

Using Python, R and Dynare to Create a Structured Projection and Policy Analysis System (PPAS)



Douglas Laxton
The Better Policy Project



July 7, 2021



09:00 Lisbon Time



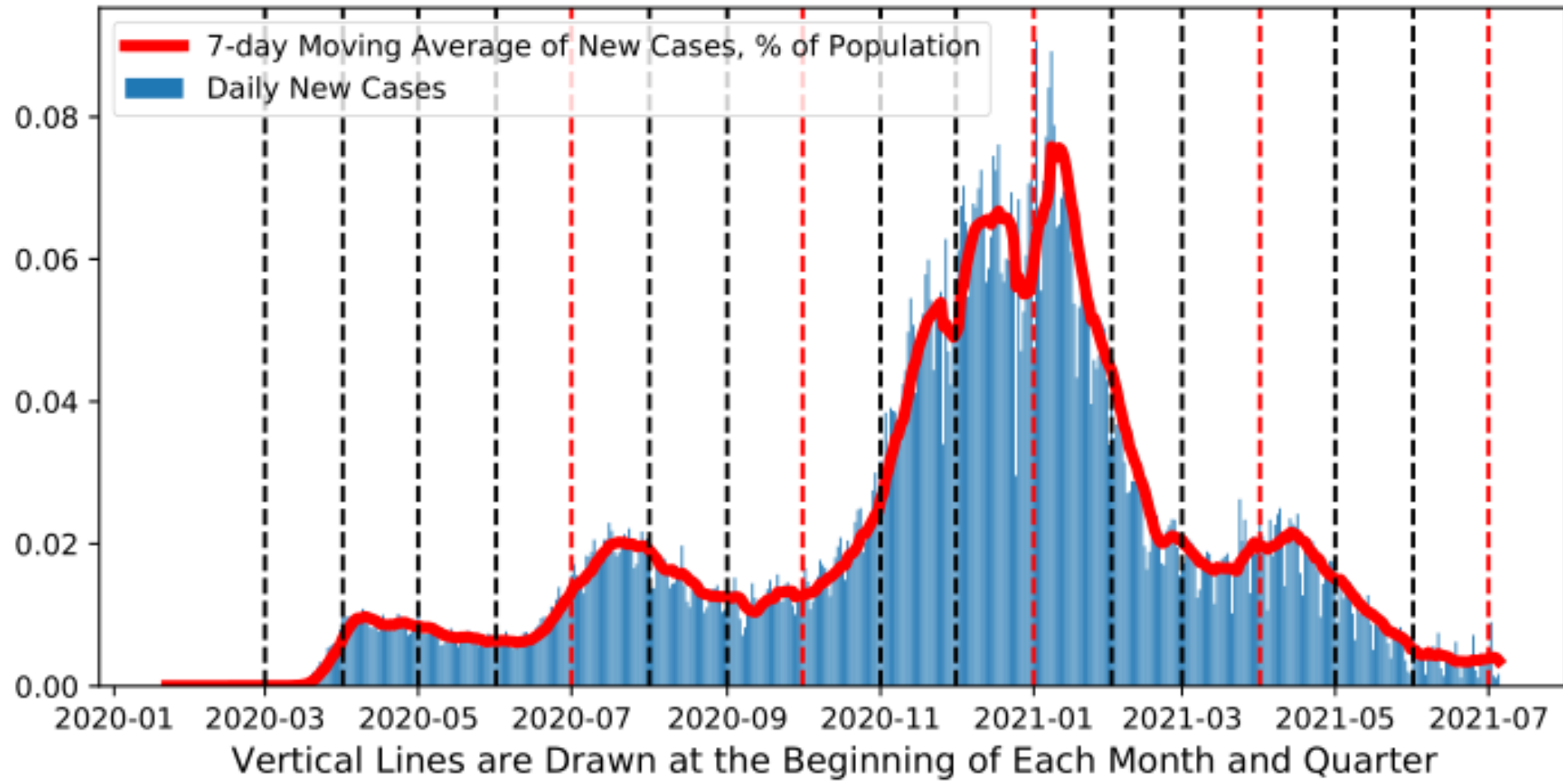
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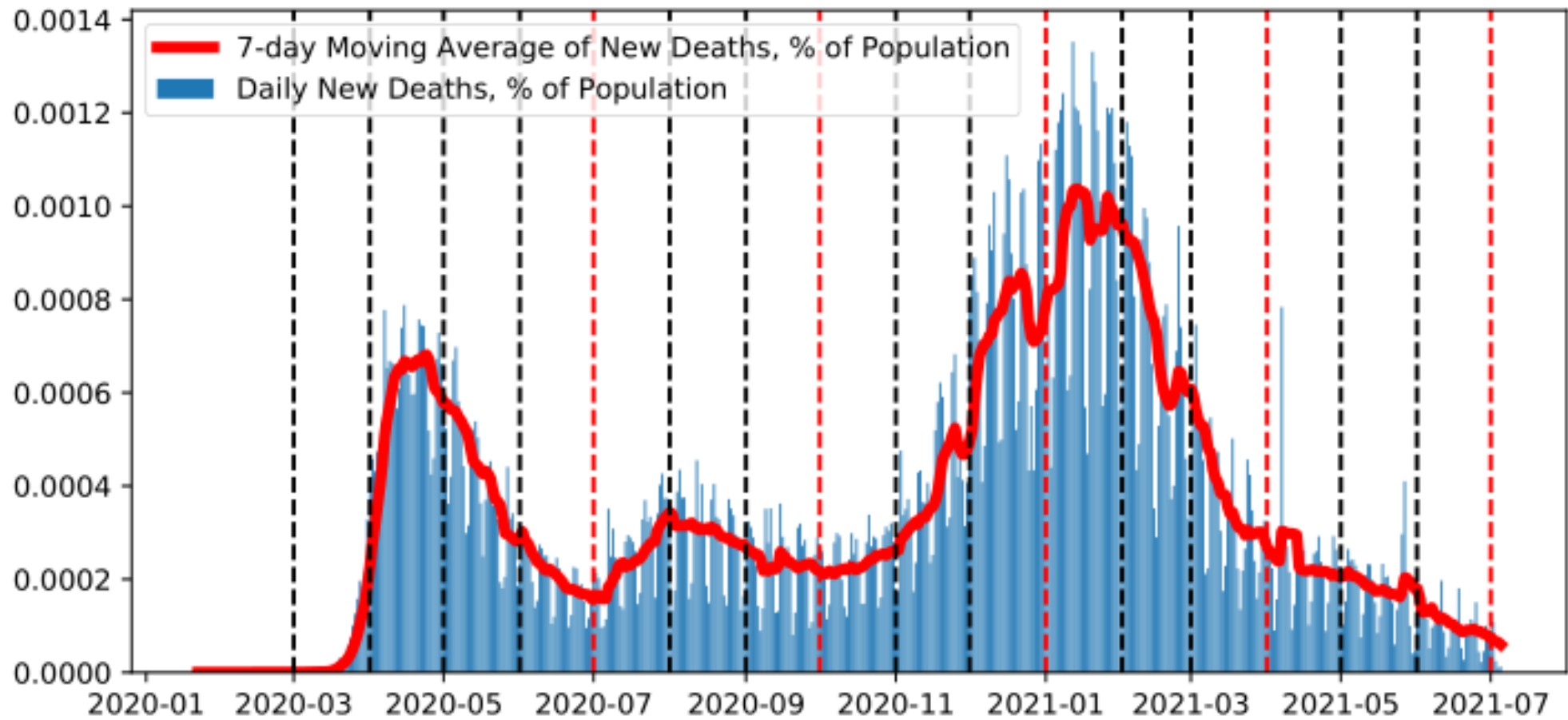
David Archer
BIS

