

ECON-GA 3200 Special Project in Economic Research

Prof. Michel Leonard

Spring 2017



NYU



**Have expectations regarding changes in
the US Interest Rate been adjusted into
Malaysian and South African Financial Markets?**

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Agenda

Section 1: Executive Summary — Sami

- I. Central Question
- II. Expectations
- III. Findings
- IV. Expectations vs Findings

Section 2: Data + Methodology — Joon

- I. Choice of Variables
- II. Methods

Section 3: Findings + Discussion — Kent

- I. Findings
- II. Discussion

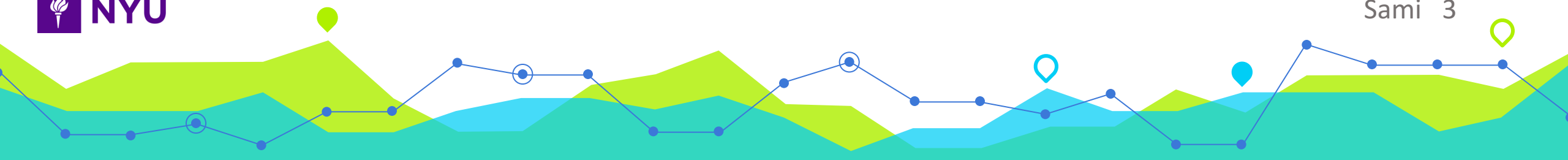
Central Question

Have expectations regarding changes in the US Interest Rate been adjusted into Malaysian and South African Financial Markets?

- **Motivation:** Study the Impact of Changes in the US Interest Rate (Expected and Actual) on Emerging Economies.
- **Outcome Measure:** 10-year Government Bond Yields (more in Section 2).
- **Sample:** South Africa and Malaysia (more in Section 2).

List of FOMC Meetings

Date of Meeting			Number of Votes	Increase Interest Rate
2015	September	16-17	1	No
2015	October	27-28	1	No
2015	December	15-16	10	Yes
2016	March	15-16	1	No
2016	April	26-27	1	No
2016	July	26-27	1	No
2016	September	20-21	3	No
2016	November	1-2	2	No
2016	December	13-14	10	Yes

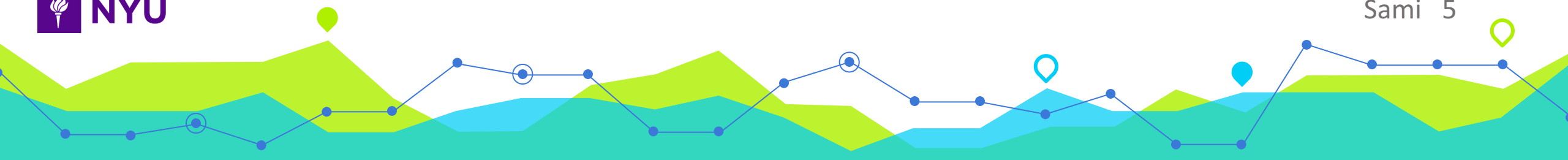


Expectations

- **What:** Expectations regarding changes in the Fed Funds Rate have already been incorporated in both South African and Malaysian Financial Markets. Hence, our outcome variable should be stable.
- **Why:** Well-established economies expected to be sophisticated enough to act to external expectations to ensure stability.
- **How:** Connection between outcome variable and US Fed Funds Rate explained in Section 2.

Findings

- **Malaysia:** Outcome variable relatively stable suggesting US Interest Rate changes have been taken into account.
- **South Africa:** Mixed results — First event of study: significant deviation of the outcome variable; Second event of study: far more stable.



Findings vs Expectations

- **Malaysia:** Tends to care a lot about keeping exchange rate stable. Findings match expectations. Outcome variable forecast turns out stable (More in Section 3).
- **South Africa:** Findings in line with expectations. Additionally, there was an occasion of extreme deviation in the government bond yield that demanded more analysis (More in Section 3).

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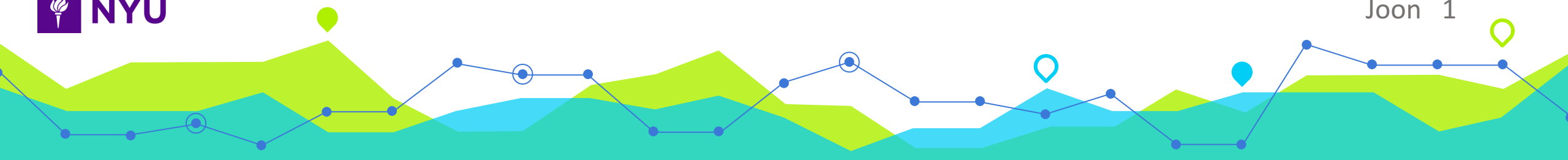
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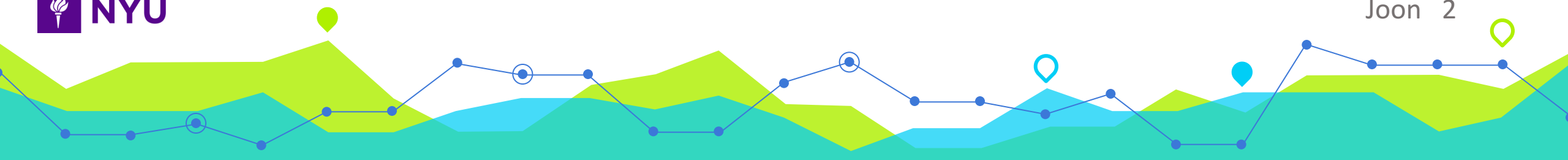


