

Property Analytics

Forecasting

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Exercise – Forecast House Price Change by Technical and Fundamental Models (in Excel)

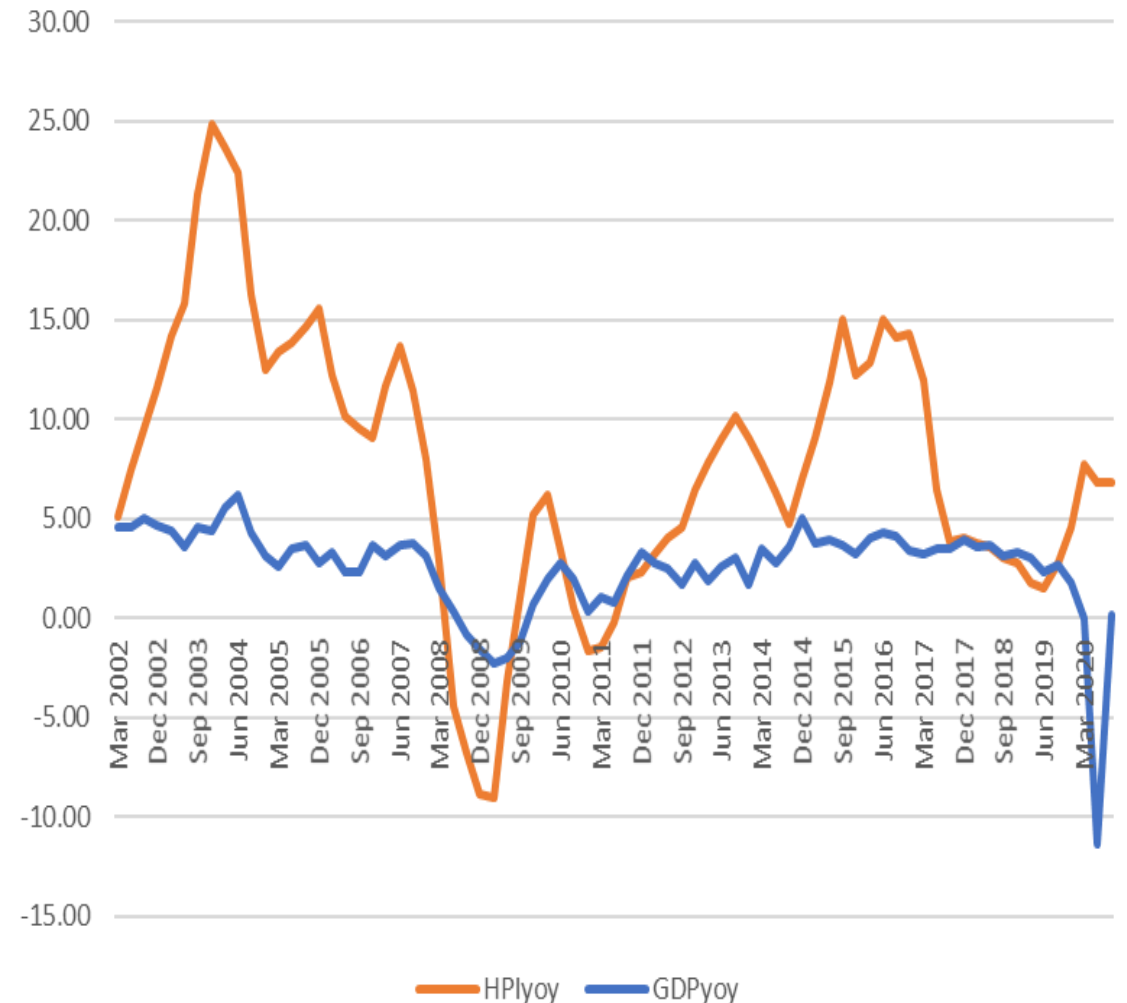
- Can House Price changes be Forecasted by Economic Growth, Unemployment and Real Interest Rate?