COVID-19 Report

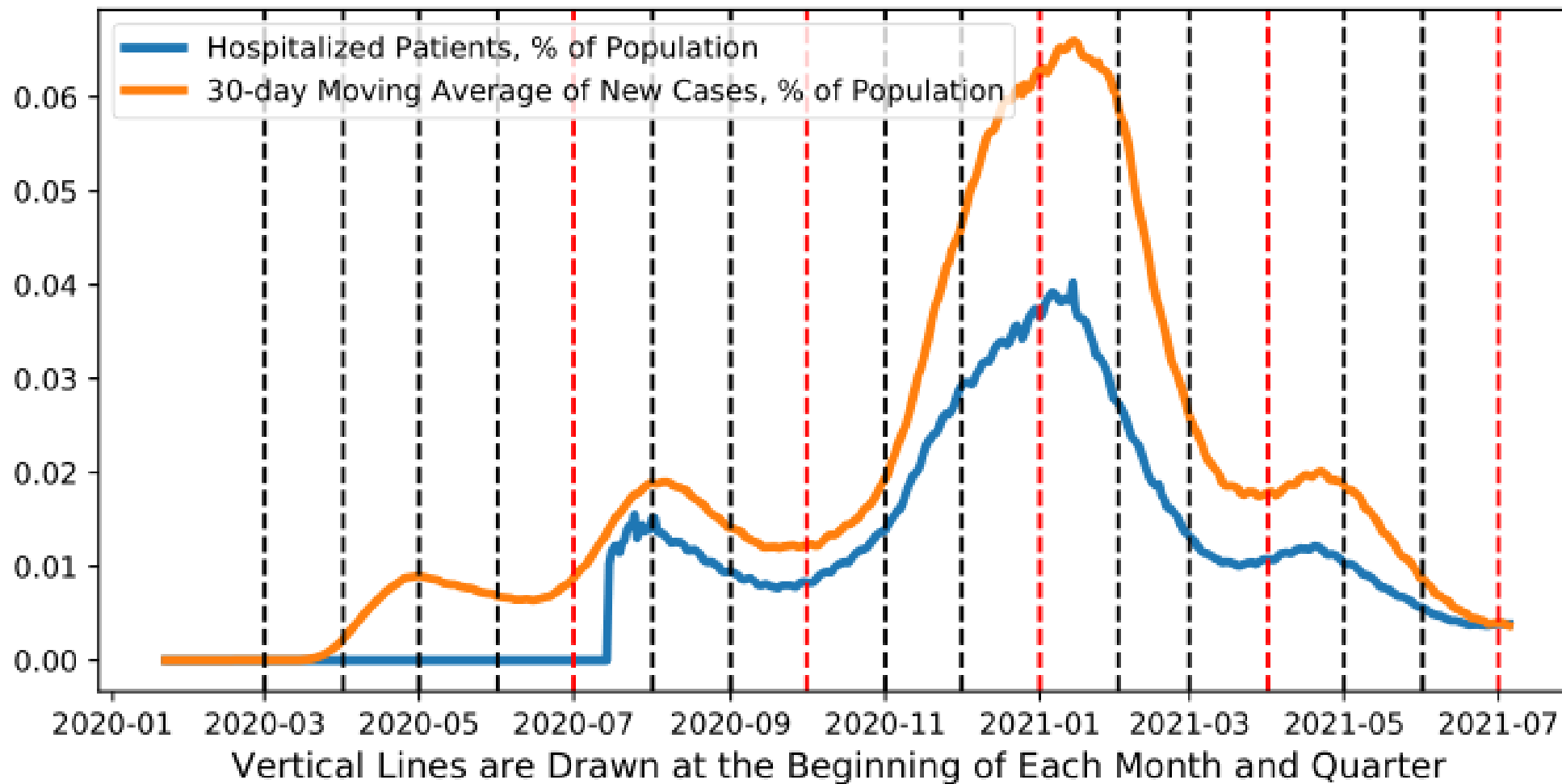
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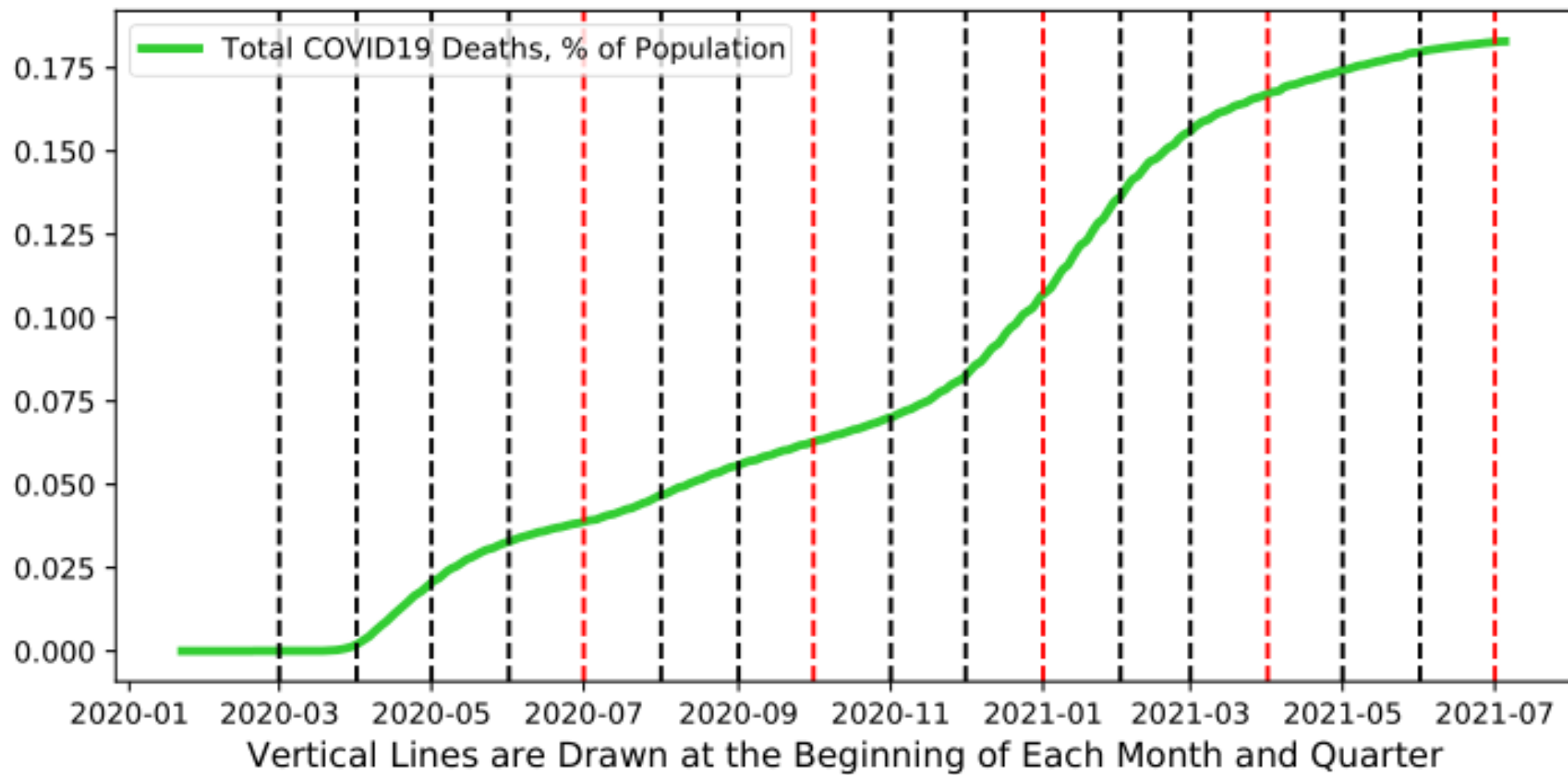