Joon 1

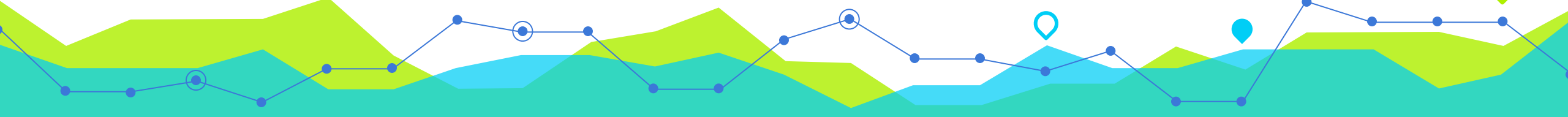
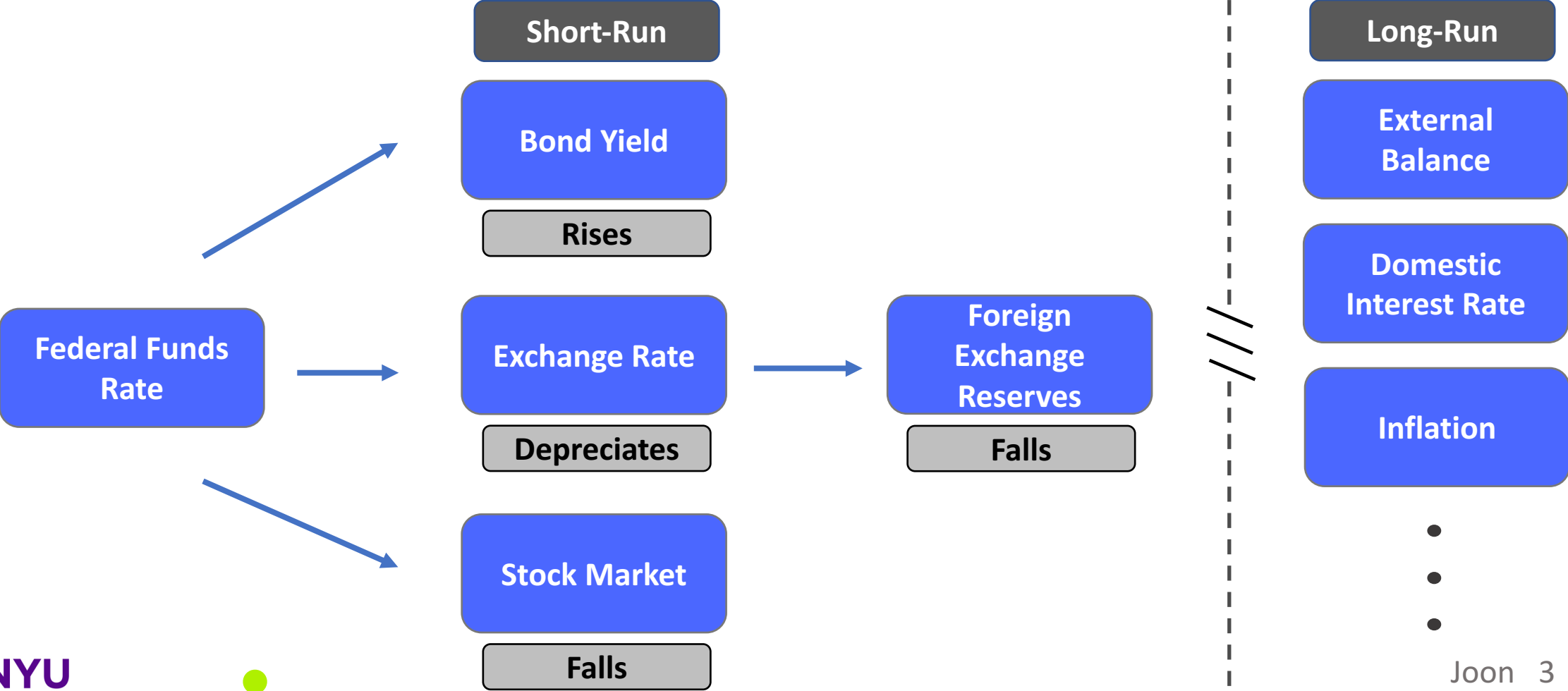


Data Description

- **Outcome Measure:** 10-year Government Bond Yield
- **Major Stock Market Index:**
 - **Malaysia:** Bursa Malaysia
 - **South Africa:** Johannesburg Stock Exchange
- **Exchange Rate per US Dollar**
- **Foreign Exchange Reserves**
- **Events:** Interest Rate Change Dates
- **Malaysia** — from January 2010 to April 2017
- **South Africa** — from June 2011 to April 2017



Theory Behind Choice of Variables



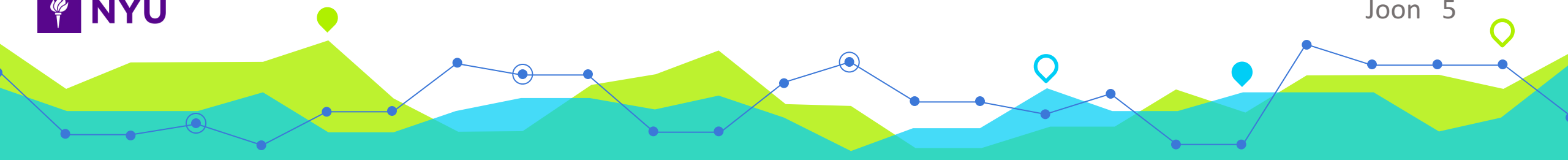
Methods – Flow



Methods – South Africa: VAR (2)

$$y_t = v + A_1 y_{t-1} + A_2 y_{t-2} + B_0 x_t + \dots + B_2 x_{t-2} + u_t$$

$y_t = (y_{1t}, \dots, y_{Kt})'$ is a $K \times 1$ random vector,
 A_1 through A_2 are $K \times K$ matrices of parameters,
 x_t is an $M \times 1$ vector of exogenous variables,
 B_0 through B_2 are $K \times M$ matrices of coefficients,
 v is a $K \times 1$ vector of parameters, and
 u_t is assumed to be white noise;



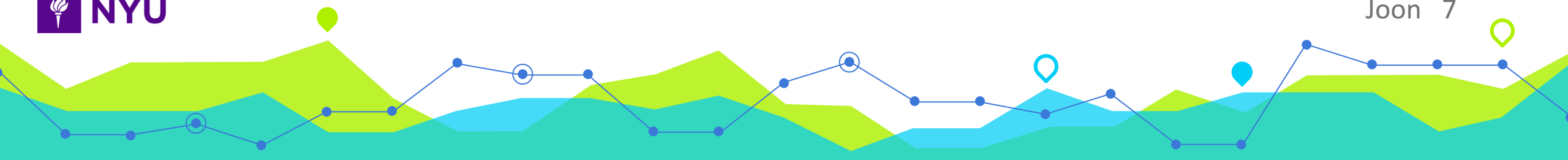
Methods – Malaysia: ARIMA (1,2,1)

$$y_t = (1 - \rho)\beta_0 + \rho y_{t-1} + \theta \varepsilon_{t-1} + \varepsilon_t$$

ρ is the first-order autocorrelation parameter
 θ is the first-order moving-average parameter
 $\varepsilon_t \sim i.i.d. N(0, \sigma^2)$, meaning that ε_t is a white-noise disturbance

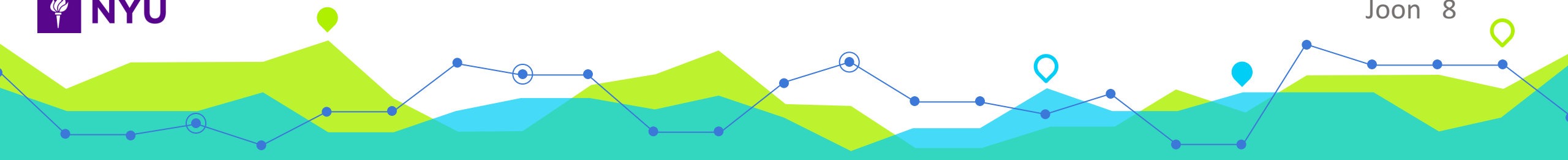
Methods – Forecast

- Forecasted – 10 Year Government Bond Yield
- Length of Forecast – 30 days
- Method – Dynamic Forecast

