Quarterly Staff-Forecast Workflow

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Bank of Israel and IMF

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Staff forecast

- First two missions: capacity enhancement

Staff forecast

- First two missions: capacity enhancement
- Third mission (this one): implementation

Outline

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What staff forecast means

Forecast of the staff, not of the model

It's not:

1. *Model* forecast

It is:

What staff forecast means

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It's not:

1. *Model* forecast
2. Single model

It is:

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It is:

1. *Staff* forecast.

What staff forecast means

Forecast of the staff, not of the model

It's not:

- *Model* forecast
- Single model

It is:

- *Staff* forecast.
- Few models & out-of-model info.

Time line

6 weeks altogether

1. Updating data

Step description

- Data collection
- Nowcasting
  - Monthly data (π, i...)
  - Delayed data (NA...)
- RoW forecasts (i , π, ΔY, ΔIMP)

[a] The focus of this talk.

Time line

6 weeks altogether

1. Updating data
2. Unconditional forecast

Step description

- By many models
- As a benchmark

[a] The focus of this talk.

Time line

6 weeks altogether

1. Updating data
2. Unconditional forecast
3. Judgemental forecast[a]

Step description

- Inter-disiplinary team
- Based on previous steps
- Integration into DSGE model

[a] The focus of this talk.

Time line

6 weeks altogether

1. Updating data
2. Unconditional forecast
3. Judgemental forecast[a]
4. Alternative scenarios

Step description

- **Departmental meeting:**
  - Review of baseline
  - Discussing baseline & scenarios
- **Following the meeting:**
  - Baseline design
  - Scenarios design & analysis

[a] The focus of this talk.

Time line

6 weeks altogether

1. Updating data
2. Unconditional forecast
3. Judgemental forecast[a]
4. Alternative scenarios
5. Departmental discussion

Step description

- Comments from all economists.
- Modifications & polish.

[a] The focus of this talk.

Time line

6 weeks altogether

1. Updating data
2. Unconditional forecast
3. Judgemental forecast[a]
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5. Departmental discussion
6. Presentation to governor

Step description

- Baseline staff-forecast.
- Alternative scenarios & analysis

[a] The focus of this talk.

Time line

6 weeks altogether

1. Updating data
2. Unconditional forecast
3. Judgemental forecast[a]
4. Alternative scenarios
5. Departmental discussion
6. Presentation to governor
7. Monetary planning

[a] The focus of this talk.

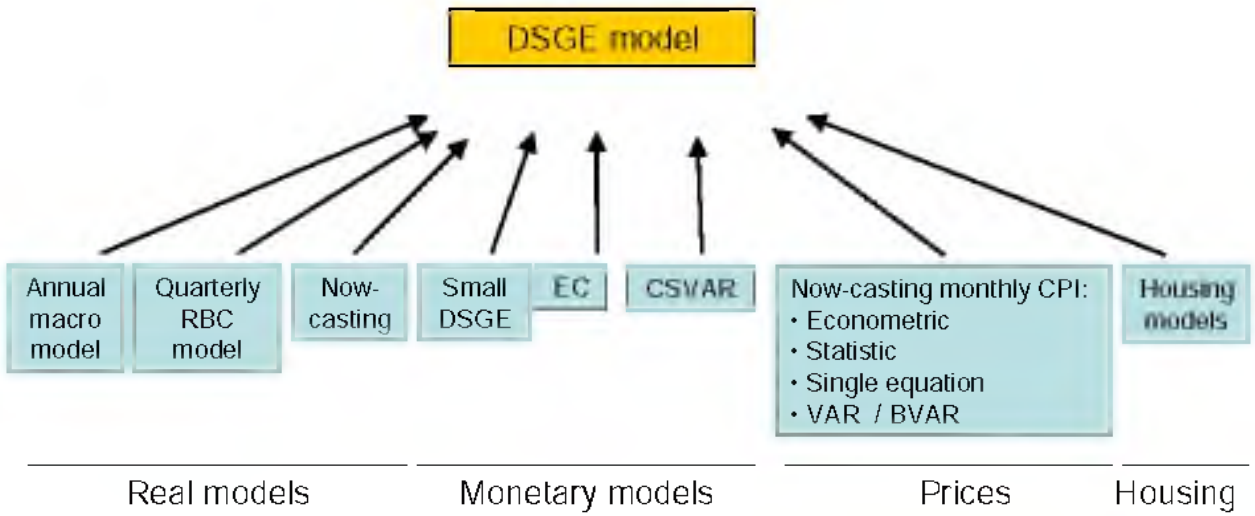
Step description

- Quick review of baseline forecast
- More scenarios
- Answers to issues raised in step 6

