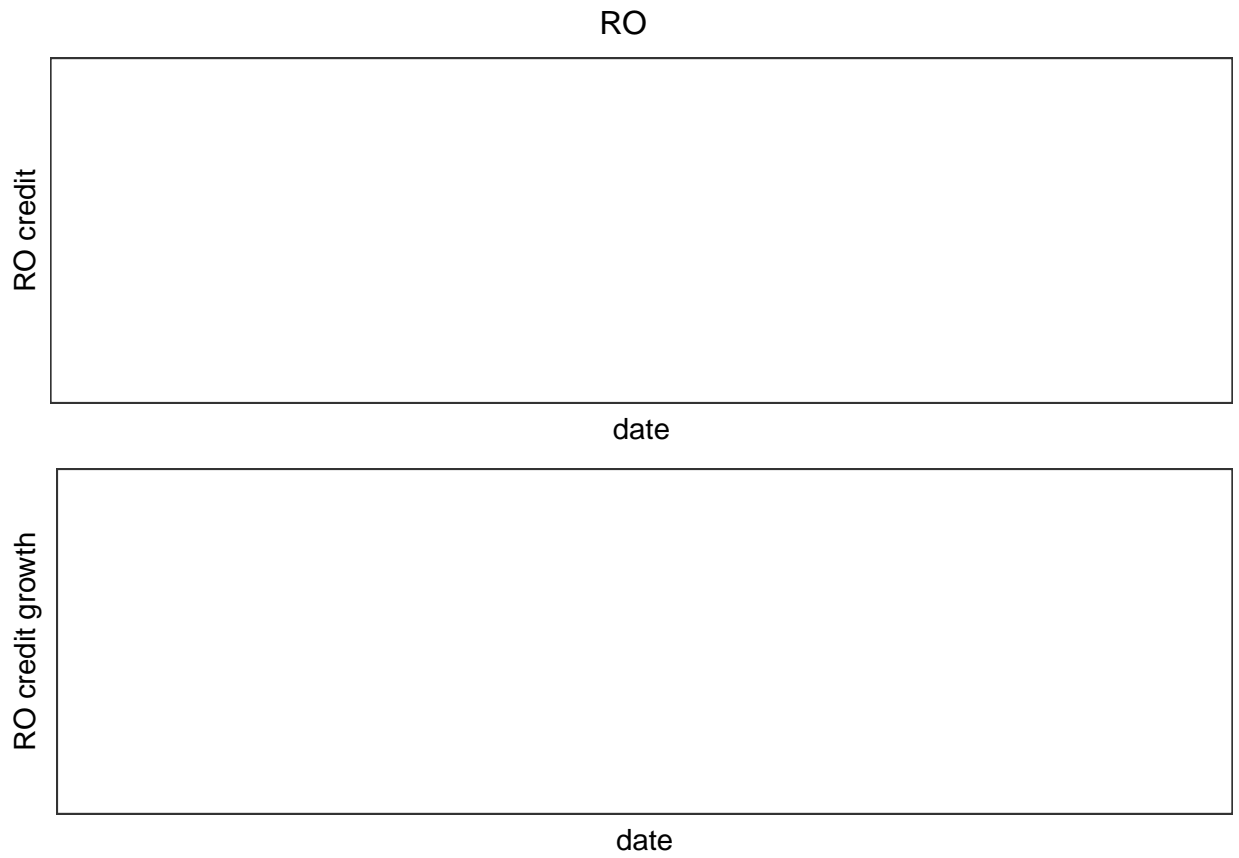
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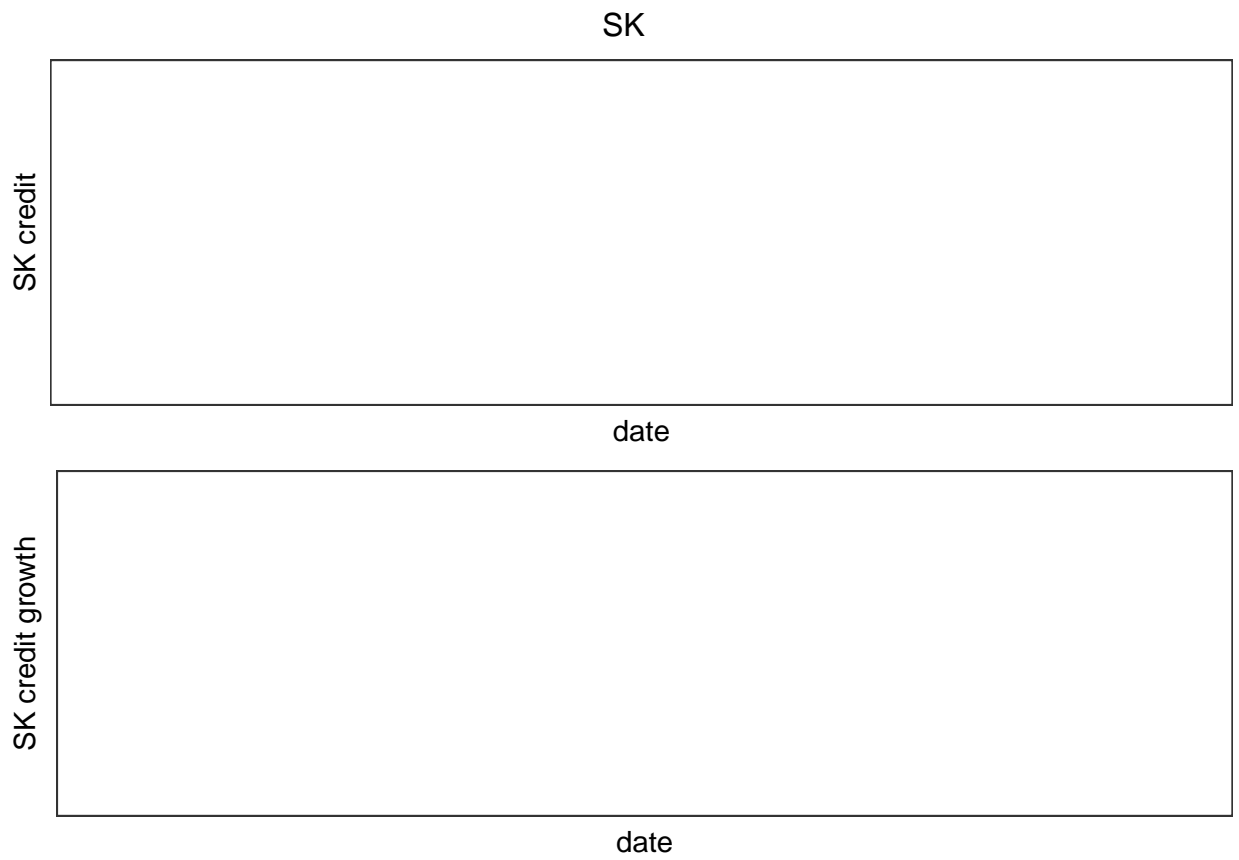
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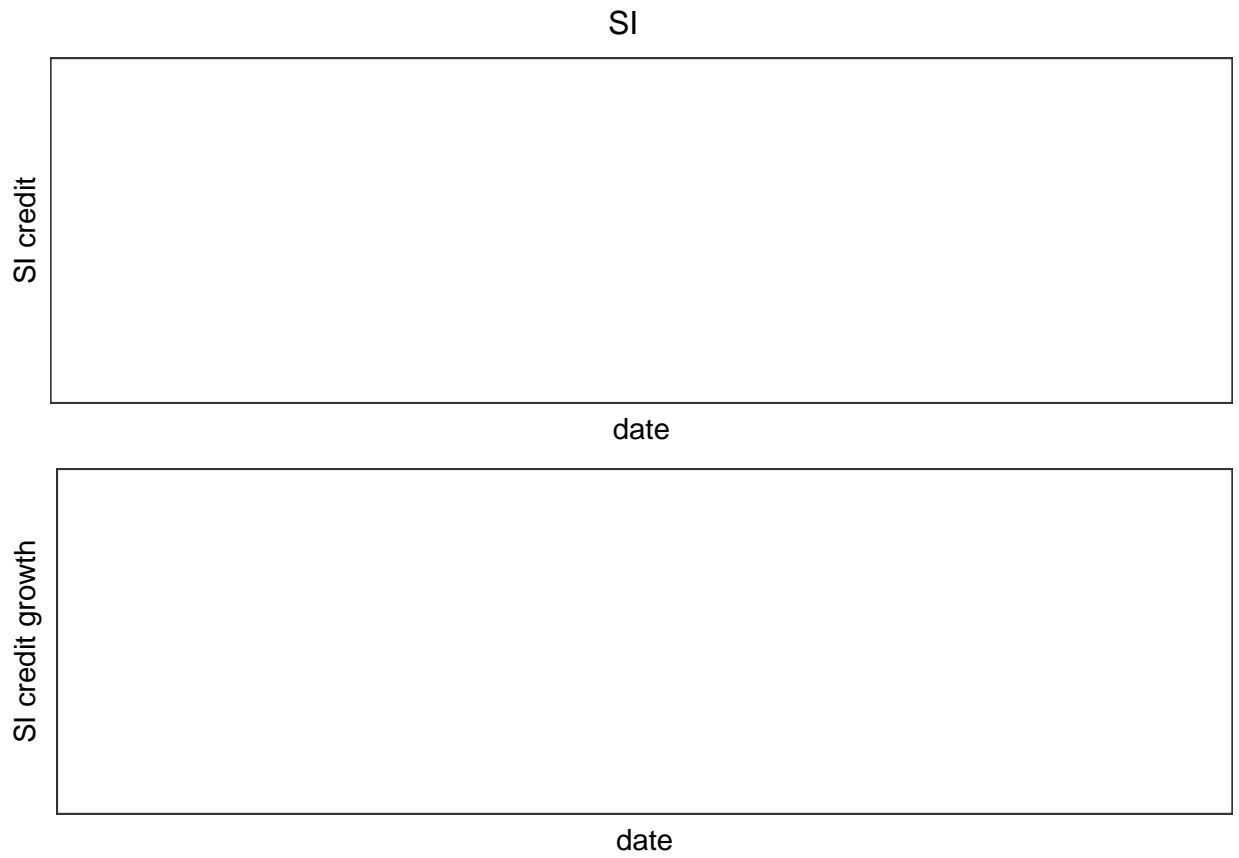
