Italy's Total Coffee Spending

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The Problem

Why Forecast Coffee Spending in Italy?

Italy is a major global consumer of coffee.

Understanding future coffee spending helps with:

Supply chain planning

Economic decision-making

Industry marketing strategy

Objective: Forecast total coffee spending in Italy for the next 5 years.

	Country	Continent	Consumption (KG)	Yearly coffee Consumption per Capita (KG)	Daily Coffee Consumption per Capita (CUP)	Coffee Drinkin (YEAR)	Lifetime Cup Consumption (CUP)	Price per cup of coffee	Total Lifetime Coffee Spending	
1	Luxembourg	Europe	13,440,000	20.53	5.31	61	118,227	$3.60	$425,618.00	
2	Finland	Europe	80,880,000	14.58	3.77	61	83,939	$4.00	$335,756.00	
3	Sweden	Europe	106,140,000	10	2.59	62	58,612	$3.70	$216,863.00	
4	Norway	Europe	54,360,000	9.93	2.57	62	58,159	$4.40	$255,900.00	
6	Denmark	Europe	46,680,000	7.9	2.04	62	44,676	$5.40	$241,250.00	
5	Austria	Europe	70,380,000	7.86	2.03	61	45,198	$3.30	$149,153.00	
7	Switzerland	Europe	63,600,000	7.23	1.87	62	42,318	$5.00	$211,591.00	
8	Netherlands	Europe	121,800,000	6.91	1.79	61	39,854	$3.10	$123,548.00	
9	Greece	Europe	68,340,000	6.61	1.71	60	37,449	$3.10	$116,092.00	
10	Germany	Europe	520,200,000	6.25	1.61	60	35,259	$3.10	$109,303.00	
16	Lebanon	Asia	33,120,000	6.19	1.6	54	31,536	$3.63	$114,476.00	
18	Brazil	South America	1,320,000,000	6.1	1.58	54	31,142	$1.55	$48,270.00	
11	Canada	North America	235,740,000	6.08	1.57	61	34,956	$3.50	$122,346.00	
12	Belgium	Europe	71,100,000	6.08	1.57	60	34,383	$3.10	$106,587.00	
14	Slovenia	Europe	12,240,000	5.77	1.49	60	32,631	$1.70	$55,473.00	
13	France	Europe	371,520,000	5.74	1.48	61	32,952	$3.10	$102,152.00	
20	Croatia	Europe	22,860,000	5.7	1.47	57	30,583	$1.72	$52,603.00	
15	Italy	Europe	328,140,000	5.57	1.44	62	32,587	$1.54	$50,184.00	
21	Estonia	Europe	7,380,000	5.58	1.44	57	29,959	$3.05	$91,376.00	
22	Lithuania	Europe	15,060,000	5.54	1.43	55	28,707	$2.72	$78,084.00	
17	Cyprus	Europe	6,900,000	5.48	1.42	60	31,098	$3.17	$98,581.00	
19	Portugal	Europe	55,860,000	5.45	1.41	60	30,879	$1.66	$51,259.00	
23	Czech Republic	Europe	50,580,000	4.82	1.25	58	26,463	$2.46	$65,098.00	
24	United States	North America	1,599,060,000	4.7	1.22	58	25,827	$4.69	$121,131.00	
24	Australia	Oceania	116,340,000	4.4	1.14	62	25,798	$3.24	$83,586.00	
26	Ireland	Europe	22,200,000	4.39	1.13	61	25,159	$3.47	$87,303.00	
27	Spain	Europe	195,180,000	4.11	1.06	62	23,988	$1.92	$46,057.00	
28	Costa Rica	North America	21,120,000	4.05	1.05	58	22,229	$2.55	$56,683.00	
32	Bulgaria	Europe	25,380,000	3.8	0.98	51	18,243	$1.57	$28,641.00	