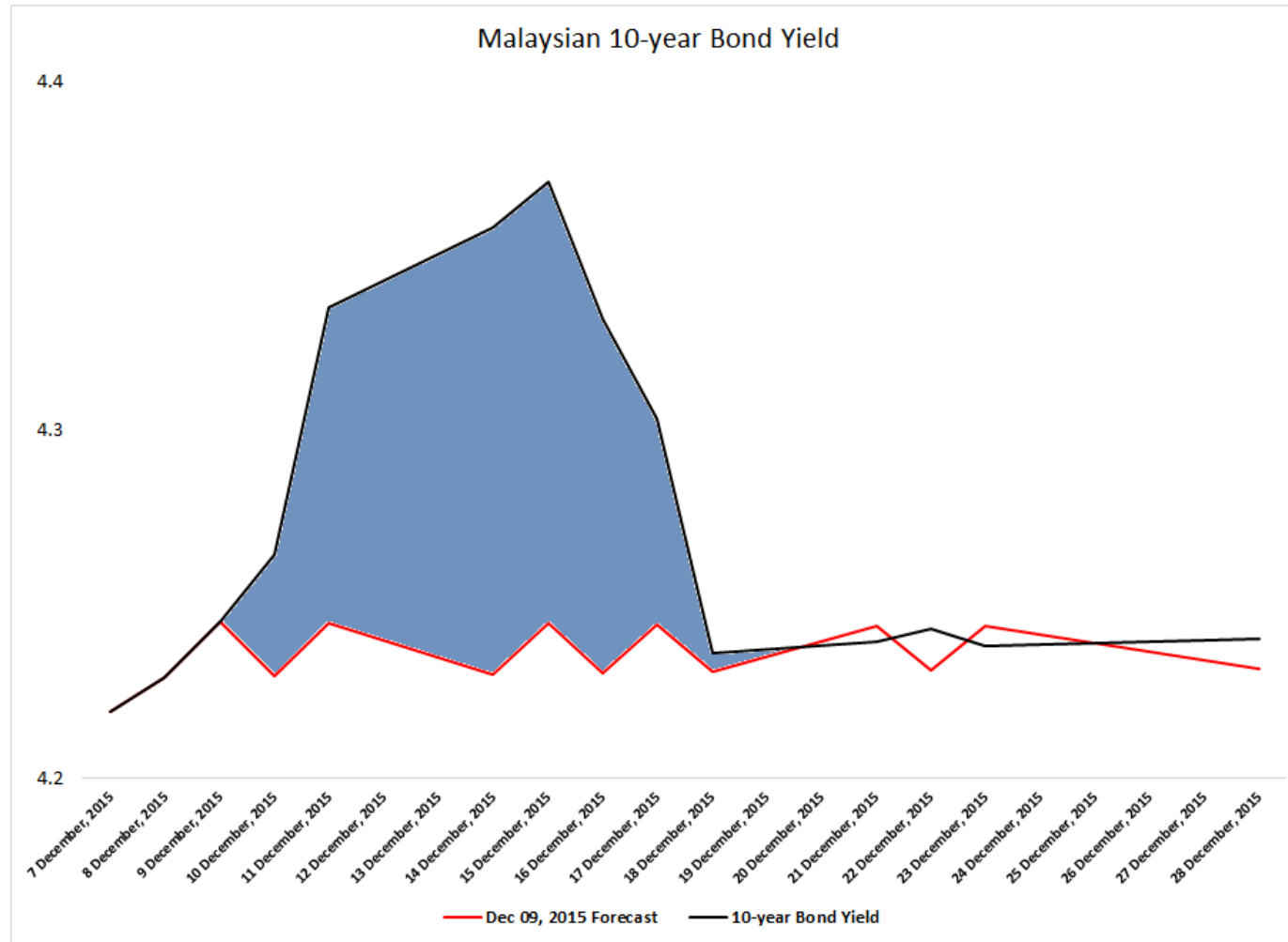


Methods – Damage Calculation

$$\int_{Dec.09,2015}^{Dec.21,2015} F(ObservedData) - F(Forecasted) dt$$



Methods – Damage Calculation: Example



Joon 9

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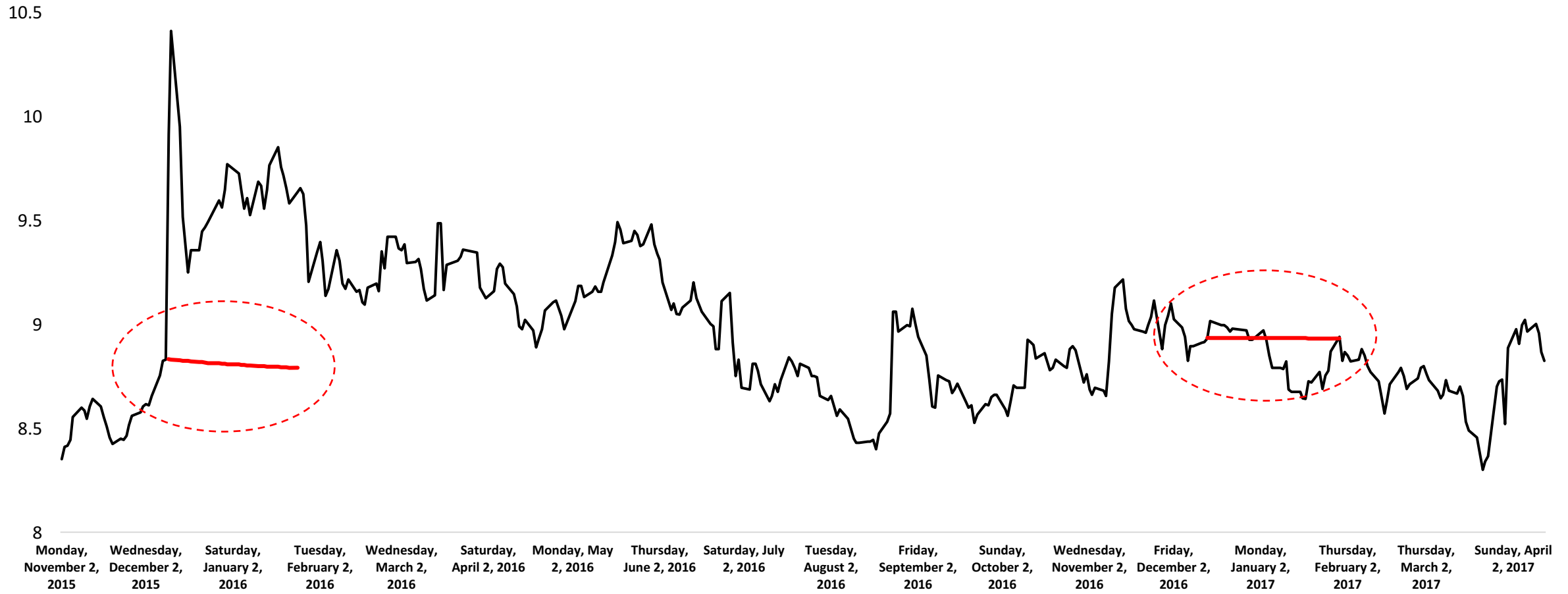
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South Africa Full Trend w/ both Forecasts