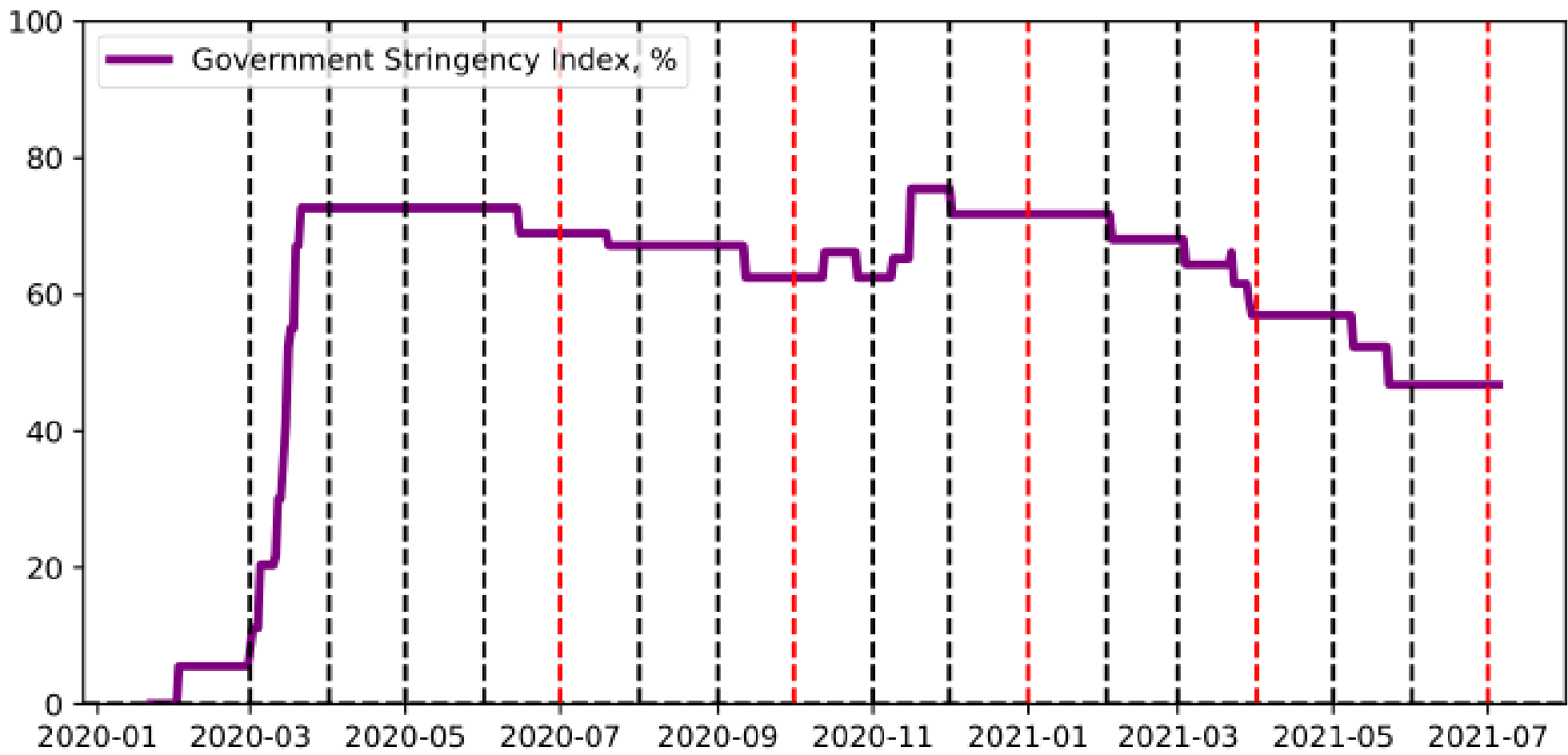
Vertical Lines are Drawn at the Beginning of Each Month and Quarter



