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Monthly forecasting of French GDP: a revised version of the OPTIM model

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Ottawa, 26 October 2007

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Monthly forecasting of French GDP: a revised version of the OPTIM model

1. Description of OPTIM
2. Modelling strategy and data selection
3. Results
4. Conclusion

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1. Description of OPTIM

The main characteristics

- Bridge model created by Irac and Sédillot (2002)
- New version by Barhoumi, Brunhes-Lesage, Darné, Ferrara, Pluyaud and Rouvreau (2007)
- Forecasts for French GDP and its components for the current quarter (and for the next one, in a forthcoming version)
- Based on monthly indicators (survey data and hard data)
- Used at the Banque de France, coupled with the structural macroeconomic model Mascotte or separately

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1. Description of OPTIM

A revised version of the model

- New equations
- Monthly forecasts (previously quarterly forecasts)
- Systematic data selection using Gets

2. Modelling strategy and data selection

Modelled components (1/3)

- French GDP quarterly growth rate
  + GDP components quarterly growth rate

- Some components are not modelled (production of non market services, immaterial investment, changes in inventories)

- Aggregation with equations

2. Modelling strategy and data selection

Modelled components (2/3)

A. On the demand side:

- Household consumption, computed by aggregation of the forecasts for:
  - Household consumption in agri-food goods
  - Household consumption in energy
  - Household consumption in manufactured goods
  - Household consumption in services
- Government consumption
- Investment, computed by aggregation of the forecasts for:
  - Corporate investment in machinery and equipment
  - Corporate investment in building
  - Household investment
  - Government investment
- Exports
- Imports

2. Modelling strategy and data selection

Modelled components (3/3)

B. On the supply side:

• Total Production, computed by aggregation of the forecasts for:
  Production of agri-food goods
  Production of manufactured goods
  Production of energy
  Production in construction
  Production of market services

C. Total GDP is forecast using a regression on total production.

2. Modelling strategy and data selection

Monthly exercises

- 3 forecasts for each quarter
- After the publication of Insee and EC surveys and before the ECB « monetary » Governing Council
- different equations can be used for the different forecasts of a component
- When data are missing for some months of the last quarter, the value for the quarter is computed as the 3-month moving average of the last available observations

2. Modelling strategy and data selection

The data set (1/3)

- Monthly or higher frequency data
- Soft (survey) data and hard data
- Recent information (less than 2 months)

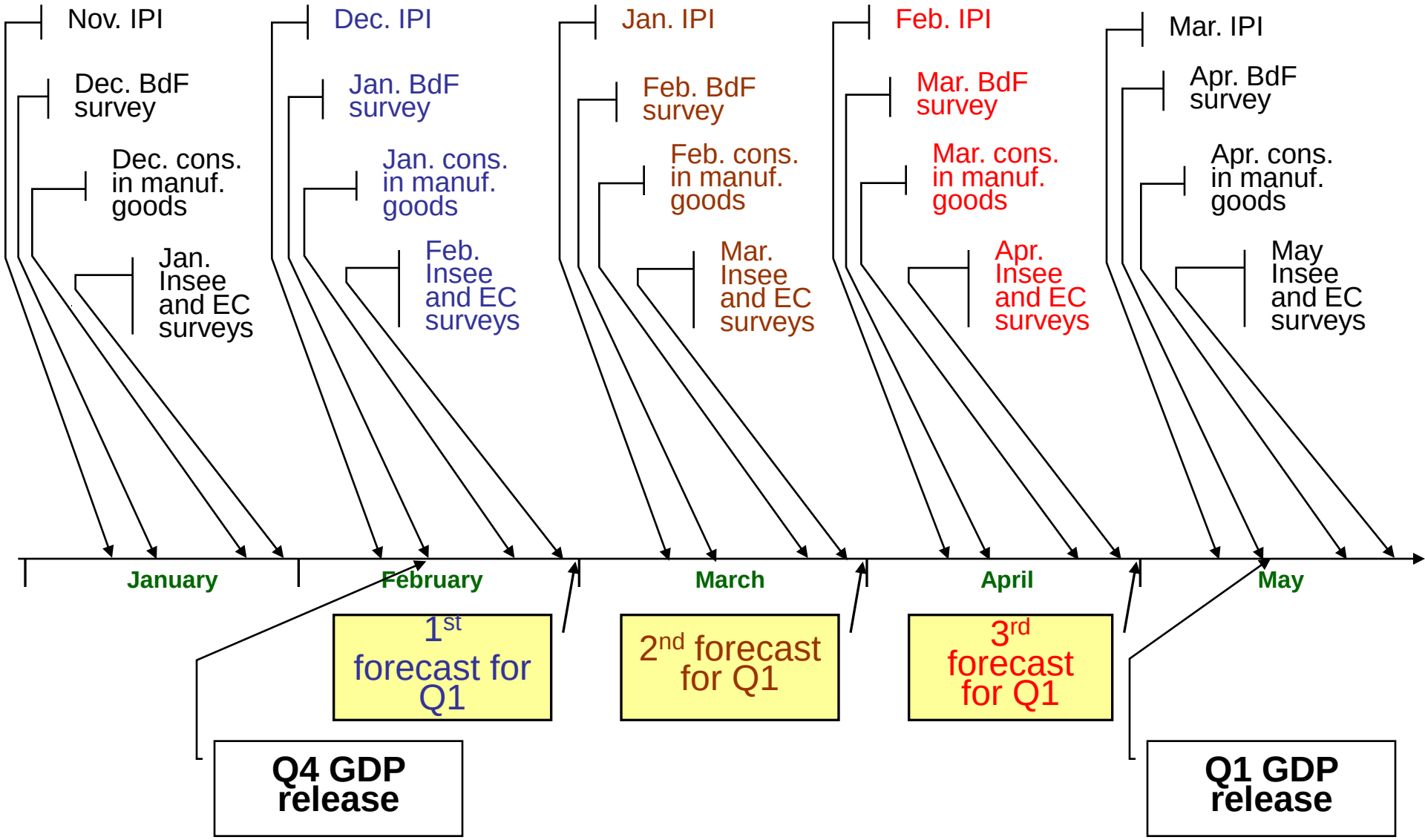
2. Modelling strategy and data selection