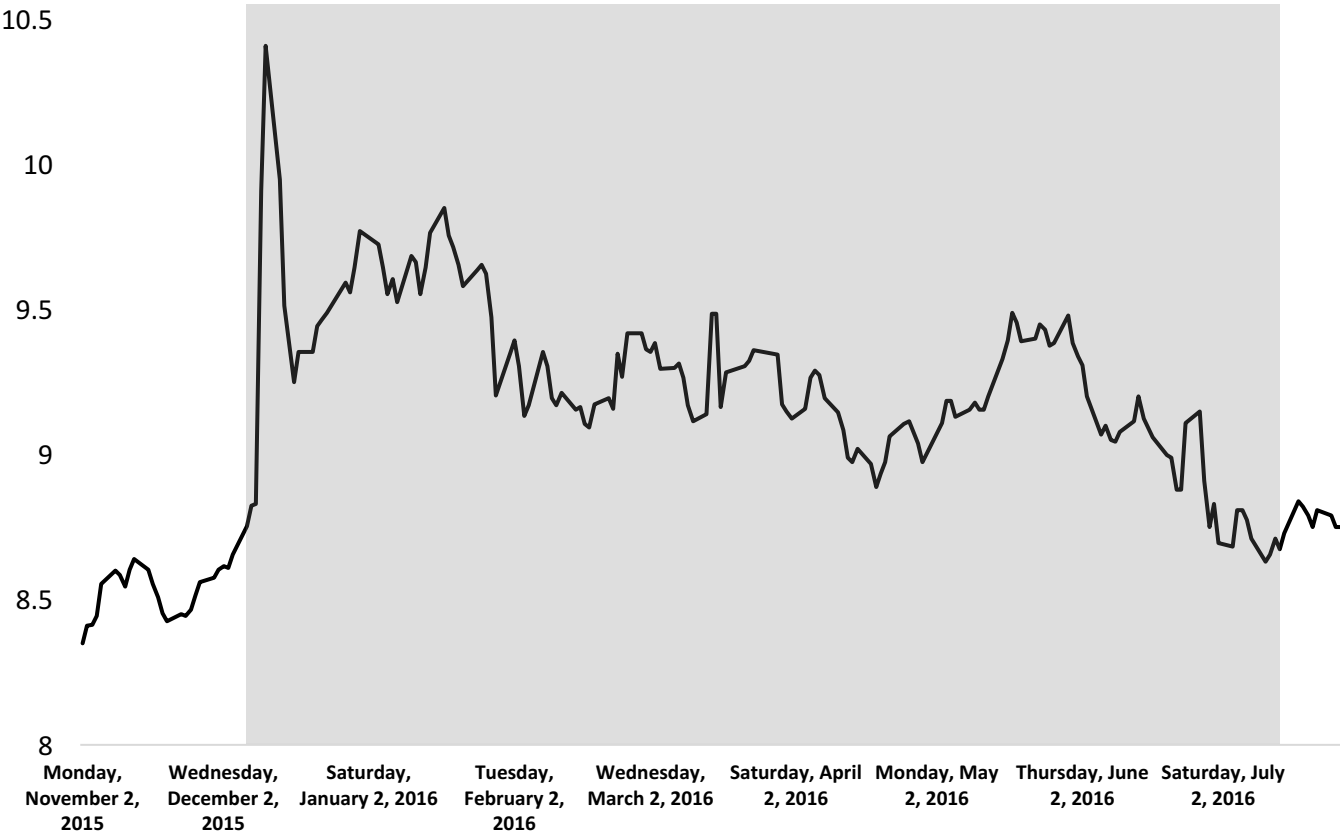
South African 10-year Bond Yield



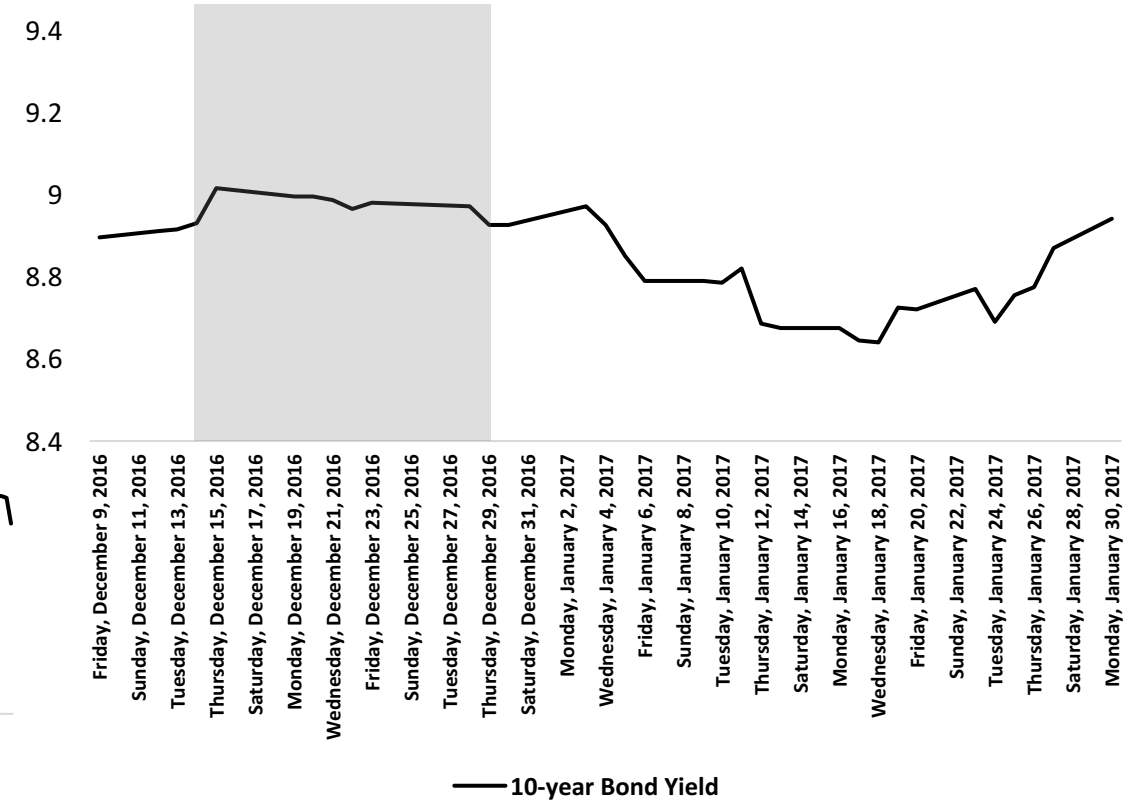
Kent 2

South Africa Structural Breaks

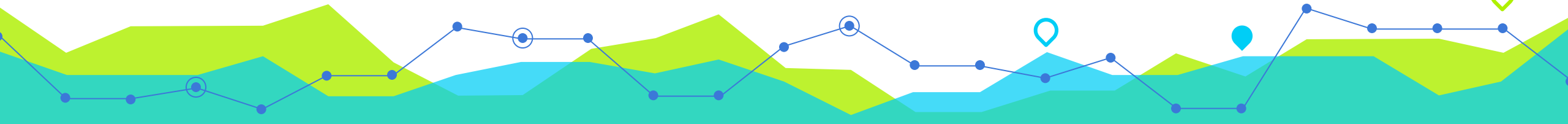
South African 10-year Bond Yield Structural Break