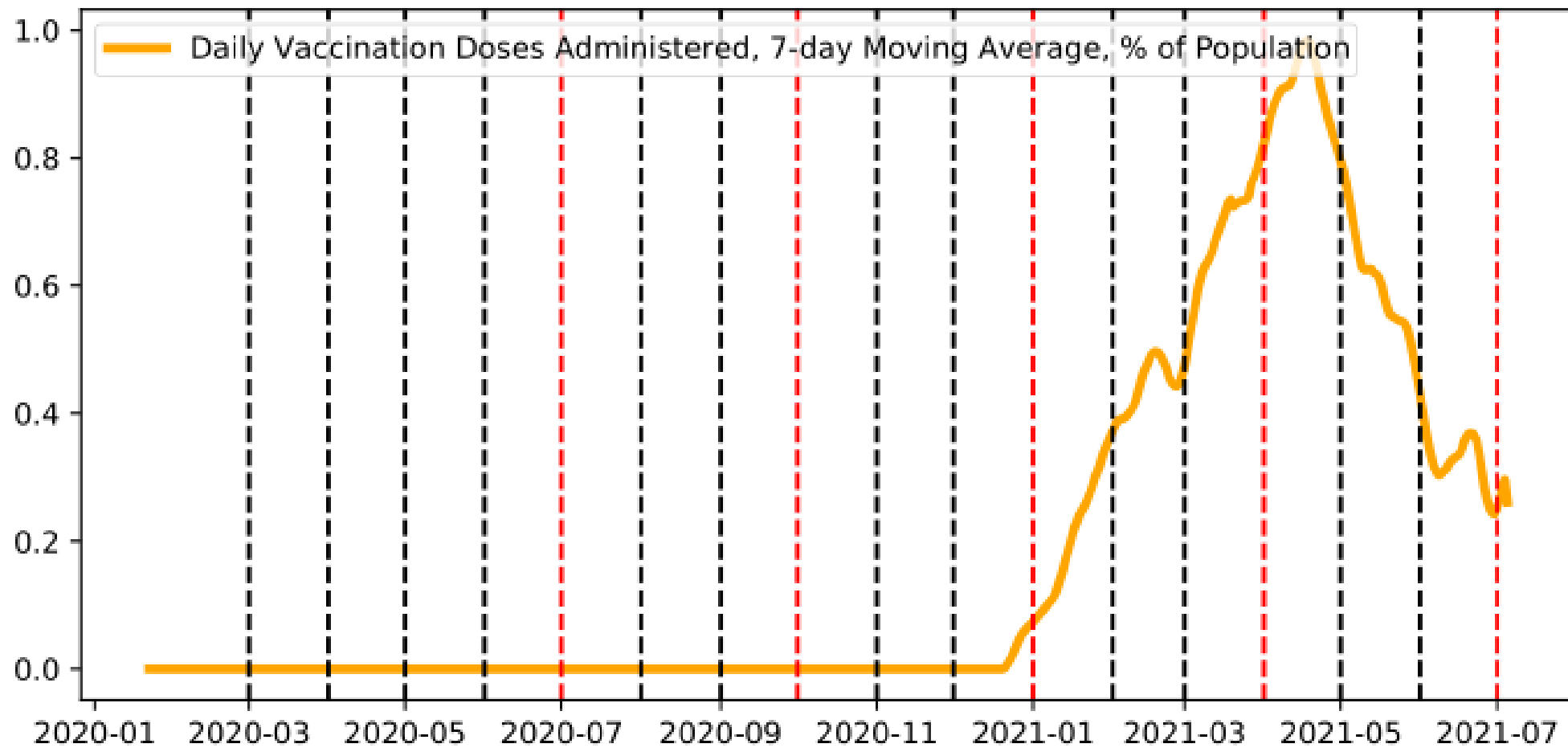
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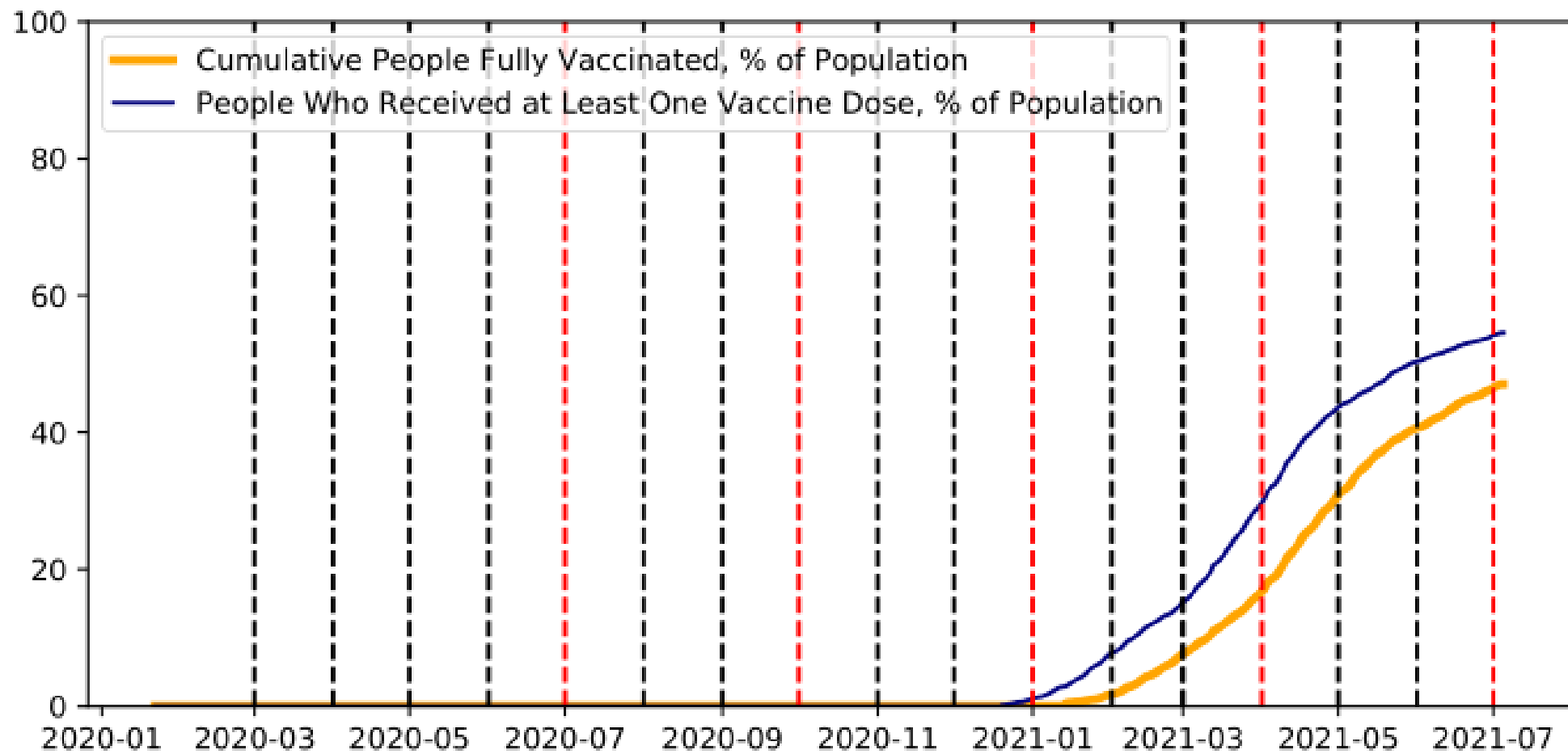