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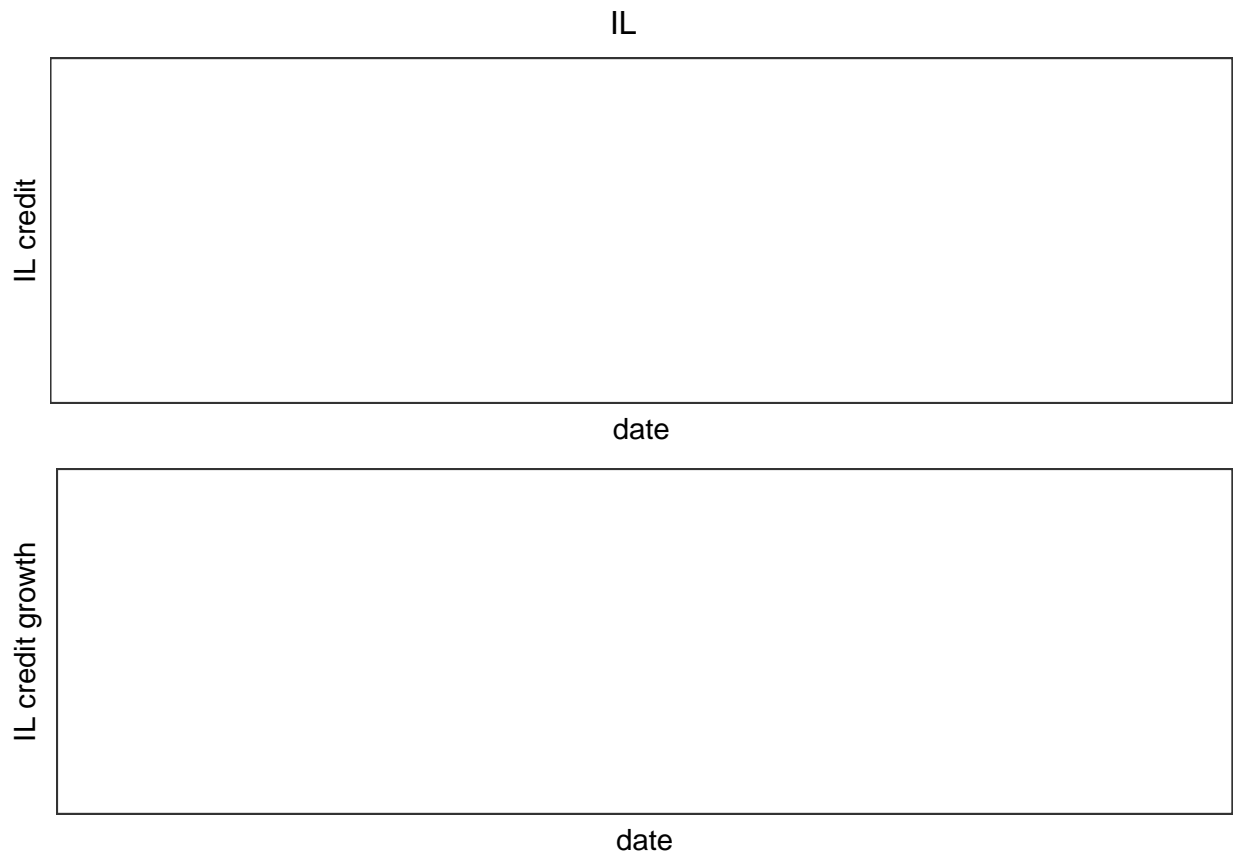
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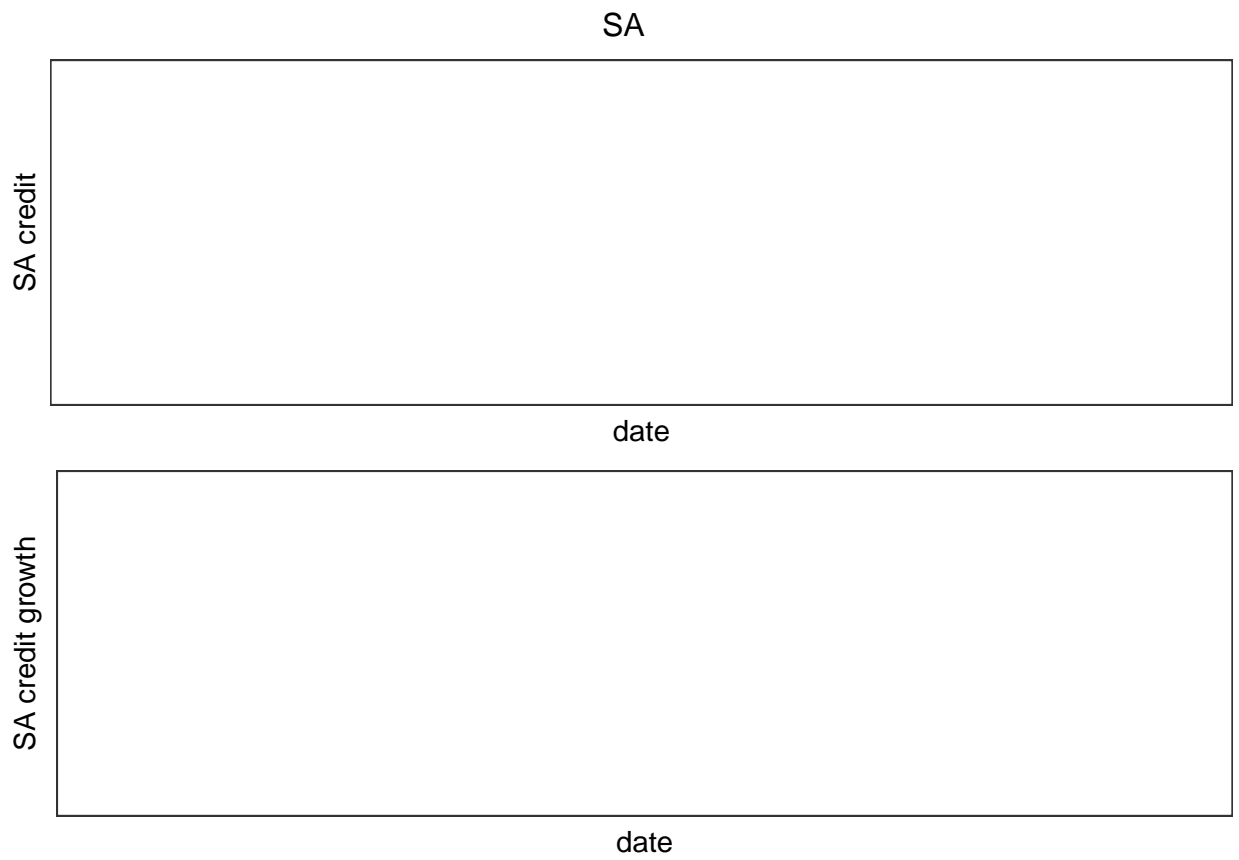