- *1. Technical Model*

- $\Delta P_t = \alpha + \beta_1 \Delta P_{t-1} + \beta_2 \Delta P_{t-2} + \varepsilon \dots$

- *2. Fundamental Model*

- $\Delta P_t = \alpha + \beta_1 \Delta GDP_t + \beta_2 UNE_t + \beta_3 RIR_t + \varepsilon \dots$



Data Source 1 – Reserve Bank of New Zealand (RBNZ)

- RBNZ – Statistics: All Key Graph Data (xlsx)
<https://www.rbnz.govt.nz/statistics>
 - Inflation
 - Current account percentage of GDP
 - Mortgage rates
 - House prices and value
 - Employment and unemployment

Key graph data

[Inflation](#)

[90 day bank bill rate](#)

[Exchange rates, nominal and TWI](#)

[Real TWI](#)

[Real GDP](#)

[Current account percentage of GDP](#)

[Mortgage rates](#)

[House prices and value](#)

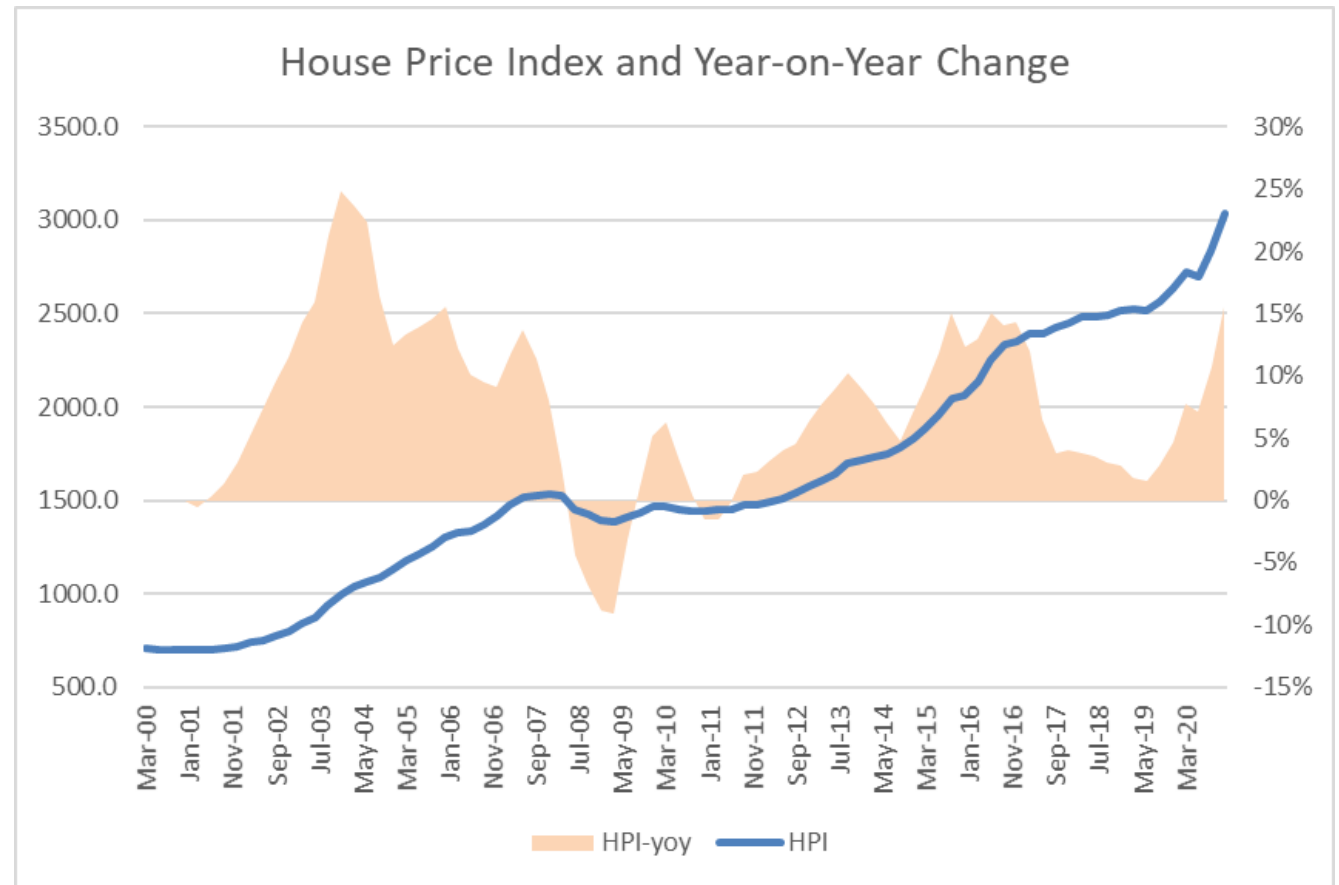
[Household debt](#)