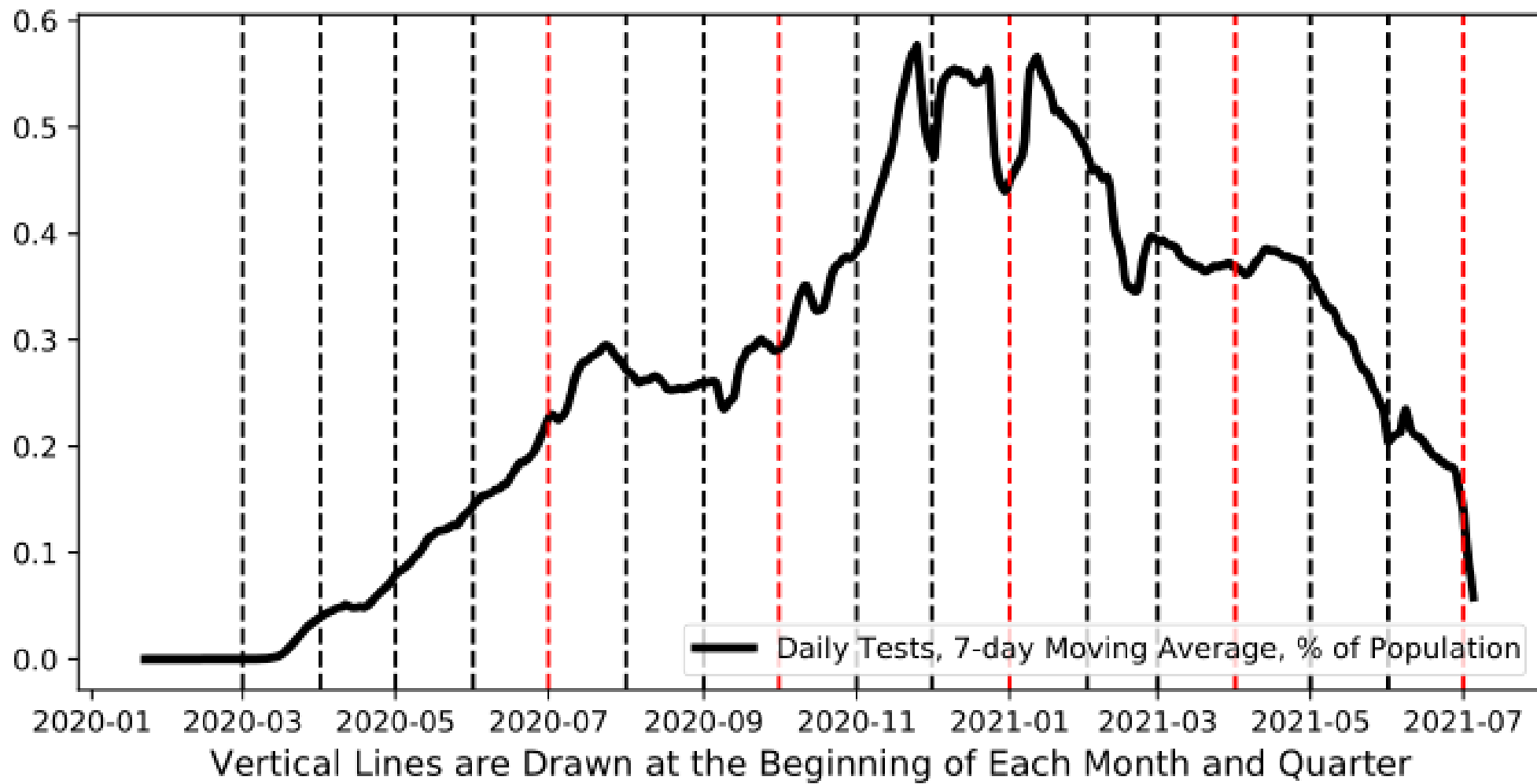
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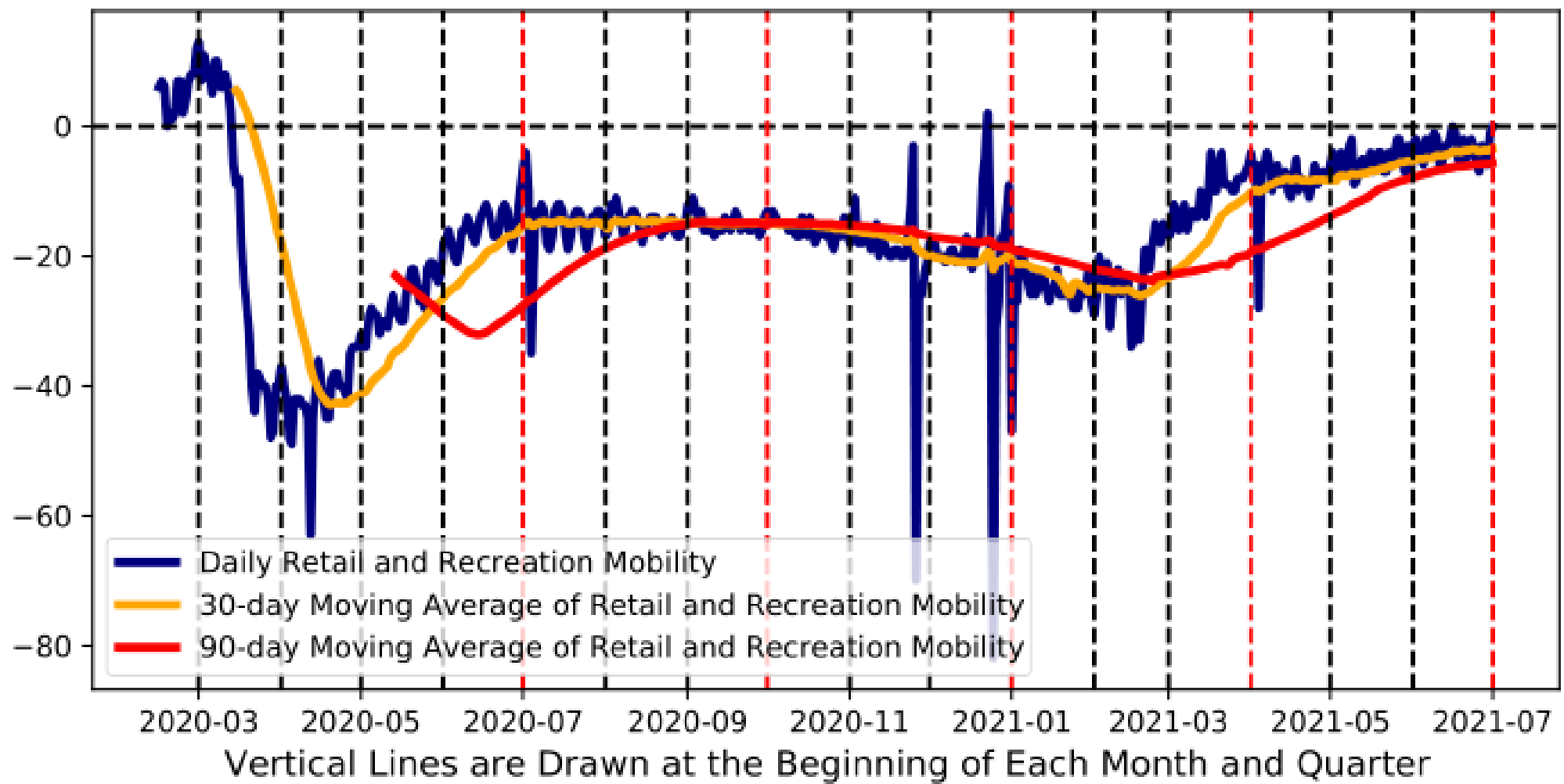