The data set (2/3)

Name	Source	Data type	Frequency	Publication lag
Quarterly National Accounts	Insee	Hard	Quarterly	45
Industrial Production Index	Insee	Hard	Monthly	40
Consumption in manufactured goods	Insee	Hard	Monthly	25
HICP in agri-food	Eurostat	Hard	Monthly	20
New cars registrations	CCFA	Hard	Monthly	2
Electricity consumption	RTE	Hard	Daily	1
Declared housing starts	Ministry of Equipment	Hard	Monthly	30
Business surveys in industry	Banque de France	Soft	Monthly	15
Business surveys in retail trade	Banque de France	Soft	Monthly	15
Business surveys in services	Banque de France	Soft	Monthly	15
Business surveys in industry	Insee	Soft	Monthly	0
Business surveys in retail trade	Insee	Soft	Monthly	0
Business surveys in services	Insee	Soft	Monthly	0
Business surveys in construction	Insee	Soft	Monthly	0
Consumer surveys	Insee	Soft	Monthly	0
Survey on public works	FNTP	Soft	Monthly	35
Business and consumer surveys	European Commission	Soft	Monthly	0

2. Modelling strategy and data selection

The data set (3/3)



2. Modelling strategy and data selection

General specification of the equations

- Autoregressive-distributed-lag (ADL) bridge equations

$$Y_t = \alpha + \sum_{i=1}^{m} \beta_i Y_{t-i} + \sum_{j=1}^{q} \sum_{i=1}^{k} \delta_{j,i} X_{j,t-i} + \varepsilon_t$$