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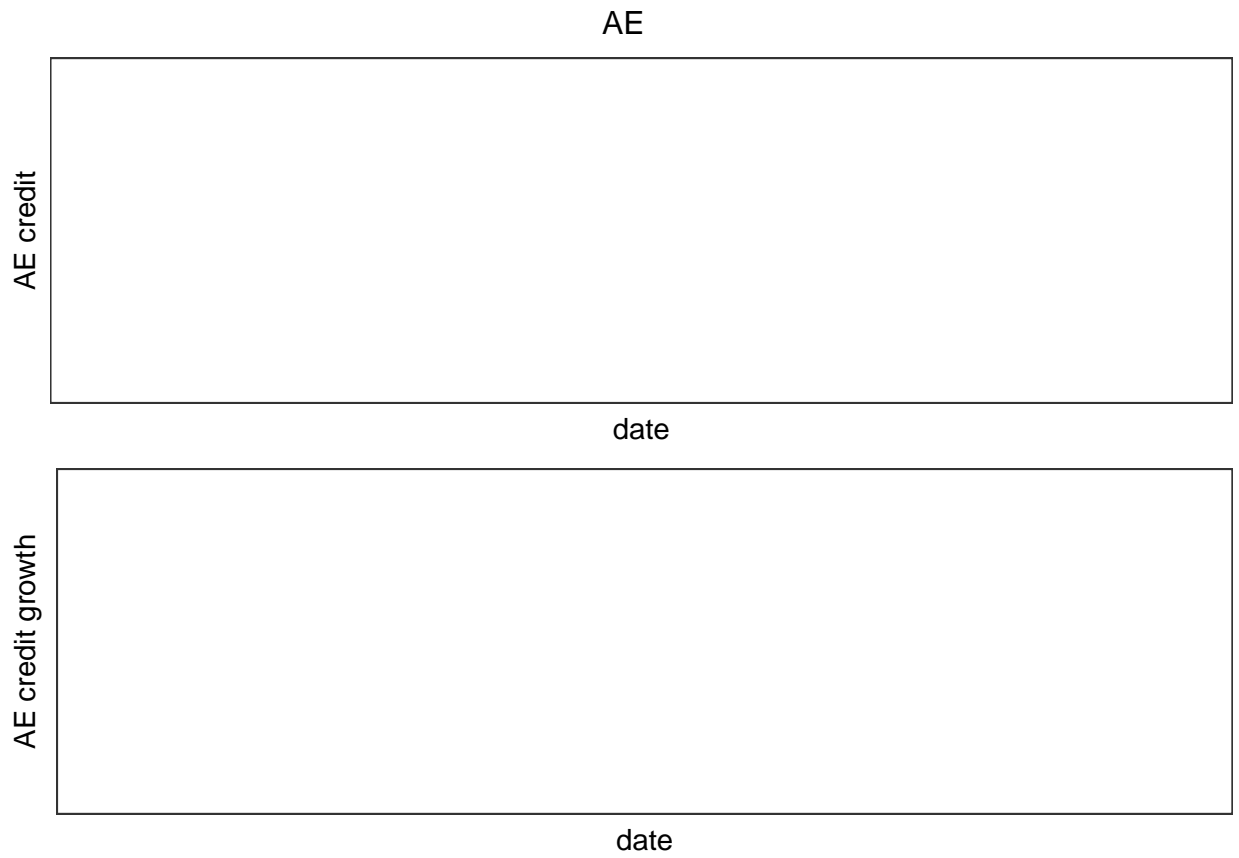
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Warning: Removed 1 rows containing missing values (geom_hline).