The Data

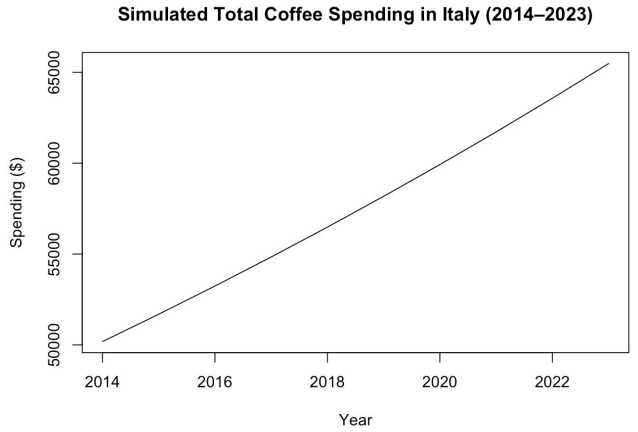
Chose to focus on Italy

Key variable: **Total Lifetime Coffee Spending**

Value extracted: $50,184

Simulated spending across 10 years assuming **3% annual growth**

Data simulated from 2014–2023



The Methodology

```
## Series: spending_ts
## ARIMA(0,2,0)
##
## sigma^2 = 3106:  log likelihood = -42.7
## AIC=87.4   AICc=88.06   BIC=87.48
##
## Training set error measures:
##                    ME     RMSE      MAE       MPE      MAPE      MASE
## Training set 36.01084 49.85013 48.80329 0.05996472 0.08471336 0.0287177
##                   ACF1
## Training set 0.1602813
```

Model selected: **ARIMA(0,2,0)**

Accuracy metrics from model:

- RMSE: 49.85→ small average error
- MAPE: 8.47%→ under 10%, which is considered very good

AIC = 87.4, BIC = 87.48 (low = better)

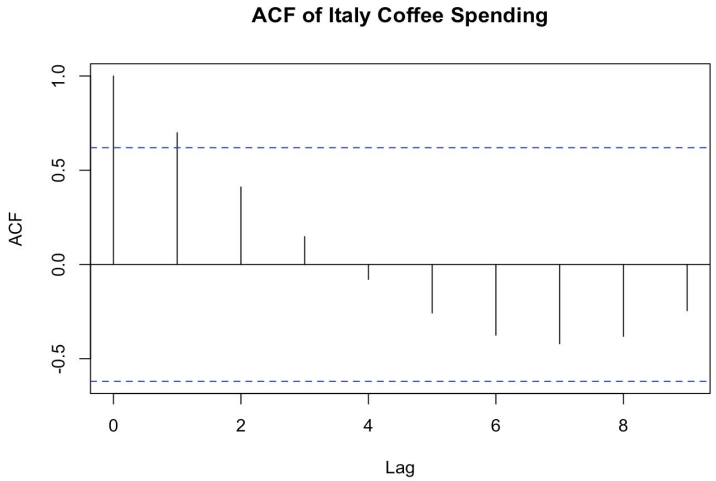
The best model was **ARIMA(0,2,0)**, which means the data had a strong trend but no seasonality or short-term noise. This model works well for data like coffee spending that increases steadily over time.