[Employment and unemployment](#)

House Price Index (HPI)

- Quarterly time series – 2000Q1 - 2020Q4
- HPI (Dec 1987) = 100.0
- Year-on-Year (yoy)

MMM-YY	HPI	HPI-yoy
Mar-16	2135.6	
Jun-16	2248.8	
Sep-16	2333.3	
Dec-16	2355.0	
Mar-17	2391.1	12.0%
Jun-17	2394.8	6.5%
Sep-17	2421.9	3.8%
Dec-17	2448.9	4.0%
Mar-18	2480.9	3.8%
Jun-18	2480.9	3.6%
Sep-18	2494.8	3.0%
Dec-18	2517.2	2.8%
Mar-19	2525.7	1.8%
Jun-19	2517.8	1.5%
Sep-19	2565.2	2.8%
Dec-19	2632.6	4.6%
Mar-20	2722.1	7.8%
Jun-20	2695.6	7.1%
Sep-20	2838.5	10.7%
Dec-20	3040.6	15.5%

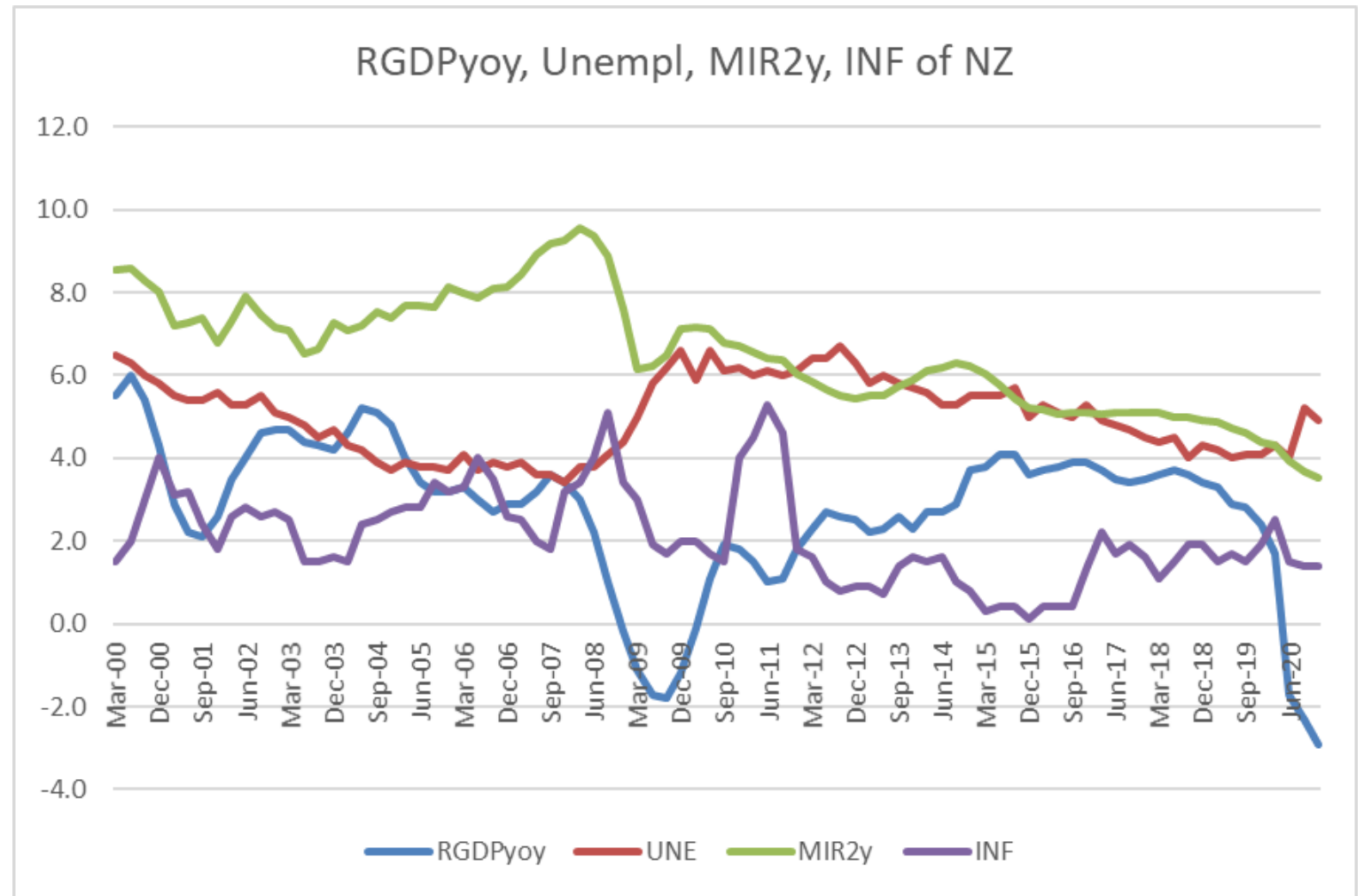


All Data

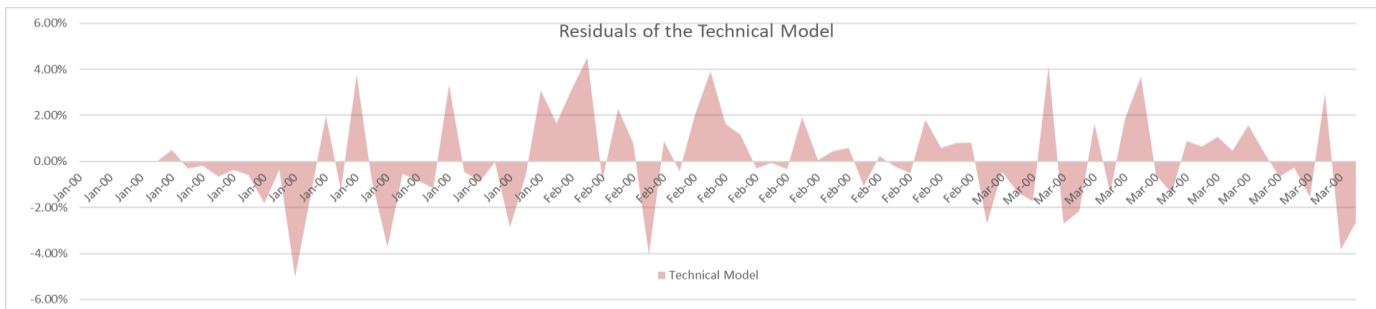
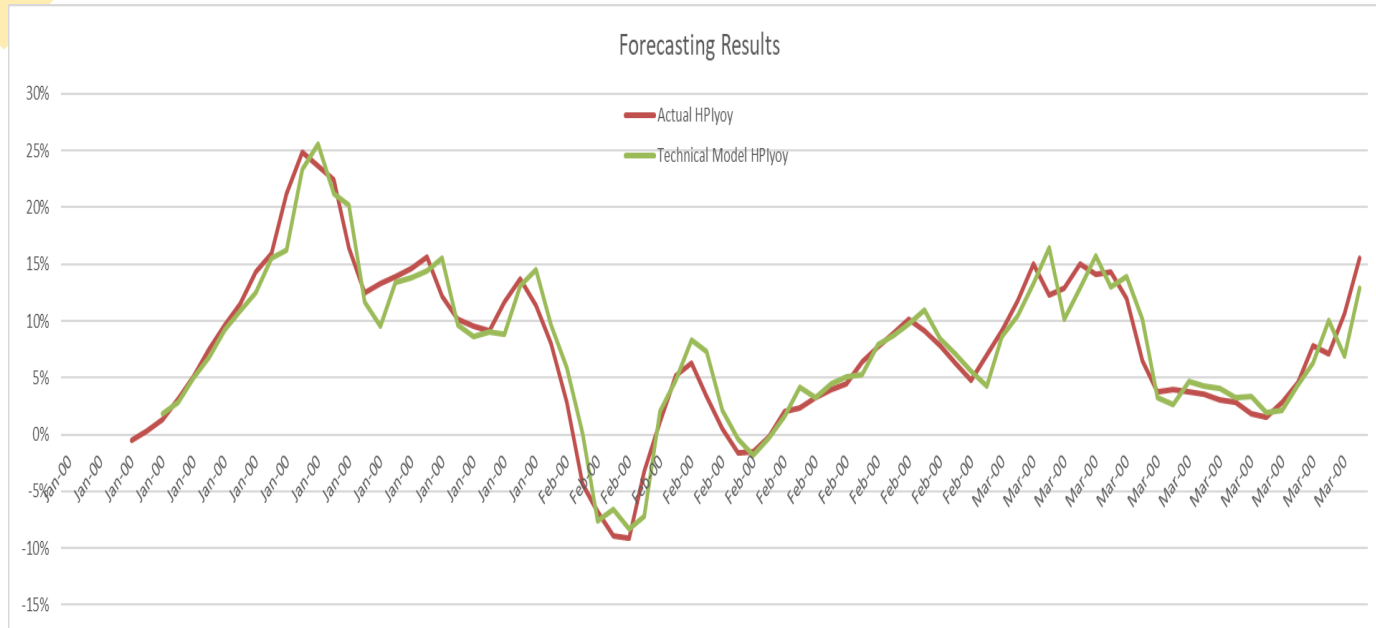
- Real Interest Rate (RIR) = Mortgage Interest Rate-2 year fixed (MIR2y) minus Inflation Rate (INF)
- $RIR = MIR2y - INF$
- Mortgage Rate – Convert from Monthly data to Quarterly data