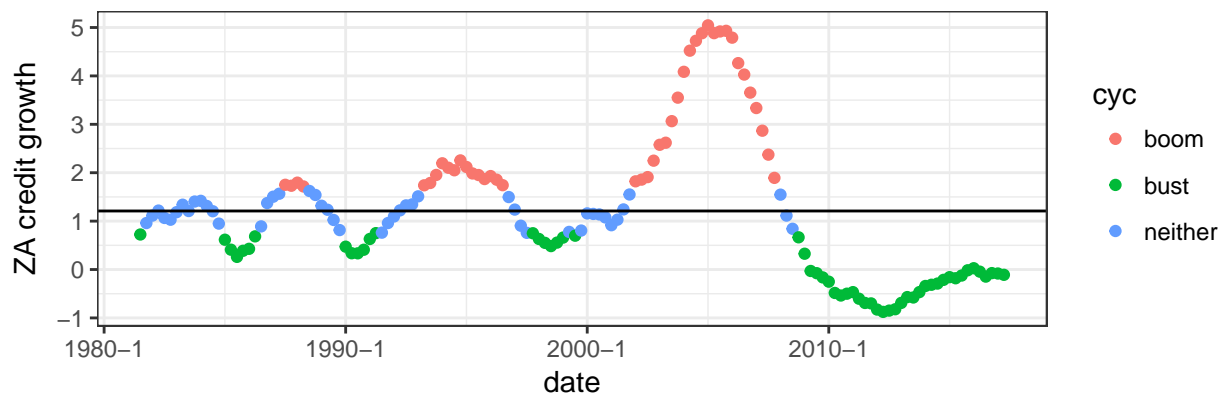
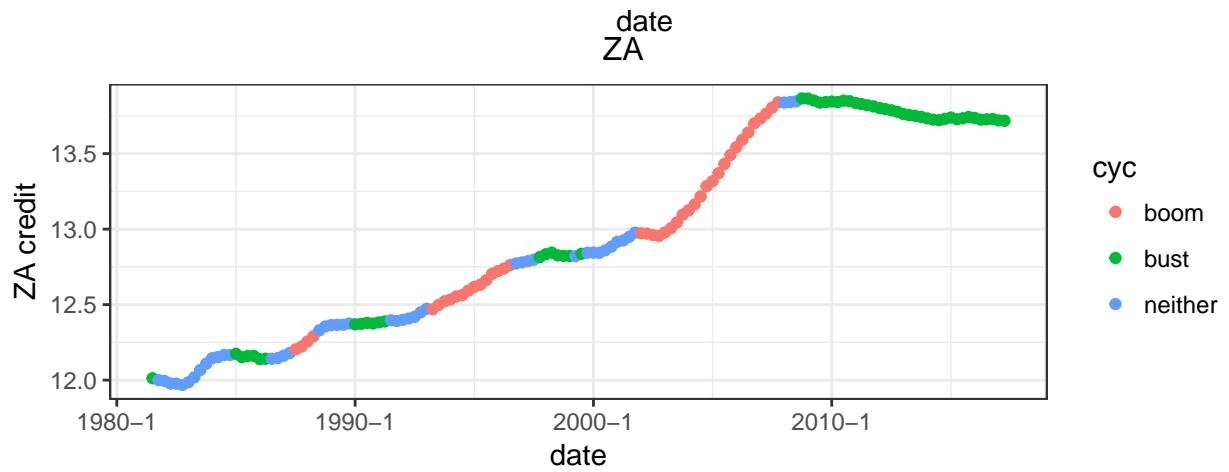
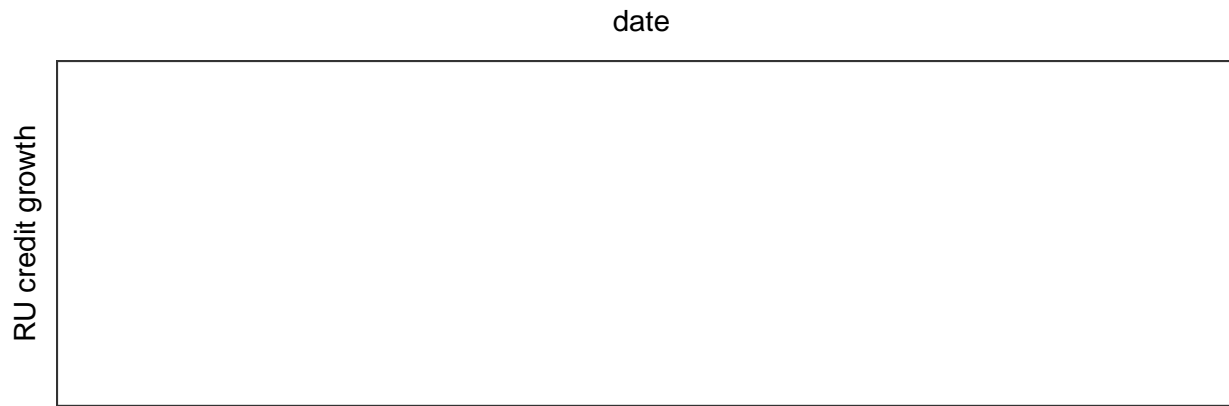
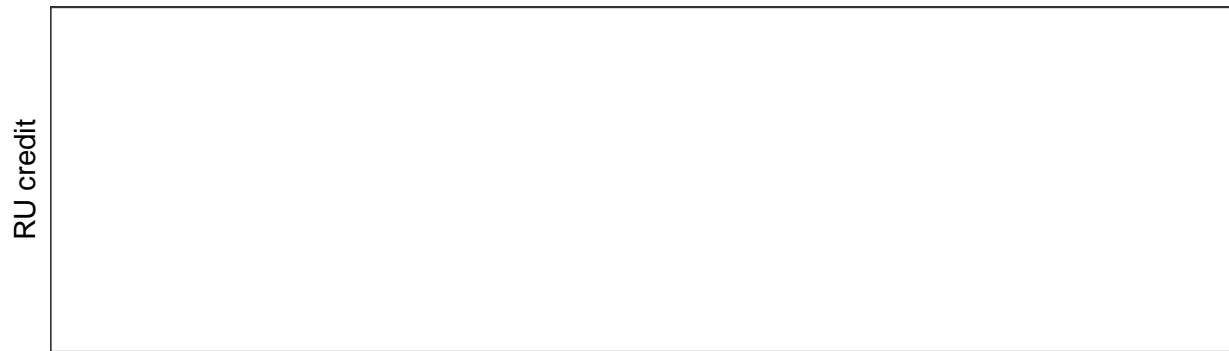