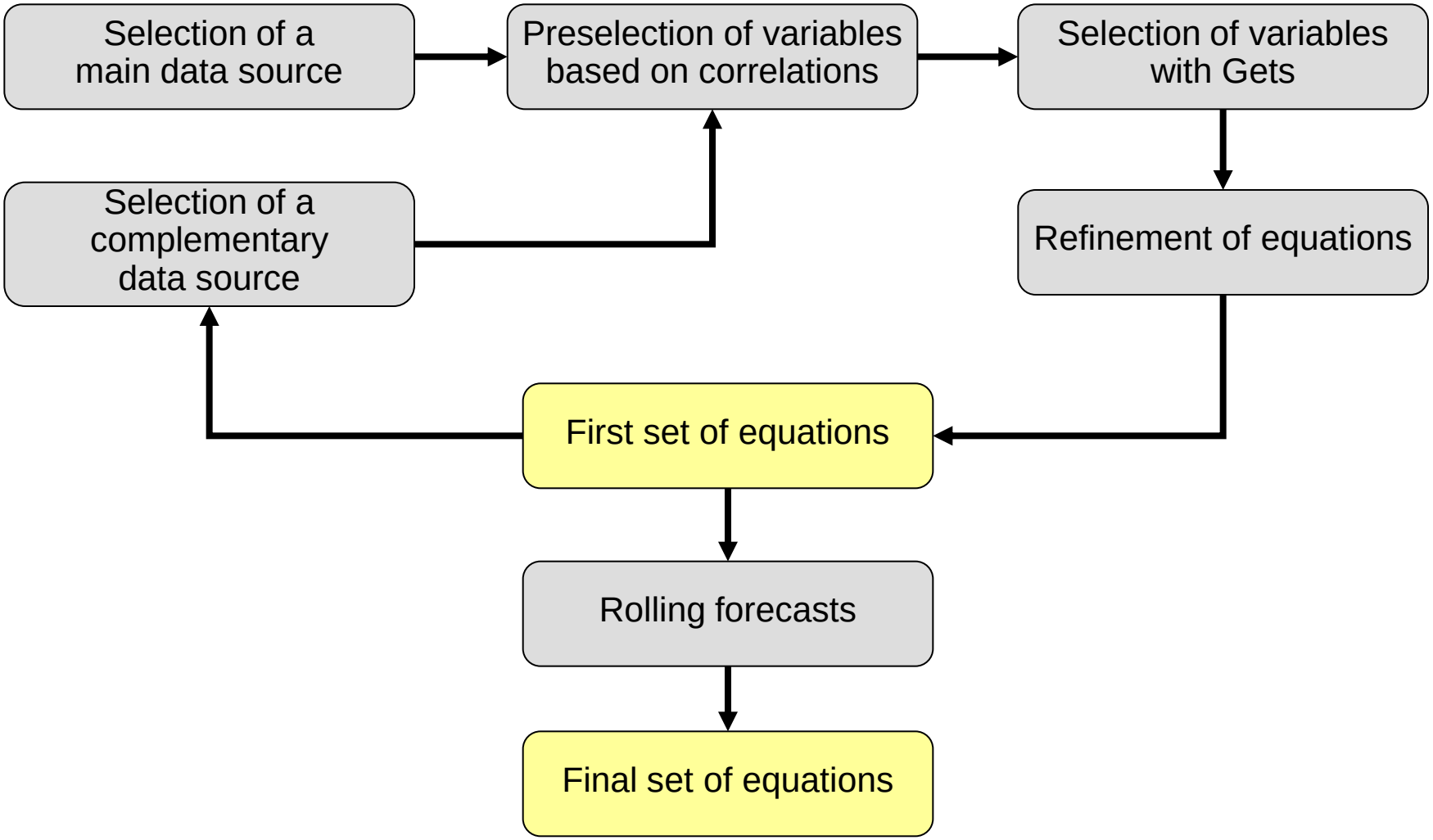
2. Modelling strategy and data selection

Data selection procedure (1/2)

- Systematic data selection using Gets
- Preselection of explanative variables strongly correlated with the modelled variable but not with each other
- No mix between similar data sources
- No use of synthetic survey indicators
- Selection of a first set of equations with an emphasis on economic content
- Final selection with rolling forecasts, taking into account the data availabilty

2. Modelling strategy and data selection

Data selection procedure (2/2)



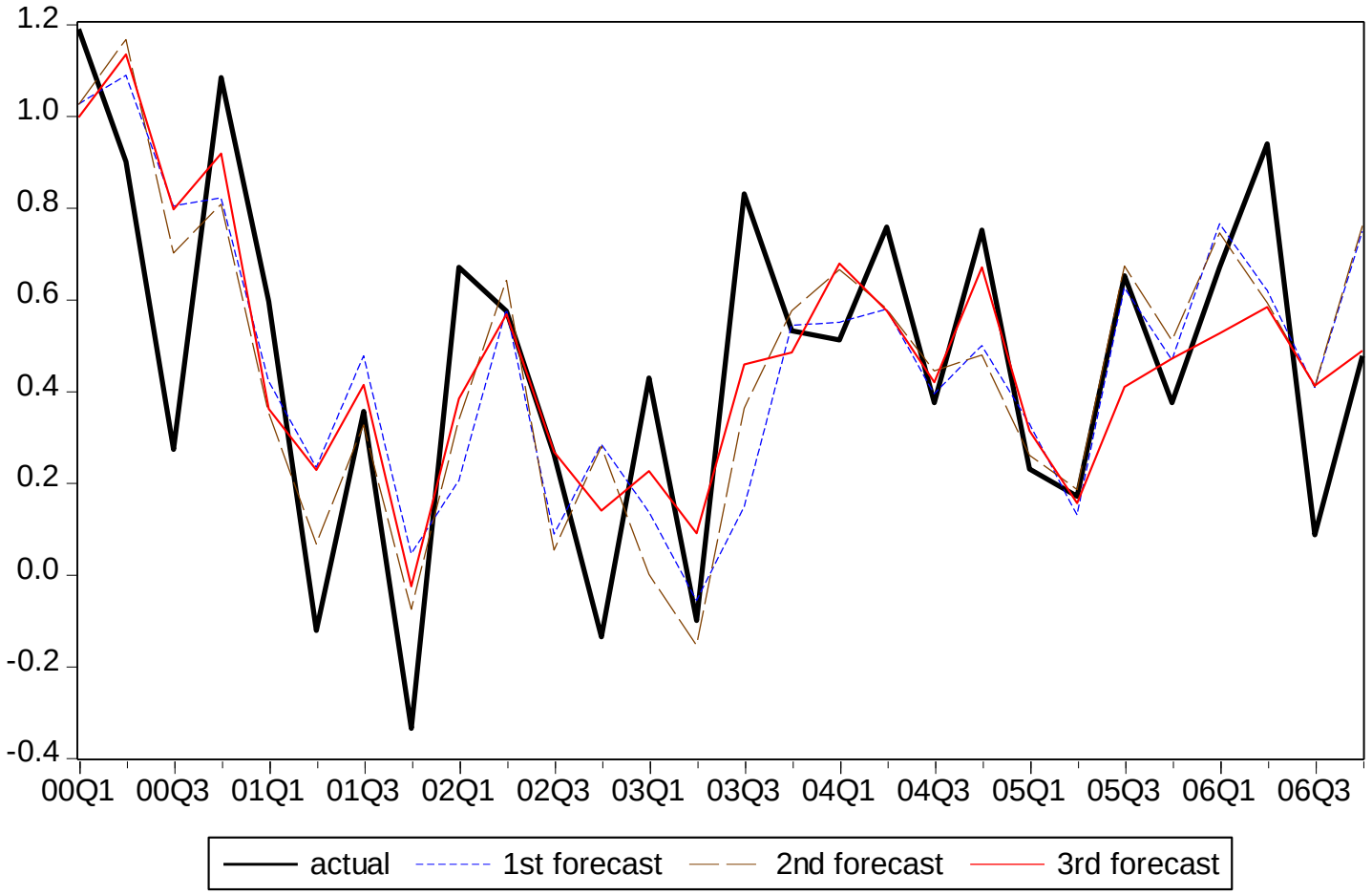
2. Modelling strategy and data selection

