



A Root Mean Square Error (RMSE) Inflation Forecasting Model: An Empirical Analysis 2009 - 2021

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Study Objective:

Determine if RMSE inflation models for personal consumption expenditures (PCE) and PCE less food and energy (PCE LFE) are reliable out-of-sample forecasting models.

Period of Analysis 2009 - 2021:

Trend Regression Periods

1. 2009 - 2017
2. 2009 – 2018

Hurdle Rate: 2.5% Forecast Error

Forecasting Model

1. Trend Regression: 2009 - 2017
2. Model: $PCE = A + B(t)$
3. Forecast 2018 PCE
4. Calculate RMSE
5. Forecast PCE, 2019, 2020, 2021
6. Adjusted Model : PCE + RMSE
7. Compare Forecast to Actual
8. Determine if forecast error $\leq 2.5\%$
9. Repeat process for trend regression through 2018
10. Repeat process for PCE LFE

Nomenclature:

1. PCE = Personal Consumption Expenditure
2. A, B = Equation Parameter
3. t = time in months, 2009 – 2021
4. FPCE = Monthly Forecast Error Value
5. $RMSE = \sqrt{\text{Sum}(FPCE_t - PCE_t)^2 / 12}$

Table 1			
PCE All Regression Model (2009 - 2017)			
Forecast Period	Average Monthly Error	Average Absolute Error	Hurdle Rate
2019	0.176464787	0.212235061	2.5%
2020	0.016570562	0.264992404	2.5%
2021	2.843708444	2.843708444	2.5%

Table 2			
PCE All Regression Model (2009 - 2018)			
Forecast Period	Average Monthly Error	Average Absolute Error	Hurdle Rate
2020	-0.20463479	0.28912004	2.5%
2021	2.60685042	2.60685042	2.5%

Table 3			
PCE LFE Regression Model (2009 - 2017)			
Forecast Period	Average Monthly Error	Average Absolute Error	Hurdle Rate
2019	0.521082744	0.521082744	2.5%
2020	0.772204581	0.772204581	2.5%
2021	0.762586971	0.762586971	2.5%

Table 4			
PCE LFE Regression Model (2009 - 2018)			
Forecast Period	Average Monthly Error	Average Absolute Error	Hurdle Rate
2020	0.203147329	0.216410688	2.5%
2021	0.155148295	0.270783205	2.5%

Conclusion:

1. Table 1; FCE below hurdle rate 2019, 2020
2. Table 2; FCE below hurdle rate 2020
3. Table 3; FCE below hurdle rate 2019, 2020, 2021
4. Table 4; FCE below hurdle rate 2020, 2021
5. RMSE inflation forecasting model reliable 2 years out, excluding Table 2