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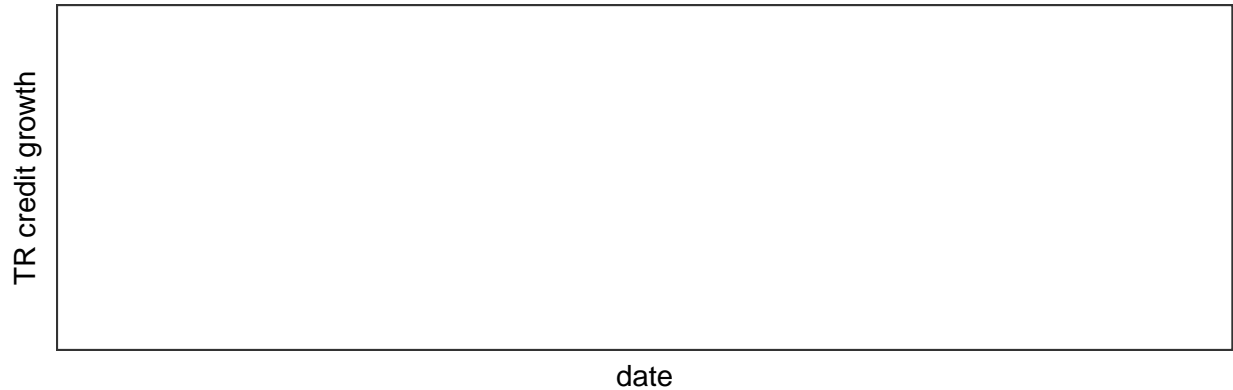
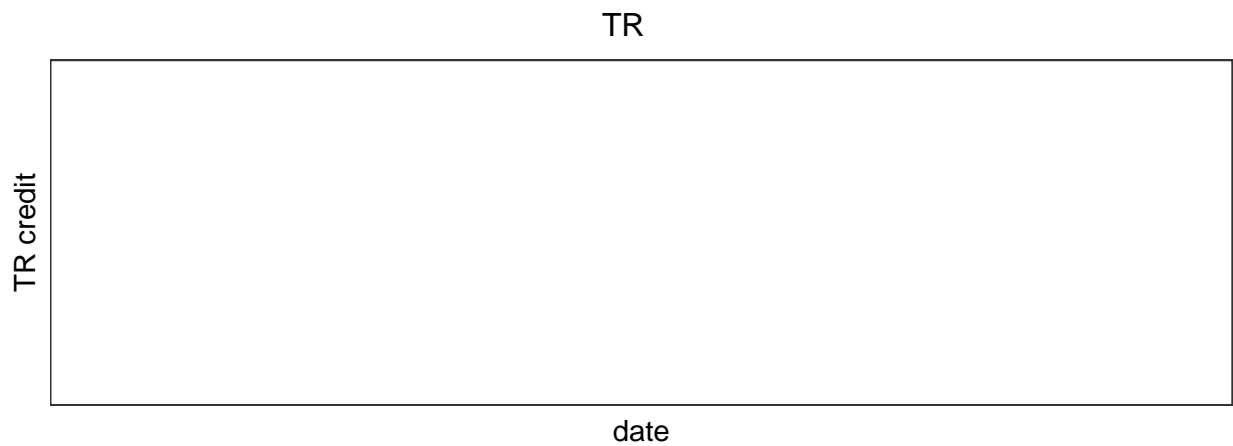