South African 10-year Bond Yield Structural Break

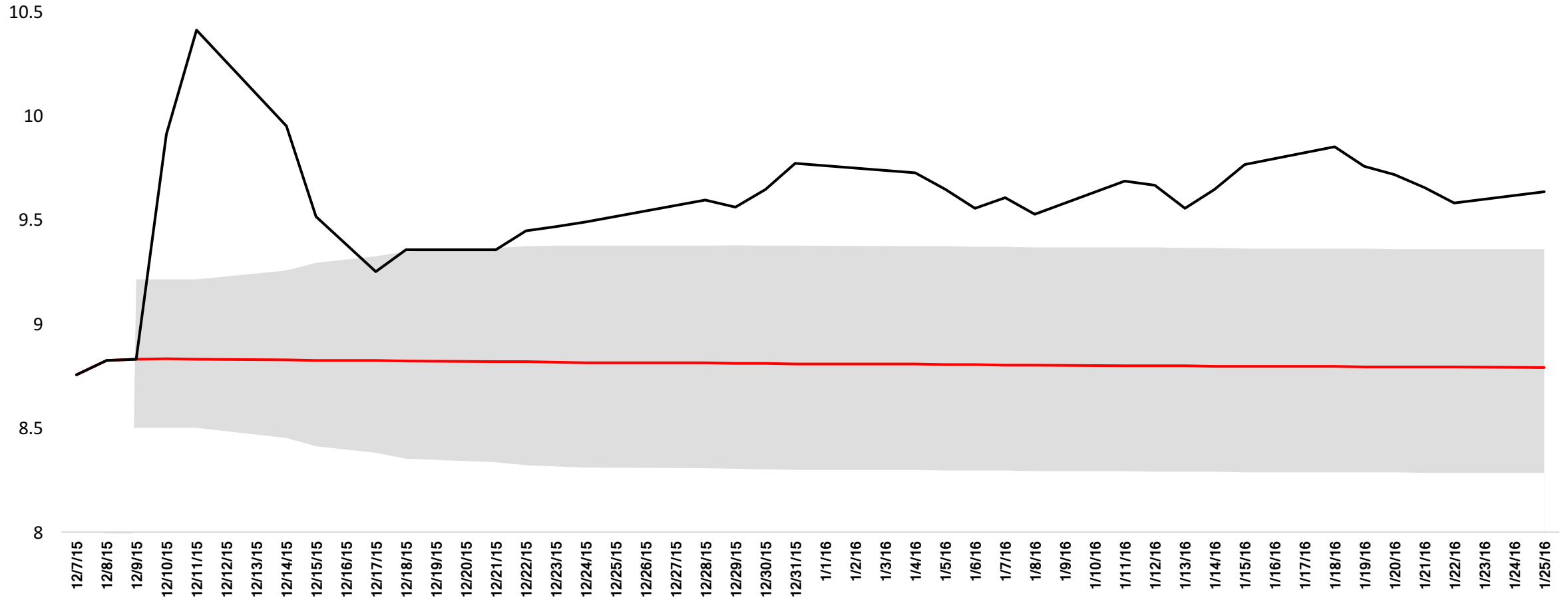


Kent 3



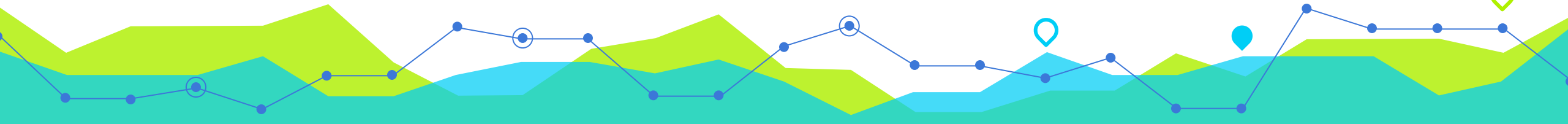
South Africa Forecast 2015

South African 10-year Bond Yield



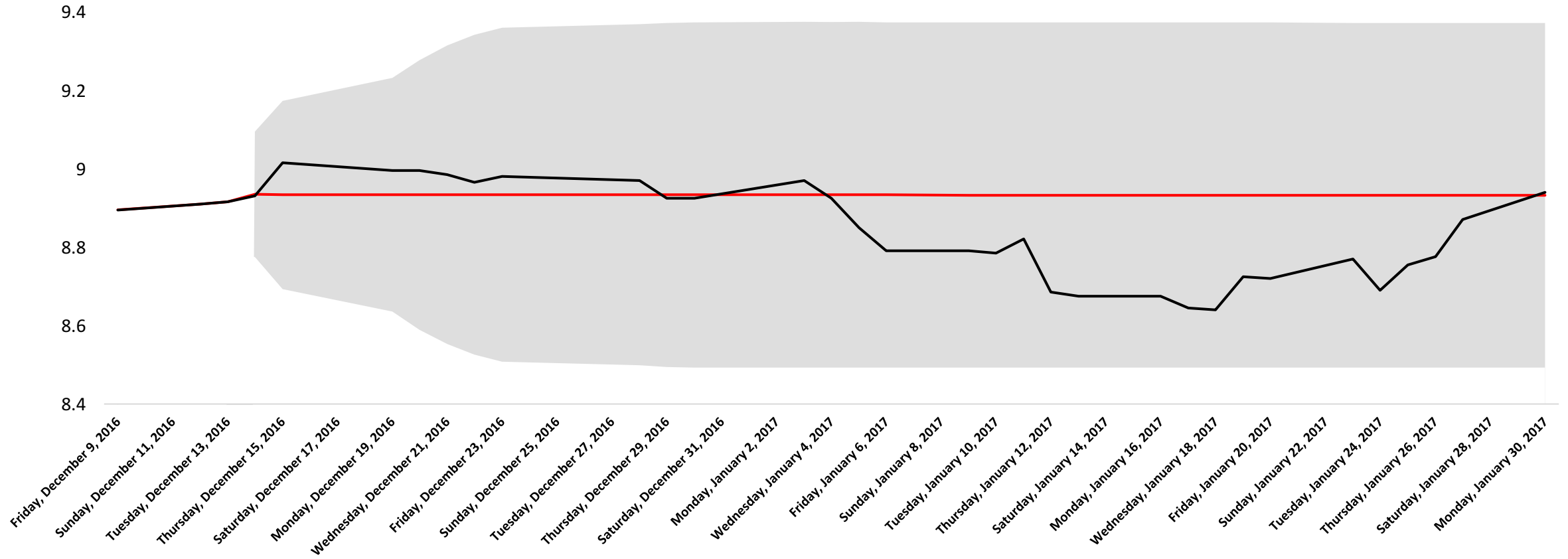
— Dec 09, 2015 Forecast — 10-year Bond Yield