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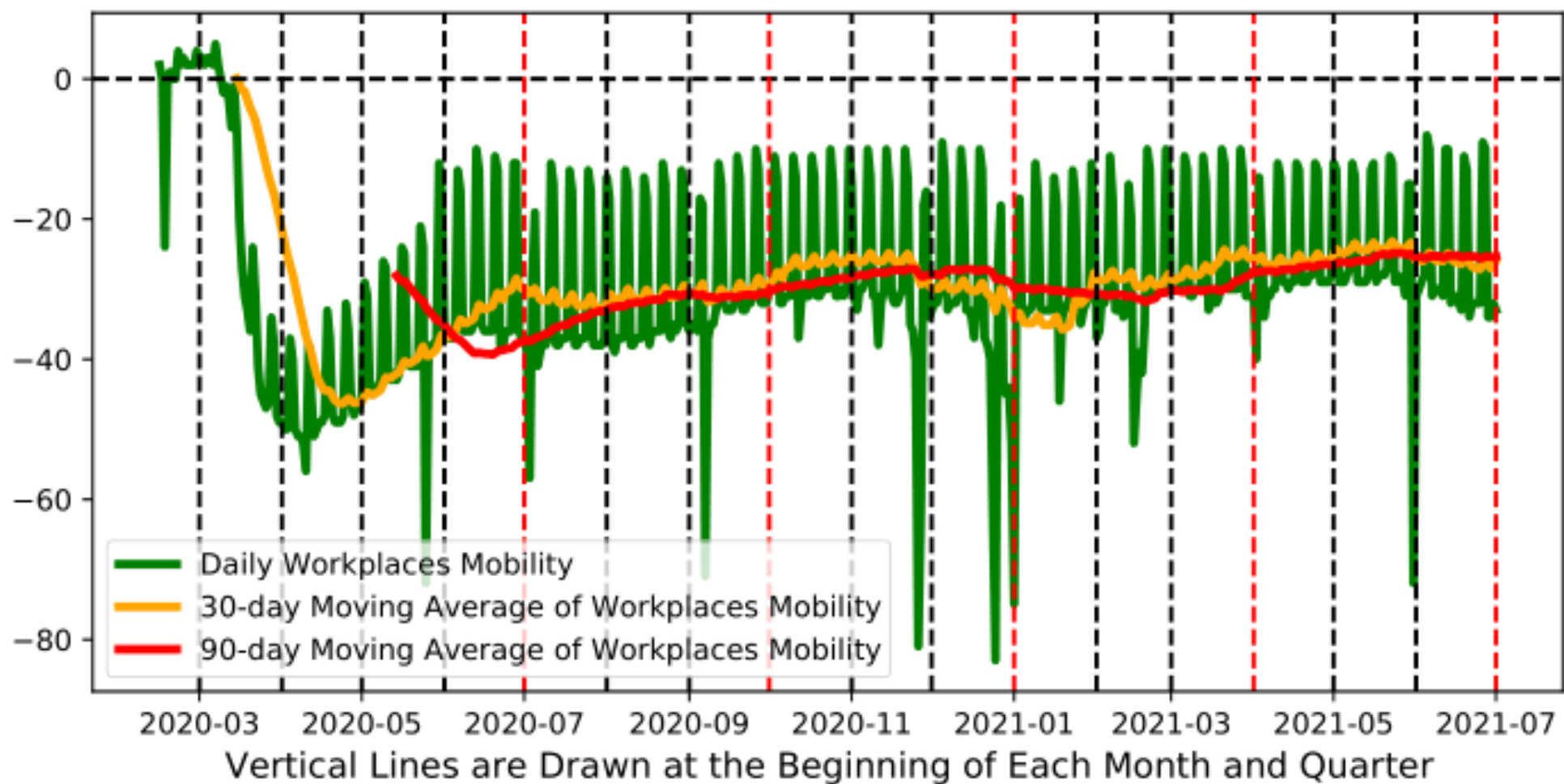


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Vertical Lines are Drawn at the Beginning of Each Month and Quarter



Outline and Benefits of a Structured Projection and Policy Analysis System (PPAS)

David Archer (BIS)

Douglas Laxton (BPP)

BPP Seminar, July 7, 2021

- Make monetary policy choices today consistent with desired outcomes in the future
- Communicate the logic of those choices to markets

**What are the
policy goals?**

- Focus limited resources on supporting monetary policy choices
- Put policy risk identification and analysis at center
- Coherent integration of current analysis with policy scenarios
- Improve understanding & communication, internally & externally

PPAS design goals?

- Macro models have never been good at forecasting
- Models can help, but people make the forecasts, especially over the near term
- People don't have crystal balls

**Forecasts are
always
judgmental and
error prone**

Forecasts vs Projections



What is your forecast? – *Answer:*
2%.



What is your projection? – *Answer:*
How much time do you have?



“I'd rather have Bob Solow than an econometric model, but I'd rather have Bob Solow with an econometric model than without one.”

Stanley Fischer

- Used to be referred to at the Bank of Canada as the “Staff Economic Projection”
- Important consistency-generating tool to help staff develop, and policymakers discuss, alternative scenarios

Projection and Policy Analysis System

- Designed to describe interaction of key macro variables over medium term
- Provides consistency check on judgment, and dynamics of medium-term scenario
- Provides substantial help dealing with risk and uncertainty
- The model does not produce a forecast

Role of the Core Model

Elements of a Structured PPAS

Databases and reporting packages

Nowcasting system

Monitoring and near-term updates

Core quarterly projection models

Quarterly process: scenario development

Risk analysis

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Risk analysis

To detect which of the scenarios is playing out, and which new scenarios are becoming relevant, early recognition is crucial.

Good policy decisions require both good analysis and good information.

Crucial to have a well-maintained and accessible system of databases and reporting packages.

Databases and Reporting Packages

Different databases, different roles.

Make choices, design databases and reporting packages to support policy.

Make them seamless and automatic.

Dedicated support resources extremely useful.