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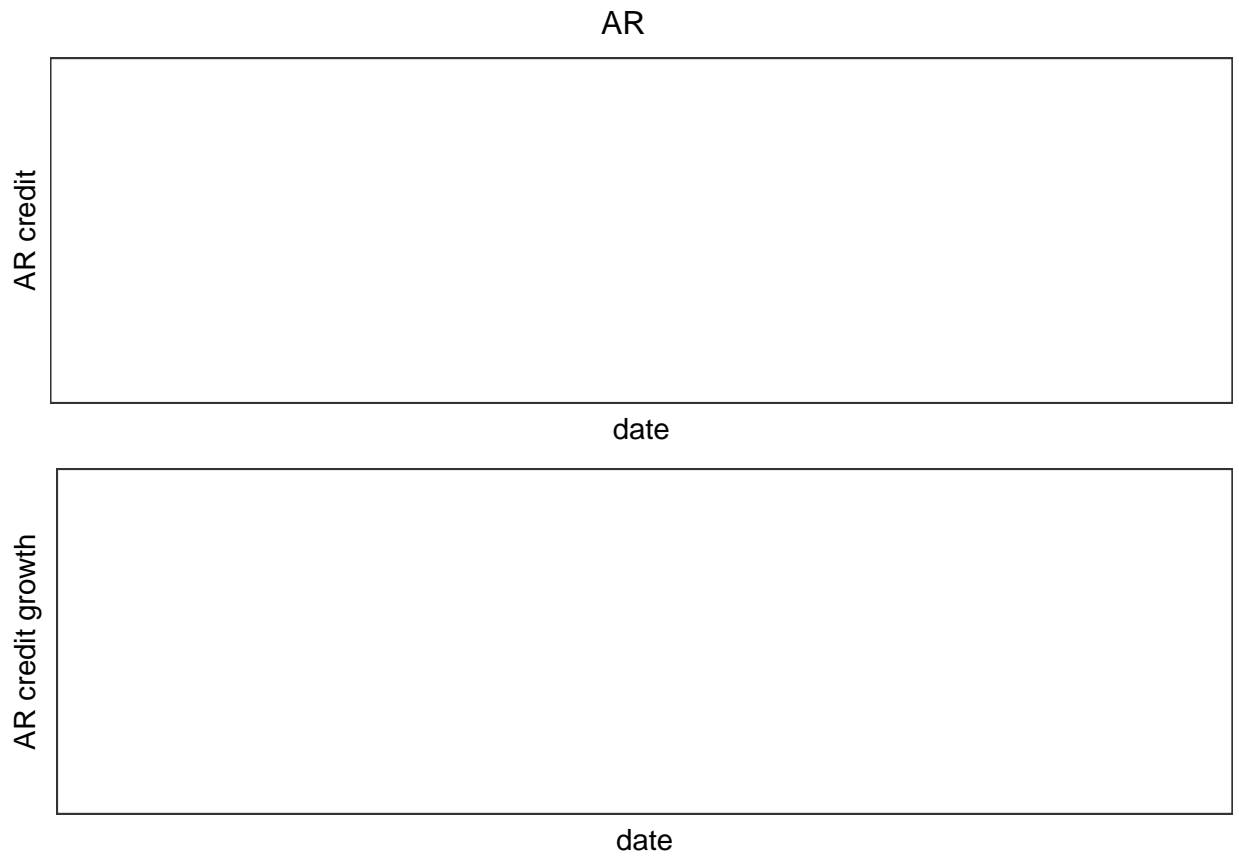
RU