Kent 4



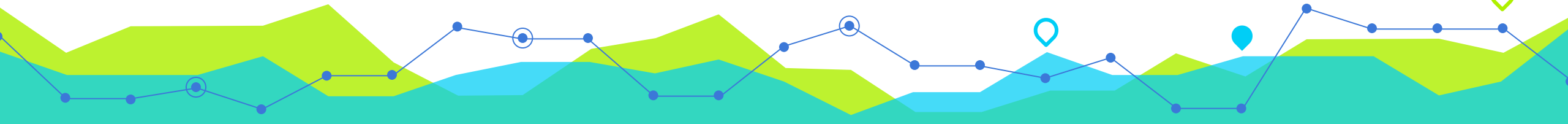
South Africa Forecast 2016

South African 10-year Bond Yield



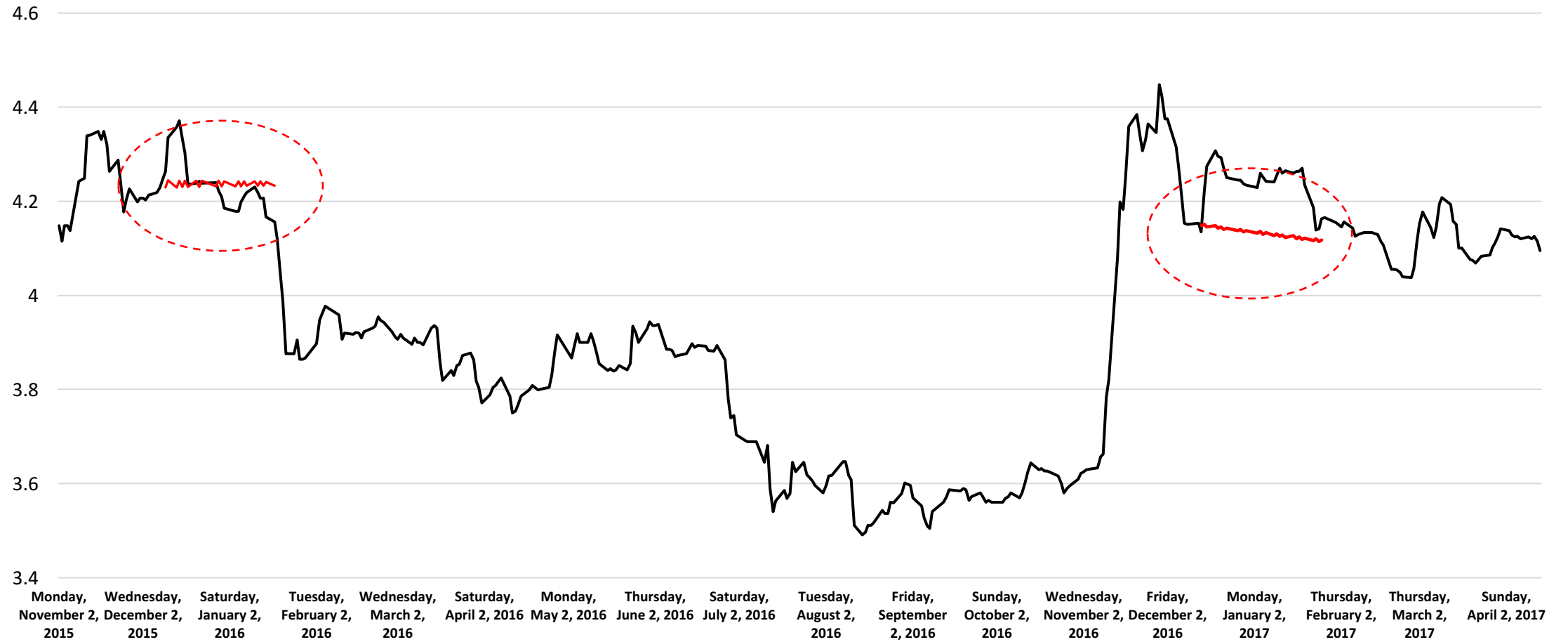
— Dec 13, 2016 Forecast — 10-year Bond Yield