MMM-YY	HPI	HPI-yoy	RGDPyo	UNE	RIR	MIR-2y	INF
Mar-16	2135.6		3.7	5.3	4.7	5.07	0.4
Jun-16	2248.8		3.8	5.1	4.7	5.10	0.4
Sep-16	2333.3		3.9	5.0	4.7	5.07	0.4
Dec-16	2355.0		3.9	5.3	3.8	5.10	1.3
Mar-17	2391.1	12.0%	3.7	4.9	2.9	5.10	2.2
Jun-17	2394.8	6.5%	3.5	4.8	3.4	5.10	1.7
Sep-17	2421.9	3.8%	3.4	4.7	3.2	5.10	1.9
Dec-17	2448.9	4.0%	3.5	4.5	3.5	5.07	1.6
Mar-18	2480.9	3.8%	3.6	4.4	3.9	5.00	1.1
Jun-18	2480.9	3.6%	3.7	4.5	3.4	4.93	1.5
Sep-18	2494.8	3.0%	3.6	4.0	3.0	4.90	1.9
Dec-18	2517.2	2.8%	3.4	4.3	2.9	4.83	1.9
Mar-19	2525.7	1.8%	3.3	4.2	3.2	4.70	1.5
Jun-19	2517.8	1.5%	2.9	4.0	2.8	4.50	1.7
Sep-19	2565.2	2.8%	2.8	4.1	2.9	4.40	1.5
Dec-19	2632.6	4.6%	2.4	4.1	2.4	4.27	1.9
Mar-20	2722.1	7.8%	1.7	4.3	1.3	3.77	2.5
Jun-20	2695.6	7.1%	-1.7	4.0	2.1	3.63	1.5
Sep-20	2838.5	10.7%	-2.3	5.2	2.1	3.50	1.4
Dec-20	3040.6	15.5%	-2.9	4.9	2.1	3.50	1.4