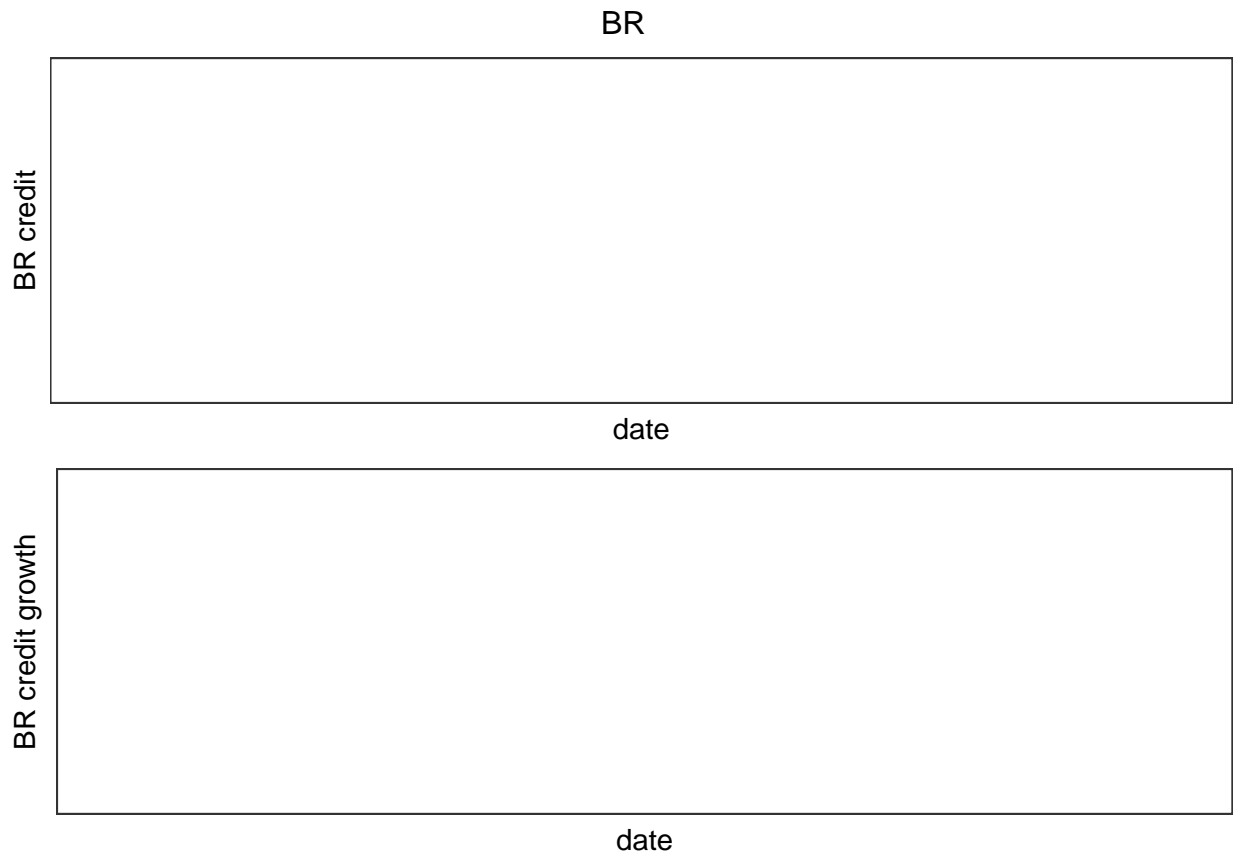
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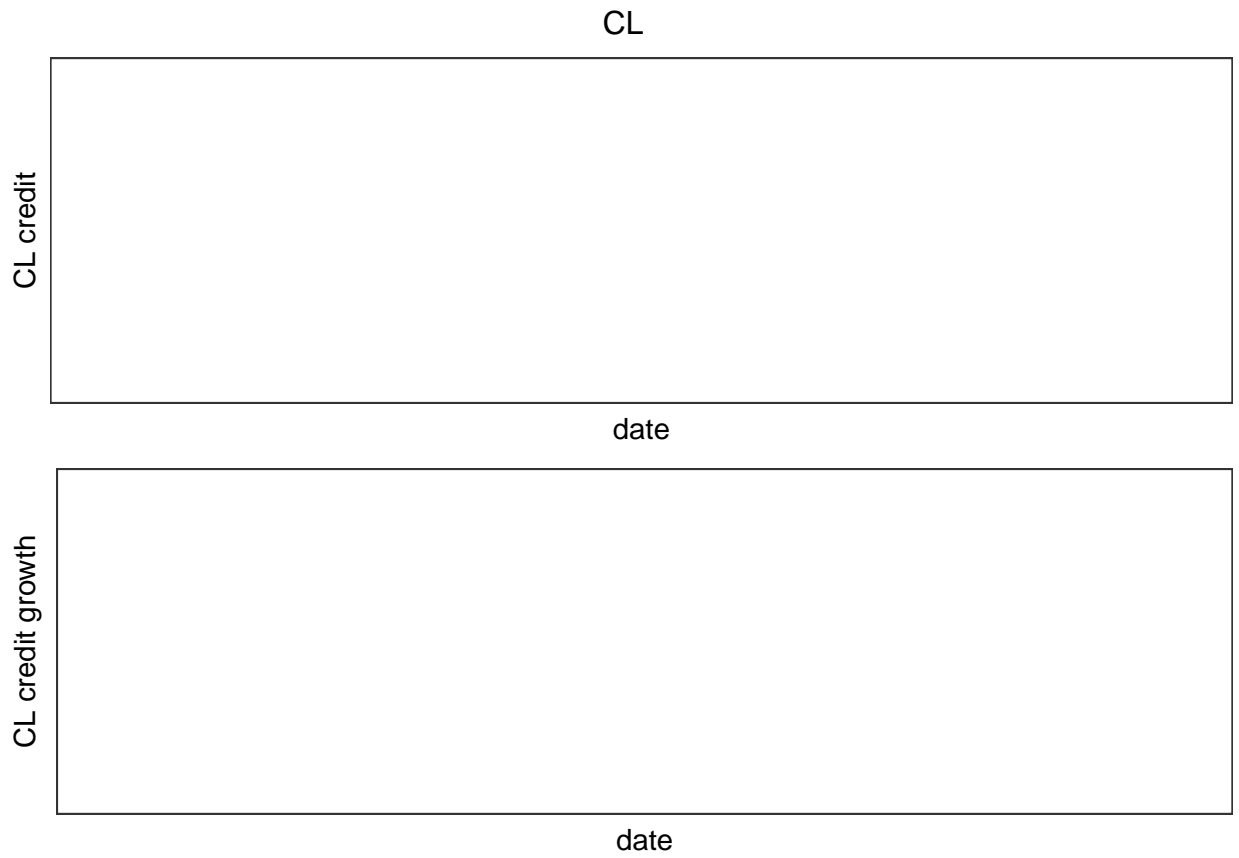
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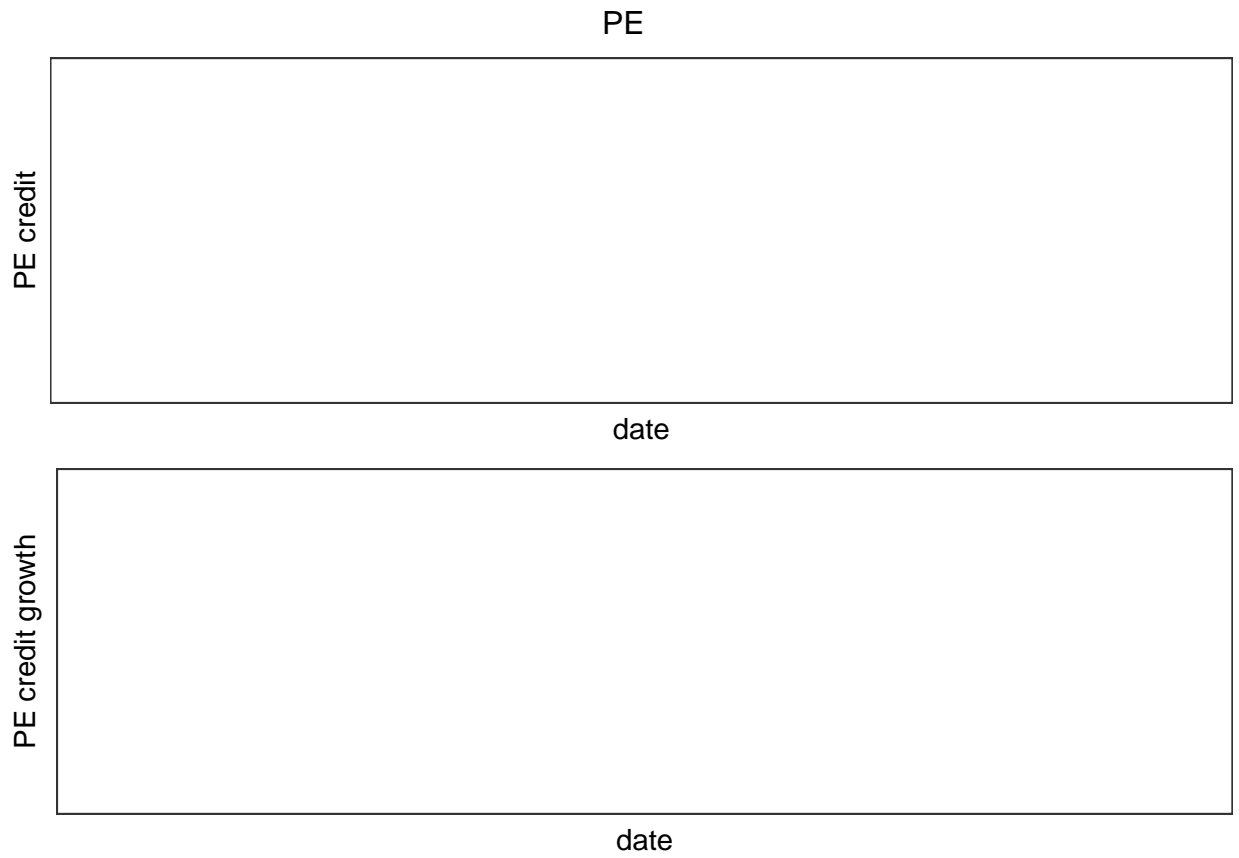
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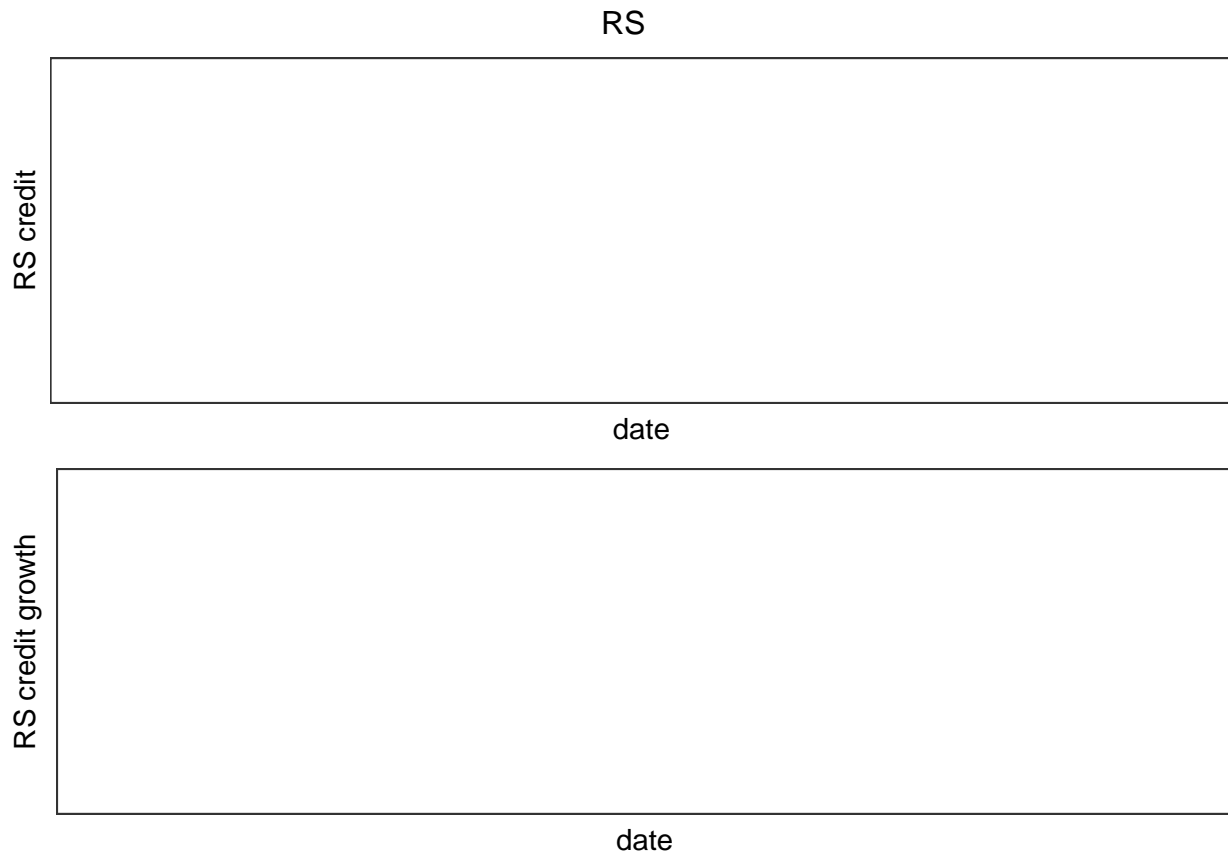
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Warning: Removed 1 rows containing missing values (geom_hline).