Kent 5



Malaysia Full Trend w/ both Forecasts

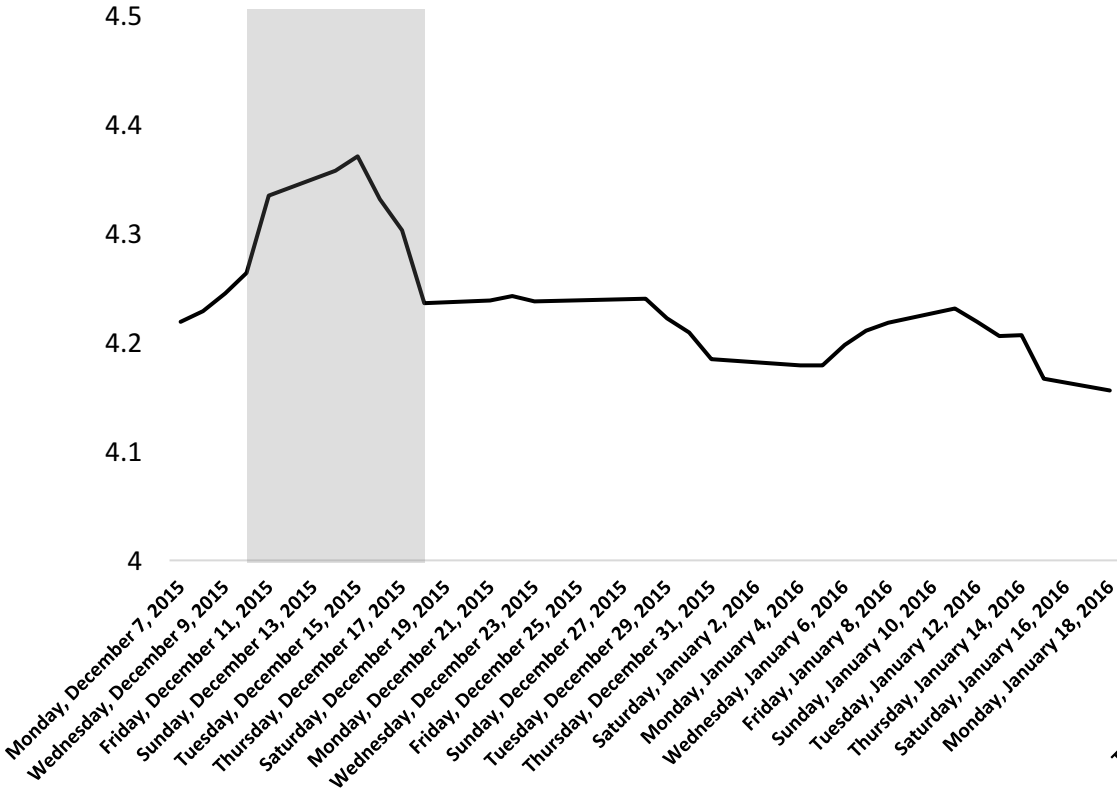
Malaysia 10-year Bond Yield



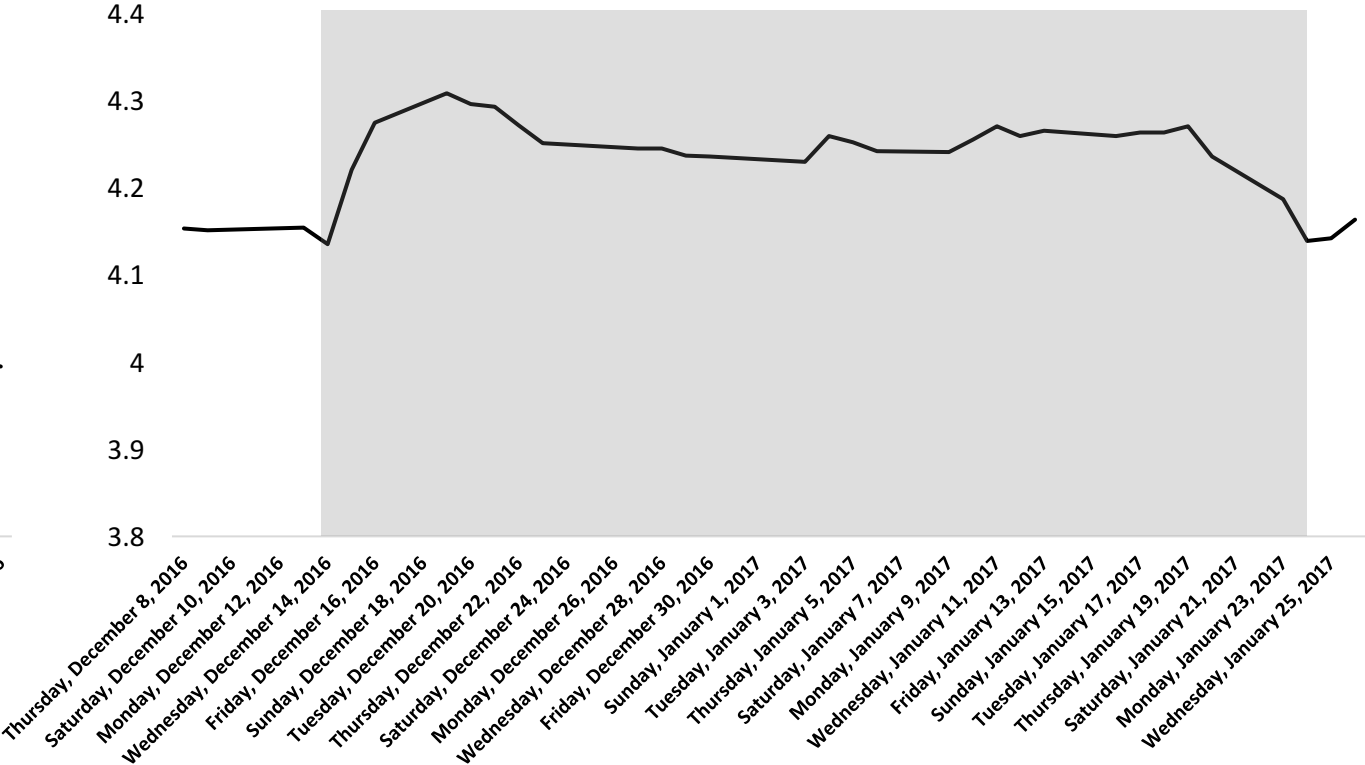
Kent 6

Malaysia Structural Breaks

Malaysian 10-year Bond Yield Structural Break



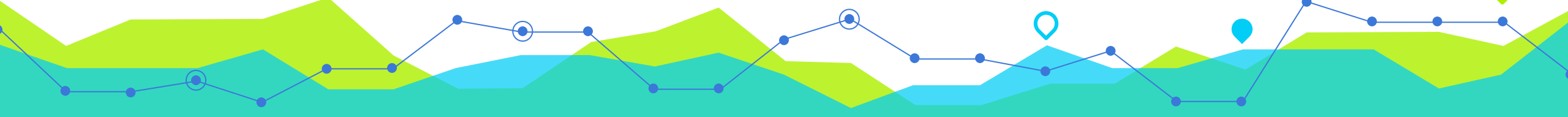
Malaysian 10-year Bond Yield Structural Break