Databases and Reporting Packages

Agreed set of variables, measurement conventions, less time wasted coherence of arguments and evidence standard reporting packages facilitate communication and discussion

Databases and Reporting Packages

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Risk analysis

Good readings of the current situation are made by people who know the data and what is happening in the economy

Near-Term Forecast

- Nowcasts of the current quarter and assessment of trends into the next quarter are made by staff judgment (increasing aided by bulk data filtering methods)
- The model is tuned to this view and plays no role, except as framework

Nowcast

Integrates skills of sector experts, data miners and macro modelers.

Is basis for evaluation of which scenario might be playing out.

Is basis for evaluation of new possible scenarios.

Encourages learning by all groups.

Leads to a coherent linking of current assessment and scenario discussion.

Nowcast

Leaves model free to focus on essential macro processes.

Model can be clear and understood by policy makers.

Separation (but integration) of trend detection and scenario exploration

(a) keeps the purpose of each phase clear

(b) brings the right tools to each task

Nowcast

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Risk analysis

Term used to describe activity in following developments between releases of data

Example: Using higher frequency data with partial information on economic activity to follow and update the outlook for quarterly measure

What is
monitoring?

Typically, full medium-term exercise is done quarterly (National Accounts).

Update done each month following release of key inflation data.

Typically, weekly monitoring and update based on new information, with report to MPC.

Monitoring and Updates

Explaining *why* there were monitoring errors generates very useful information.

Systematic review of data generates insight into:

- which scenario is playing out
- what's not well explained by closest scenario
- so what new scenarios might be relevant
- and questions for research

Makes link to next scenario development round more continuous.

Monitoring and Updates

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Nowcasting system

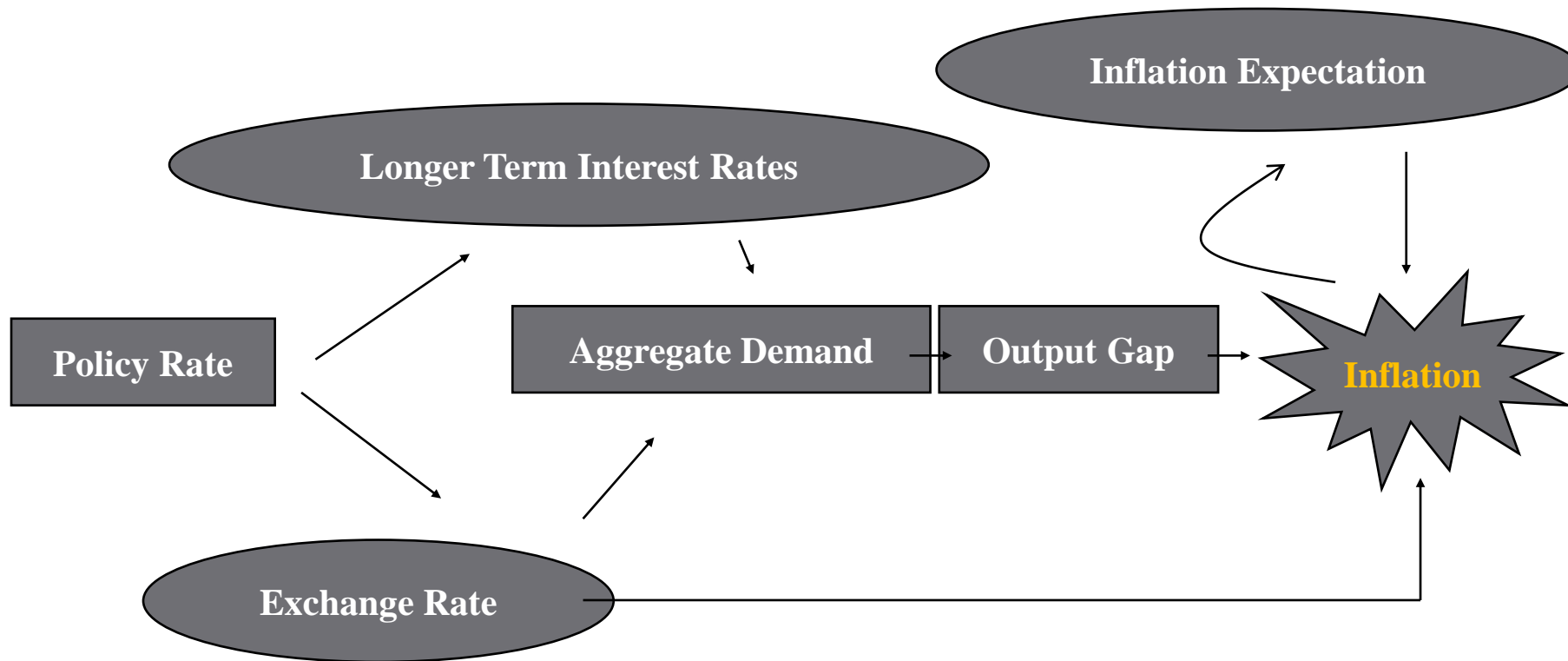
Monitoring and near-term updates

Core quarterly projection models

Quarterly process: scenario development

Risk analysis

Core Model, Simplest Form



Each model embodies a view on the transmission mechanism (how monetary policy works) and how the economy responds to shocks.

- Models serve the policy makers (MPC)
- MPC must see alternative models/
parameterisations as reflecting the
possibilities they need to consider
- Comfort leads to confidence and use of
the information in communication
- Resulting consistency in communication
enhances credibility