Real GDPyoy,
Unemployment
Rate, Real
Interest Rate of
New Zealand

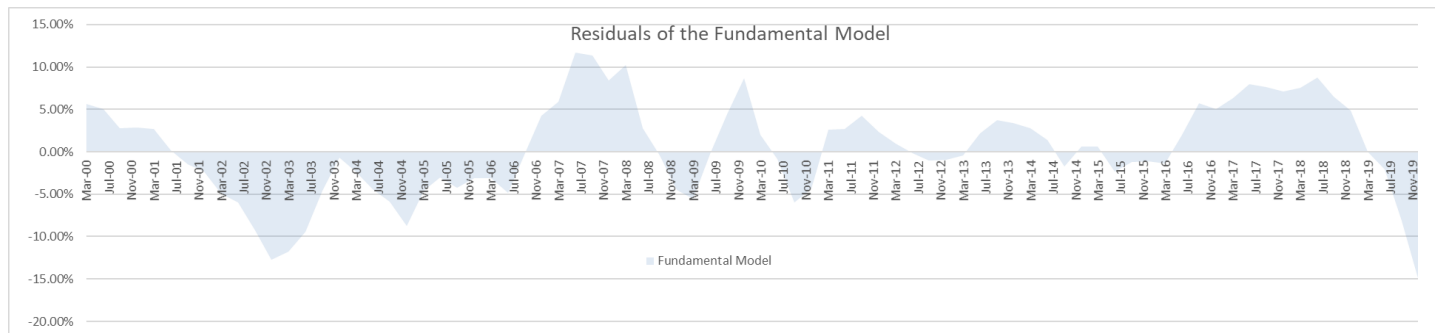
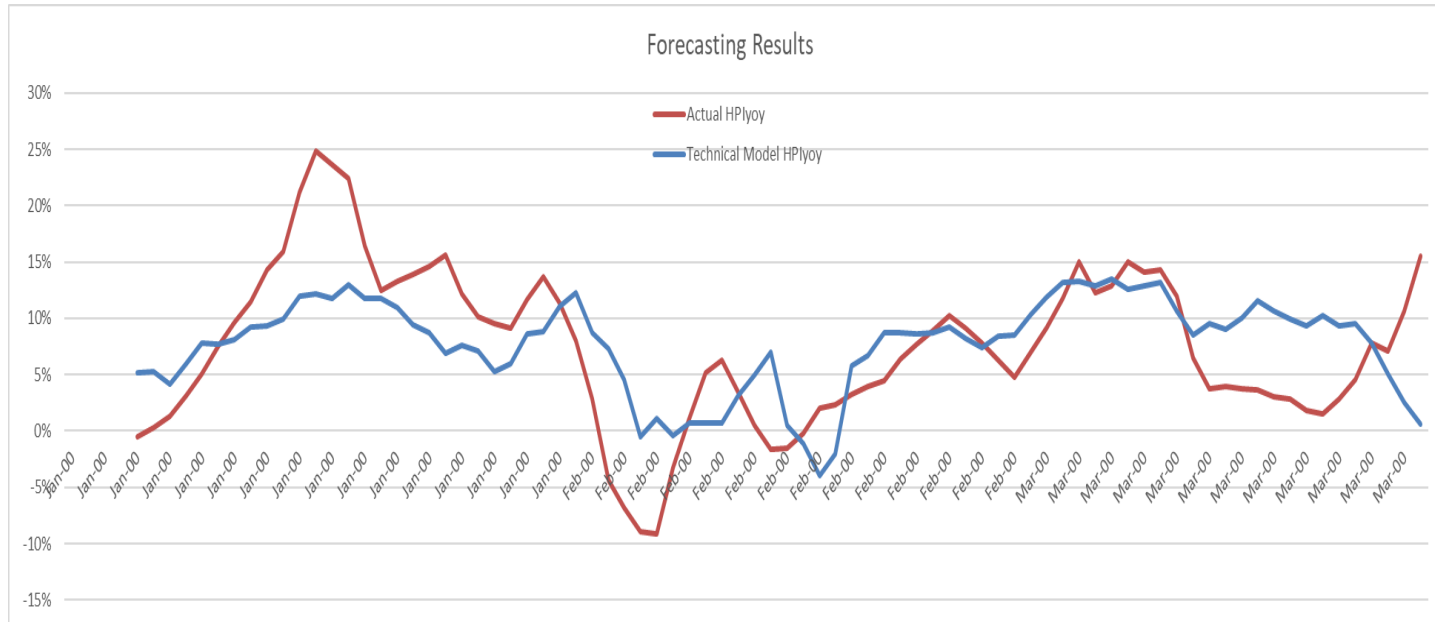


Forecasting Result 1 – Technical Model



Dep Var	HPIyoy			
Regression Statistics				
Multiple R	0.96			
R Square	0.92			
Adjusted R Squa	0.92			
Standard Error	0.02			
Observations	78.00			
ANOVA				
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>
Regression	2.00	0.33	0.17	427.39
Residual	75.00	0.03	0.00	
Total	77.00	0.36		
Coefficienndard E t Stat P-value				
Intercept	0.01	0.00	2.76	0.01
HPIyoy(-1)	1.54	0.09	16.99	0.00
HPIyoy(-2)	-0.65	0.09	-7.24	0.00

Forecasting Result 2 – Fundamental Model



Dep Var	HPIyoy			
Regression Statistics				
Multiple R	0.589			
R Square	0.347			
Adjusted R Squ	0.311			
Standard Error	0.057			
Observations	79.000			
ANOVA				
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>
Regression	4.000	0.127	0.032	9.815
Residual	74.000	0.240	0.003	
Total	78.000	0.368		
Coefficients				
	<i>Coefficient</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>
Intercept	0.113	0.062	1.826	0.072
RGDPyoy(-1)	0.015	0.005	3.218	0.002
UNE(-1)	-0.010	0.008	-1.219	0.227
MIR2y(-1)	0.004	0.006	0.646	0.520
INF(-1)	-0.025	0.008	-3.302	0.002