The forecast process

Workflow

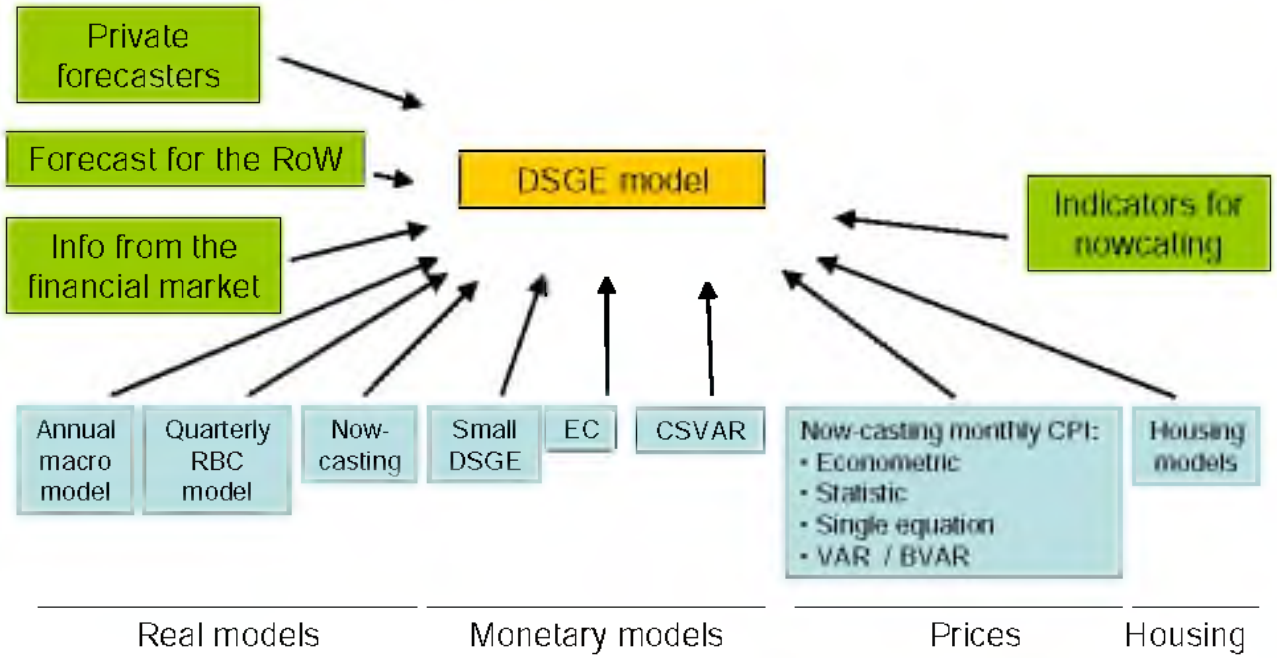
Step 1. Model-based nowcast & unconditional forecast:



Models employed at each step

Workflow

Step 2. Out-of-model information:



Models employed at each step

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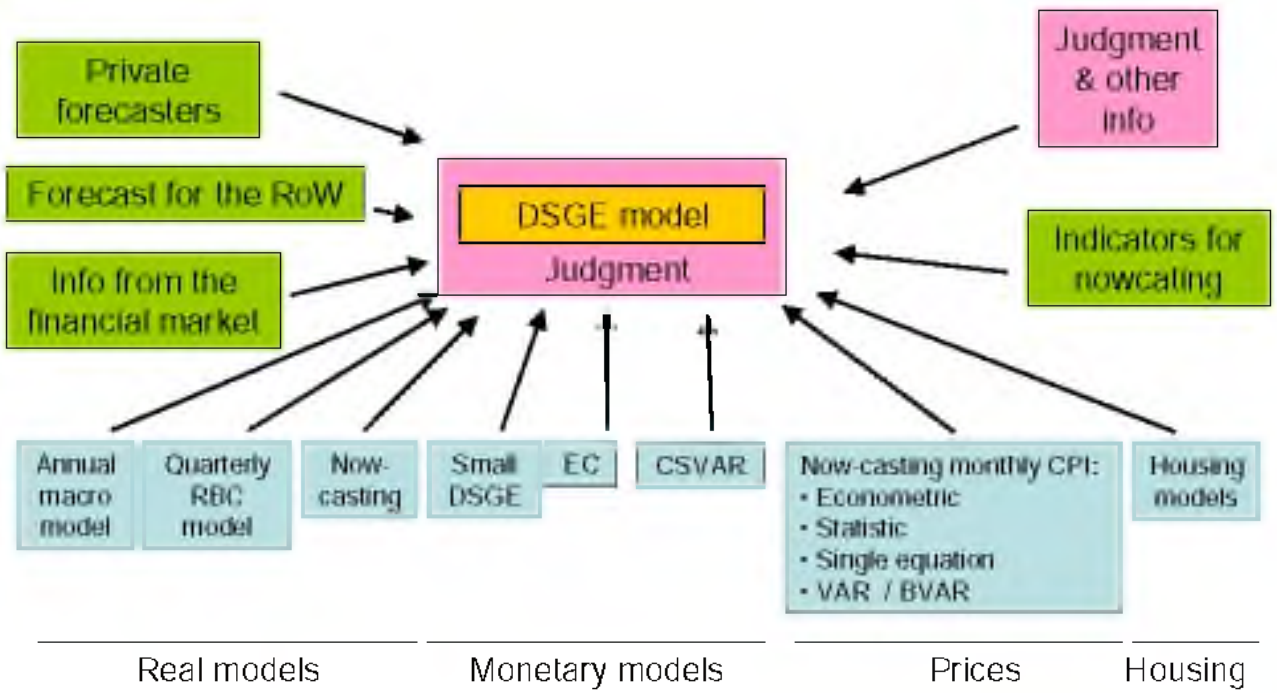
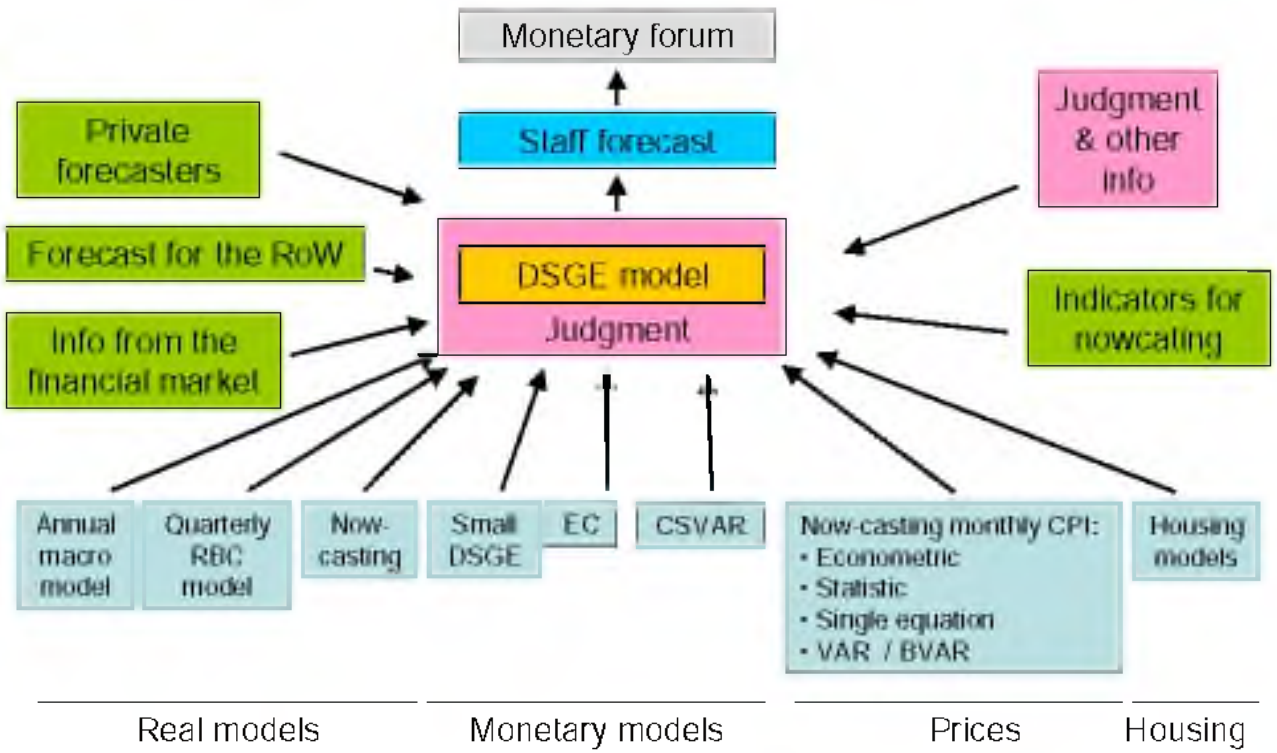
Step 3. Judgement:



Models employed at each step

Workflow

Step 4. Staff Forecast:



Models employed at each step

Focus on DSGE model

Backasting & conditional forecasting:

- Integration (rich model - real & nominal variables)

Scenarios:

Focus on DSGE model

Backasting & conditional forecasting:

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- Coherent detrending & shocks decomposition

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  - On **endogenous** variables

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Scenarios:

- Counterfactual analysis

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- Fan charts (hard & soft conditioning)

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Scenarios:

- Counterfactual analysis
- Fan charts (hard & soft conditioning)
- Scenarios – Interpretable shocks around baseline (IR)

Conditioning on **endogenous** variables

Intuition-building example for Waggoner & Zha (1999) & Maih (2010)

Example (Simple model – 2 variables, no dynamics)

$$\begin{bmatrix} x \\ \pi \end{bmatrix} = \begin{bmatrix} \alpha & \beta \\ \gamma & \delta \end{bmatrix} \cdot \begin{bmatrix} u^x \\ u^\pi \end{bmatrix}; \qquad \Sigma_u = \begin{bmatrix} \sigma_x^2 & 0 \\ 0 & \sigma_\pi^2 \end{bmatrix}$$

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Problem (Best forecast for π, provided restriction on x ?)

$x = x^r$. $\quad \widehat{\pi} = ? \quad \left(\left[\widehat{u}^x, \widehat{u}^\pi\right]' = ? \right)$

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Solution (Involves transmission mechanisms and σ :)

$$\begin{bmatrix} \widehat{u}^x \\ \\ \widehat{u}^\pi \end{bmatrix} = \frac{1}{\alpha^2\sigma_x^2 + \beta^2\sigma_\pi^2} \begin{bmatrix} \alpha \cdot \sigma_x^2 \\ \\ \beta \cdot \sigma_\pi^2 \end{bmatrix} x^r \quad \text{and} \quad \widehat{\pi} = \gamma\widehat{u}^x + \delta\widehat{u}^\pi$$

Conditioning restrictions & manipulating shocks

What happens in the kitchen

Stepwise conditioning:

Conditioning restrictions & manipulating shocks

What happens in the kitchen

Stepwise conditioning:

1. Unconditional forecast

Conditioning restrictions & manipulating shocks

What happens in the kitchen

Stepwise conditioning:

1. Unconditional forecast
2. Rest of the World (RoW)

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What happens in the kitchen

Stepwise conditioning:

1. Unconditional forecast
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3. Trends

Conditioning restrictions & manipulating shocks

What happens in the kitchen

Stepwise conditioning:

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4. Exogenous variables (G, Taxes...)

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Stepwise conditioning:

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Manipulating shocks or structure:

Conditioning restrictions & manipulating shocks

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Manipulating shocks or structure:

- Explore results at each step

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Manipulating shocks or structure:

- Explore results at each step
- Changing future σ (of future **surprising** shocks)

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Stepwise conditioning:

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Manipulating shocks or structure:

- Explore results at each step
- Changing future σ (of future **surprising** shocks)
- Changing parameters (the α, β...) – less surprises are required
- Direct intervention in specific shocks.

Restricting **endogenous** variables:
December 2010 as an Example

	OB_DY_AAG	OB_DY	OB_DIM_AAG	OB_DIM	OB_DC_AAG	OB_DC
Mar-09	2.84%	-1.12%	-1.30%	-13.43%	1.21%	-1.16%
Jun-09	1.39%	-0.13%	-7.11%	-0.22%	0.67%	1.74%
Sep-09	0.38%	0.43%	-11.34%	3.18%	0.66%	1.06%
Dec-09	0.24%	0.67%	-12.96%	1.22%	1.69%	1.69%
Mar-10	1.08%	0.53%	-6.42%	2.63%	3.68%	-0.13%
Jun-10	2.25%	0.66%	0.29%	2.67%	4.76%	1.19%
Sep-10	3.26%	0.51%	4.75%	-1.77%	5.28%	-0.10%
Dec-10	3.82%	0.47%	7.95%	0.07%	5.17%	2.00%
Mar-11		0.47%				
Jun-11		0.47%				
Sep-11		0.48%				
Dec-11		0.53%	5.20%		3.50%	
Mar-12		0.53%				
Jun-12		0.53%				
Sep-12		0.51%				
Dec-12		0.47%	8.20%		3.80%	