Tests implemented in Gets

- Godfrey (1978) Lagrange multiplier test for serial correlation in the residuals up to 5 lags [LM(5)]
- Doornik and Hansen (1994) normality test [DH]
- Nicholls and Pagan (1983) test for quadratic heteroscedasticity between regressors [NP]
- Chow in-sample predictive failure test on 50% [Chow(50%)] and 90% [Chow(90%)] of the sample
- Belsley, Kuh, and Welsch (1980) multicollinearity diagnostic [BKW]

3. Results

GDP forecasts



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3. Results

Root Mean Squared Errors

Component		First	Second	Third	AR	Naive
GDP	with IPI	0.32	0.31	0.23	0.38	0.51
	without IPI	0.27	0.25	0.25		
Production Agri-food	with IPI	0.49	0.47	0.45	0.57	0.68
	without IPI	0.54	0.54	0.54		
Production Manufactured	with IPI	1.14	1.07	0.71	1.28	1.73
	without IPI	0.82	0.79	0.79		
Production Energy	with IPI	1.56	1.48	1.21	1.44	2.52
	without IPI	1.44	1.34	1.34		
Production Construction	with IPI	0.63	0.57	0.55	0.67	0.76
	without IPI	0.62	0.60	0.60		
Production Services	with IPI	0.41	0.41	0.34	0.45	0.59
	without IPI	0.44	0.39	0.37		
Household Consumption		0.26	0.19	0.19	0.33	0.45
Government Consumption		0.23	0.23	0.23	0.23	0.28
Investment		0.80	0.77	0.71	0.87	1.24
Imports		1.23	1.13	1.13	1.31	1.54
Exports		1.46	1.32	1.27	1.62	2.07

3. Results

Diebold-Mariano tests against the AR model

- Diebold Mariano tests against the AR model
- Modified version by Harvey, Leybourne and Newbold (1997), not presented in the paper

Component		First	Second	Third
GDP	with IPI	0.0754	0.0454	0.0027
	without IPI	0.0116	0.0072	0.0078
Production Agri-food	with IPI	0.0805	0.0471	0.0355
	without IPI	0.0761	0.0740	0.0910
Production Manufactured	with IPI	0.1136	0.0293	0.0001
	without IPI	0.0051	0.0052	0.0052
Production Energy	with IPI	0.8436	0.6529	0.0560
	without IPI	0.4735	0.2123	0.2123
Production Construction	with IPI	0.1488	0.0830	0.0743
	without IPI	0.3202	0.2662	0.2662
Production Services	with IPI	0.0568	0.1426	0.0054
	without IPI	0.4336	0.1513	0.0729
Household Consumption		0.0368	0.0002	0.0001
Investment		0.2308	0.1523	0.0826
Imports		0.2238	0.0771	0.0771
Exports		0.1730	0.0303	0.0108

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4. Conclusion

- Satisfying results given the comparisons with benchmarks
- Next step: future quarter forecasts
- Problems concerning the aggregation of forecasts for GDP components