Warning: Removed 1 rows containing missing values (geom_hline).



```
[[1]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.136]
```

```
[[2]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.262]
```

```
[[3]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.301]
```

```
[[4]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.340]
```

```

[[5]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.379]

[[6]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.418]

[[7]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.457]

[[8]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.496]

[[9]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.622]

[[10]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.748]

[[11]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.874]

[[12]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]

```

```

2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.913]

```

[[13]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.1039]

```

[[14]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.1078]

```

[[15]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.1117]

```

[[16]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.1156]

```

[[17]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.1282]

```

[[18]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.1321]

```

[[19]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.1360]

```

[[20]]

```

TableGrob (3 x 1) "arrange": 3 grobs

```

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.1399]

[[21]]

TableGrob (3 x 1) "arrange": 3 grobs

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.1438]

[[22]]

TableGrob (3 x 1) "arrange": 3 grobs

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.1564]

[[23]]

TableGrob (3 x 1) "arrange": 3 grobs

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.1603]

[[24]]

TableGrob (3 x 1) "arrange": 3 grobs

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.1642]

[[25]]

TableGrob (3 x 1) "arrange": 3 grobs

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.1768]

[[26]]

TableGrob (3 x 1) "arrange": 3 grobs

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.1807]

[[27]]

TableGrob (3 x 1) "arrange": 3 grobs

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.1846]

```
[[28]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.1885]
```

```
[[29]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.1924]
```

```
[[30]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.1963]
```

```
[[31]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2002]
```

```
[[32]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2041]
```

```
[[33]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2080]
```

```
[[34]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2119]
```

```
[[35]]
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
```

```
3 3 (1-1,1-1) arrange text[GRID.text.2158]
```

```
[[36]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
```

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.2197]

```
[[37]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
```

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.2236]

```
[[38]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
```

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.2275]

```
[[39]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
```

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.2314]

```
[[40]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
```

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.2353]

```
[[41]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
```

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.2392]

```
[[42]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
```

	z	cells	name	grob
1	1	(2-2,1-1)	arrange	gtable[layout]
2	2	(3-3,1-1)	arrange	gtable[layout]
3	3	(1-1,1-1)	arrange	text[GRID.text.2431]

```
[[43]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
```

	z	cells	name	grob
--	---	-------	------	------

```

1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2470]

```

[[44]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2509]

```

[[45]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2548]

```

[[46]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2587]

```

[[47]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2626]

```

[[48]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2665]

```

[[49]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2704]

```

[[50]]

```

TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2830]

```

[[51]]


```
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2869]
```

```
[[52]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2908]
```

```
[[53]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2947]
```

```
[[54]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.2986]
```

```
[[55]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.3025]
```

```
[[56]]
```

```
TableGrob (3 x 1) "arrange": 3 grobs
  z      cells      name      grob
1 1 (2-2,1-1) arrange      gtable[layout]
2 2 (3-3,1-1) arrange      gtable[layout]
3 3 (1-1,1-1) arrange text[GRID.text.3064]
```