Considering implied shocks:
December 2010 as an Example

Hist std	0.09%	0.15%	2.40%	0.77%	2.28%	1.12%
	ETA_FW_ROW	ETA_GR_Z	ETA_H	ETA_NU	ETA_PIM	ETA_RP_FX
03-08	-0.55	-0.30				
06-08	-0.05	-0.96				
09-08	0.02	-0.45				
12-08	-0.81	-0.20				
03-09				3.59		
06-09				0.23		
09-09				0.02		
12-09				0.72	0.16	0.65
03-10				0.44	1.29	-0.57
06-10				0.10	0.91	0.69
09-10	-1.59	0.06	-0.07	1.27	0.01	1.47
12-10	-0.42	-0.23	0.29	1.09	0.78	0.26
03-11	0.00	-0.23	0.54	0.91	0.15	0.49
06-11	0.00	-0.04	0.00	1.03	0.34	0.49
09-11	0.00	-0.21	0.00	1.14	0.25	0.49
12-11	0.00	-0.07	0.00	0.99	0.15	0.49
03-12	0.00	-0.04	0.00	0.92	0.08	0.45
06-12	0.00	-0.01	-0.03	0.85	0.10	0.45
09-12	0.00	0.01	-0.02	0.68	0.15	0.40
12-12	0.00	0.02	-0.02	0.69	0.14	0.40

מארקאפ על מחירי חיבוא. לאור הייסופים שהיו, האינפלציה "גבוהה מדי".

על רקע ירידת חיבוא, ובחמשך גם על רקע פער הריביות, השער היה צריך לרדת יותר. רכישות?...

מסביר את צניחת חיבוא לפער שלילי של 15 אחוזים. מסביר גם ייסוף. למעשה, היה מצופה אף ייסוף חד יותר, ולכן נגזרים גם עזווי שע"ח (רכישות?).

New Normal abroad

Manipulating future σ:
December 2010 as an Example

Pushing away from certain shocks
towards more desired ones

S.D.	0.82%	0.46%	0.09%	2.40%	0.77%
Shocks	ETA	ETA_C	ETA_FW_ROW	ETA_H	ETA_NU
Mar-11	0.00	1.00	0.00	1.00	5.00
Jun-11	0.00	1.00	0.00	0.00	5.00
Sep-11	0.00	1.00	0.00	0.00	5.00
Dec-11	0.00	1.00	0.00	0.00	4.00
Mar-12	0.00	1.00	0.00	0.00	4.00
Jun-12	0.10	1.00	0.00	0.10	4.00
Sep-12	0.10	1.00	0.00	0.10	3.00
Dec-12	0.20	1.00	0.00	0.20	3.00

Changing structural parameters:
December 2010 as an Example

		Scenarios:			
Parameters' names	Backasting params	Baseline_1	2	3	4
p_rho_drp	0.999				
p_rho_f	0.150				
p_rho_fw_row	0.990		0.96	0.96	
p_rho_g	0.637				
p_rho_gz	0.765				
p_rho_h	0.935				
p_rho_i	0.896				
p_rho_im	0.000				
p_rho_im_row	0.000				
p_rho_nu	0.799				
p_rho_ob_dpy	-0.204	0	0		
p_rho_oil1	0.646				
p_rho_oil2	-0.424				

Direct interventions:
December 2010 as an Example

	CURLYPHI_H	ETA_RP_FX
Mar-09	-1.59%	1.29%
Jun-09	0.88%	1.16%
Sep-09	-0.24%	-0.50%
Dec-09	-1.71%	0.72%
Mar-10	-0.23%	-0.63%
Jun-10	0.86%	0.77%
Sep-10	0.64%	1.64%
Dec-10	1.30%	0.29%
Mar-11	2.50%	0.55%
Jun-11		0.55%
Sep-11		0.55%
Dec-11		0.55%
Mar-12		0.50%
Jun-12		0.50%
Sep-12		0.45%
Dec-12		0.45%

FX Risk-Premium Shock:
For otherwise strong appereciation.
Quantity: average of last two years.

Domestic Markup Shock:
To capture the housing component.
Quantity: first running without housing.

Between jobs?

1. Introduction
   - Staff forecast – what is it?
   - Time line
2. The forecast process
   - Models involved
   - Conditioning on endogenous variables
   - December 2010 as an example
3. Between Q forecasts
   - Monthly analysis
   - Modelling
   - Infrastructure

Monthly analysis

- Staff forecast into π report

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  - New scenarios
  - Issues requested in the previous monetary planning

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- Paper

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- Model enhancement (following experience/lessons):

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  - Modifying detrending block

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  - More observed variables. Income Tax, ΔIMP^{RoW}, hours...

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  - Followed by required modification to some equations
  - Followed by re-estimation

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- Theoretical extensions:

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  - Financial frictions
  - Housing sector

Infrastructure

- Improving cooperation within the research department

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  - Monthly analysis
  - Modelling & "infrastructuring"