Ownership of Models

Elements of a Structured PPAS

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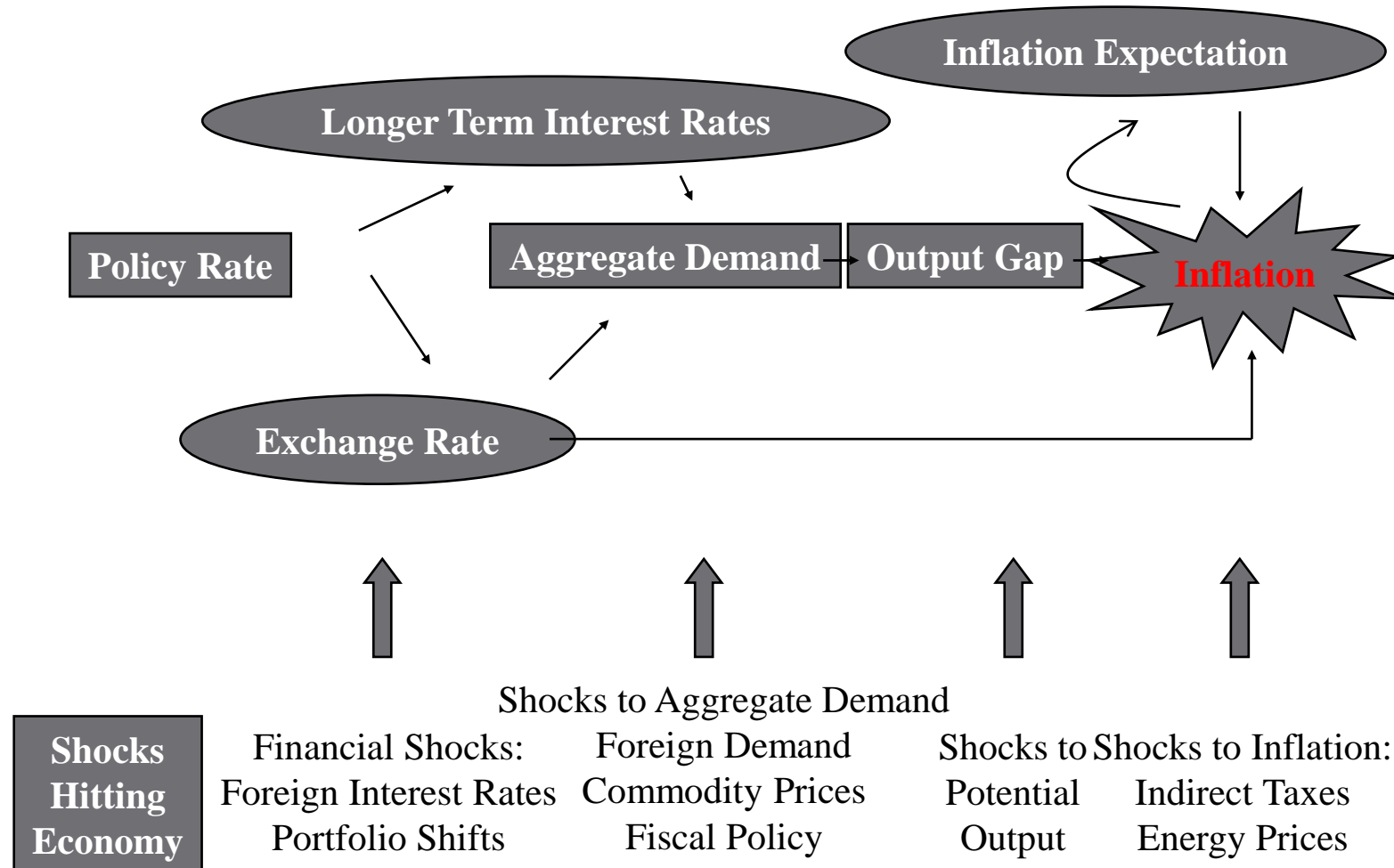
Core quarterly projection models

**Quarterly process: scenario
development**

Risk analysis

Quarterly Projection Exercise

CORE MODEL



- Meld of judgmental near-term and model-based medium-term elements
- Scenarios show paths for the policy instrument consistent with bringing inflation to the target path under agreed assumptions

Scenario Development

Elements of a Structured PPAS

Databases and reporting packages

Nowcasting system

Monitoring and near-term updates

Core quarterly projection models

Quarterly process: scenario development

Risk analysis

- Scenarios depict important possible paths for the economy calling for a policy response.
- Example: External environment
- Advice to the policymakers will always include analysis of alternatives, especially where required policy adjustments might not be “measured”.
- Models designed to make this routine

Risk Analysis

- Encourages thinking at macro level
- Institution develops a paradigm for analysis and discussion of alternative paths
- Coherent view on the macro numbers
- More focused debate on issues
- Improved communication and transparency both inside and outside

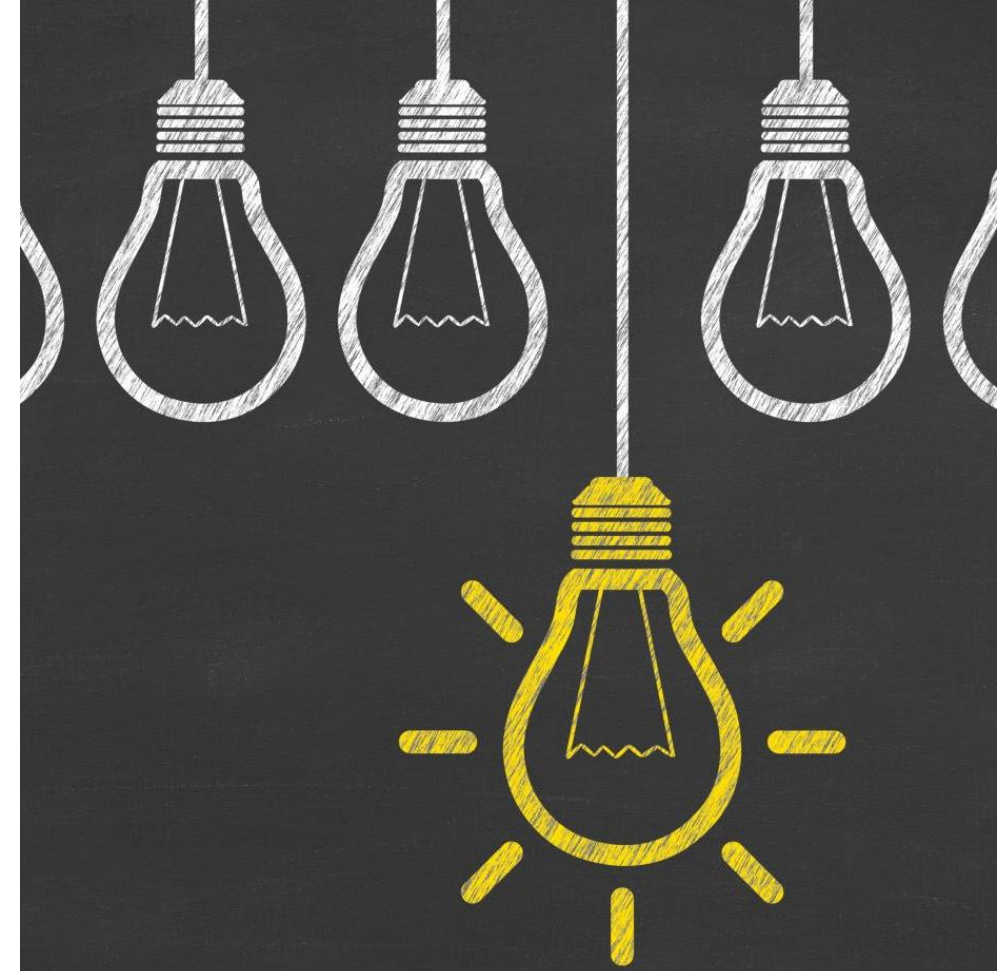
Summary:

- Development of expertise in staff
- Development of institutional capability
- Research on issues that arise in making monetary choices
- Basis for evaluating institutional performance

Summary:

In Short, to Conclude:

- Effective use of scarce resources.
- Meetings shorter and more productive.
- Policymakers weigh risks depicted in staff scenarios; they own their judgement of what that means for the policy choice.
- Policy discussions more focused.
- Communication enhanced at all levels.





Thank you!