— 10-year Bond Yield

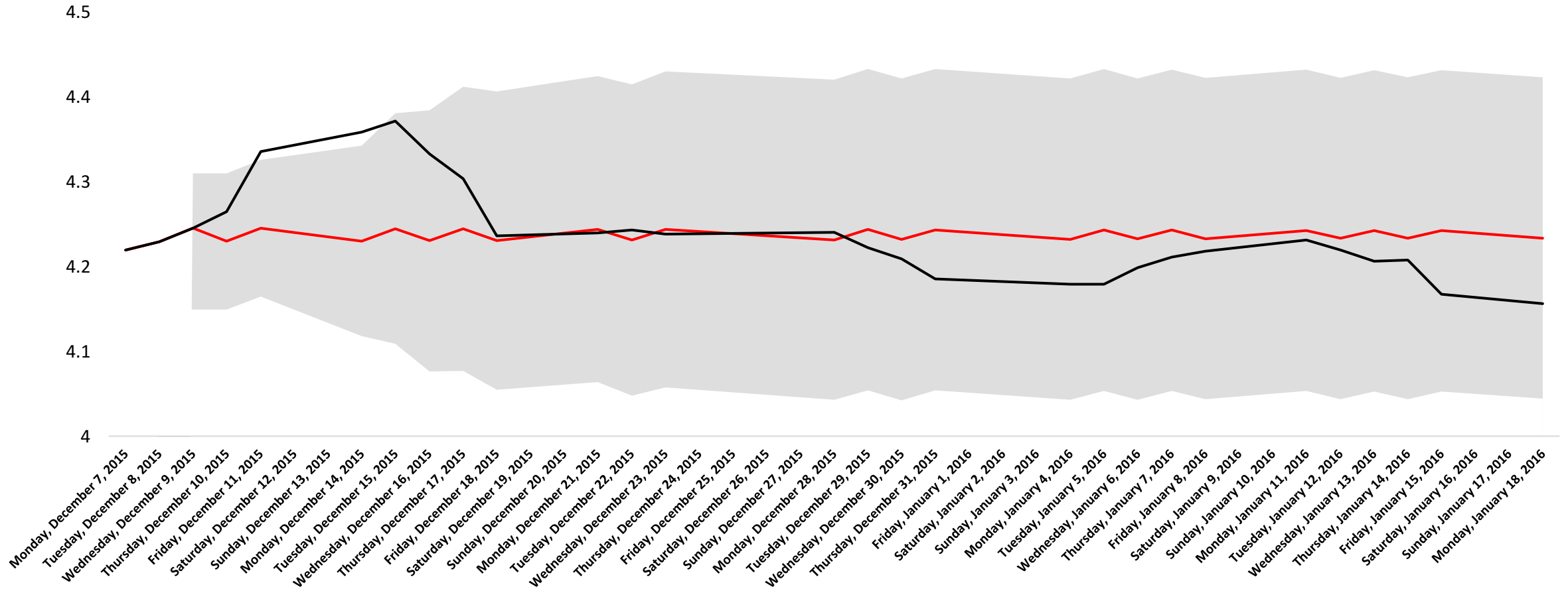
— 10-year Bond Yield

Kent 7



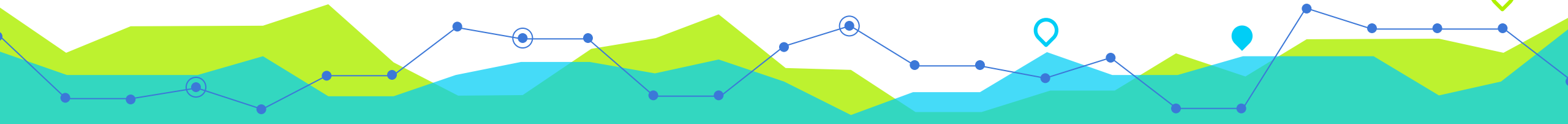
Malaysia Forecast 2015

Malaysian 10-year Bond Yield



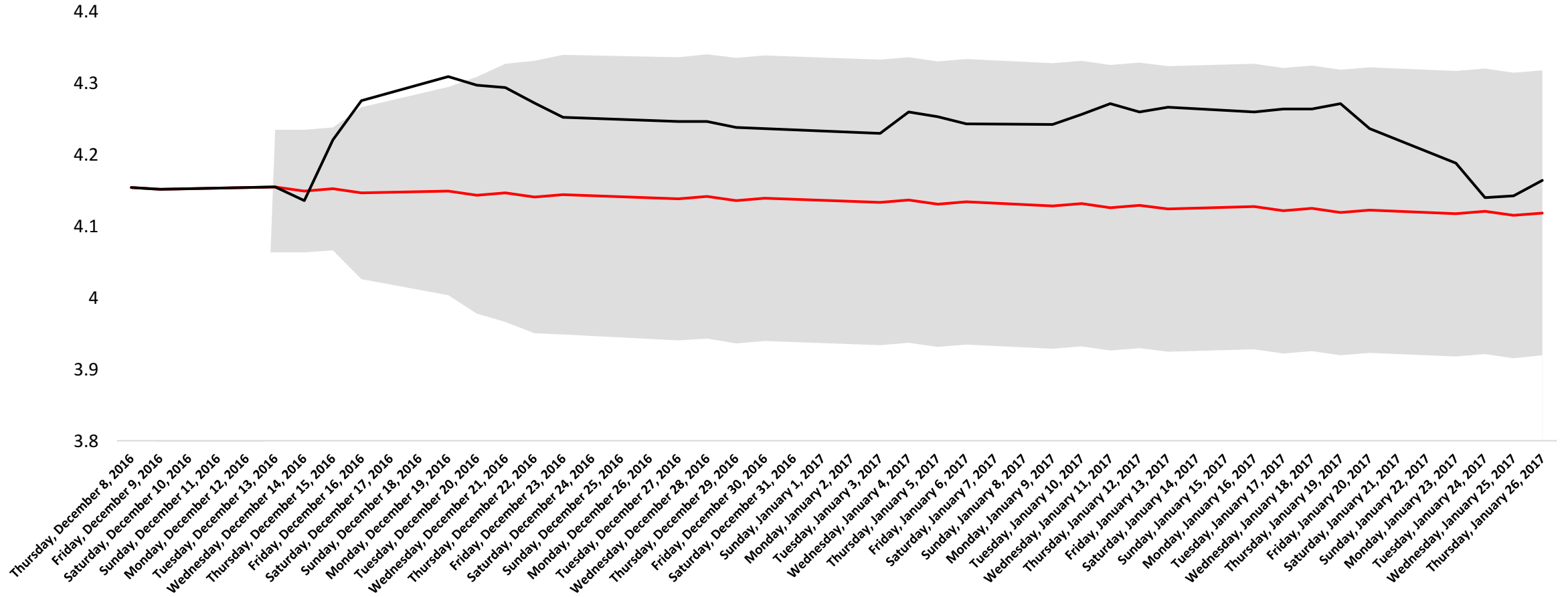
— Dec 09, 2015 Forecast — 10-year Bond Yield

Kent 8



Malaysia Forecast 2016

Malaysian 10-year Bond Yield



— Dec 13, 2016 Forecast — 10-year Bond Yield

Kent 9

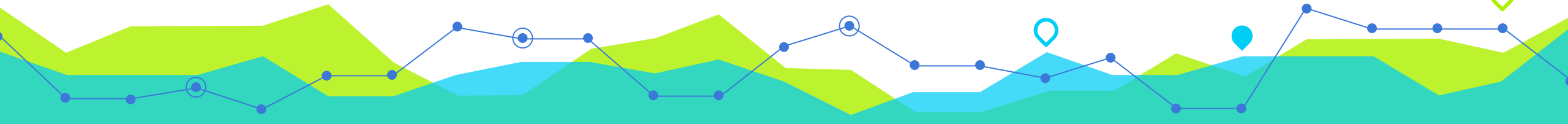
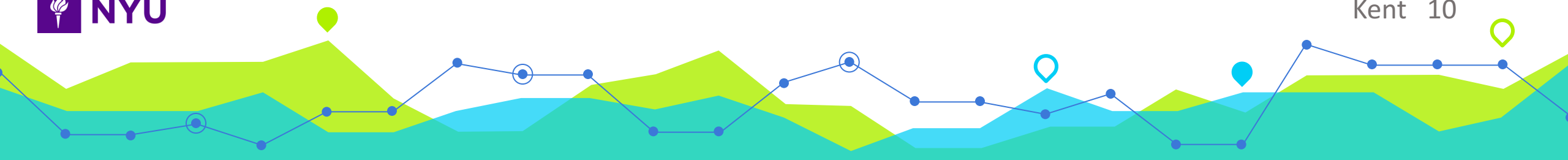


Table of Calculus

FINDINGS TABLE	Area Under Observed Bond Data	Area Under Forecasting	“Damages” (difference in integration)
South Africa 2015 Dec. 09 to July 11	1330.74	1261.75	68.99
South Africa 2016 Dec. 13 to Jan. 04	107.629	107.183	0.446
Malaysia 2015 Dec. 09 to Dec. 21	34.4404	33.9037	0.5367
Malaysia 2016 Dec. 13 to Jan. 24	118.936	115.684	3.252



THANK YOU!

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