0- no lags necessary to determine forecast

2- data had trend; had to flatten it out by differencing it twice

0- no erratic jumps

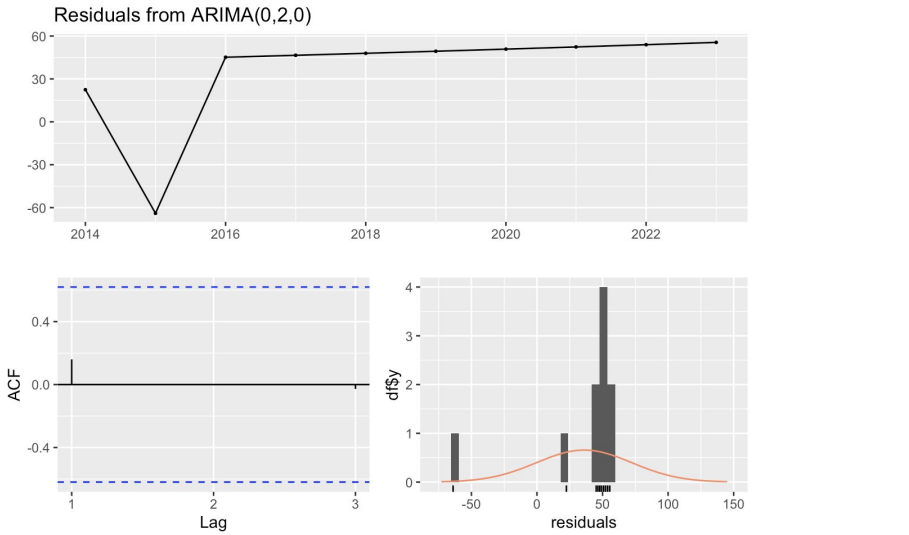
Bottom Line: A clean upward trend was found



- Lag 1 is very strong (around 1.0): This means this year's coffee spending is strongly related to last year's
- Lag 2 also shows some correlation
- After that, autocorrelation drops off, suggesting no major seasonal or repetitive pattern
- This is exactly what you expect in a steadily trending time series

The ACF plot shows that recent years strongly influence current spending, but the pattern is stable — not random or seasonal — which supports using a trend-focused forecasting model.

Exploration



In our case, residuals are not centered around zero — most values are positive

This suggests that the ARIMA(0,2,0) model tends to overestimate coffee spending

There is no strong autocorrelation left in residuals (good!)

But the residual distribution shows a bias, meaning model accuracy could be improved

Judgement

While the ARIMA(0,2,0) model captures the trend well and leaves no autocorrelation in residuals, it does show a tendency to overpredict coffee spending. This means future improvements could involve model adjustments, such as exploring different ARIMA orders.

Residuals had no autocorrelation, meaning the model captured the structure well

While the model had some bias (tended to overpredict), it still provided:

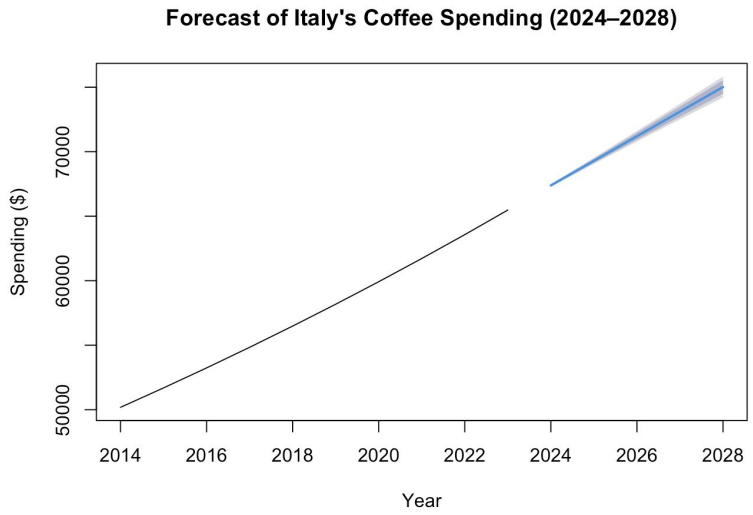
A clear trend forecast

Reliable performance on basic diagnostics

The model isn't perfect, but it does a solid job forecasting the overall trend

I went with ARIMA because it provided the best overall trade-off between performance, simplicity, and interpretability. Even though there's some bias in the residuals, ARIMA(0,2,0) had no autocorrelation and produced reliable trend forecasts.

Recommendation



The model forecasts a steady increase in Italy's coffee spending from 2024 to 2028

If trends continue, total spending could exceed $75,000+ per person

- Growing consumer demand
- Potential market expansion opportunities for the coffee industry

While forecasts may slightly overestimate, the overall upward trajectory is clear

Even with a small overprediction bias, the trend is strong and upward — which is valuable information for stakeholders planning around future demand

Forecast and Conclusion