

Marketing Analytics - HW1 - Nare Stepanyan

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From the TIME's the best inventions of 2023 this paper will focus on a new espresso machine called Superkop, its look-alike innovation from the past, estimated Bass Model, predictions made on diffusion, as well as the number of adopters of this product in France.

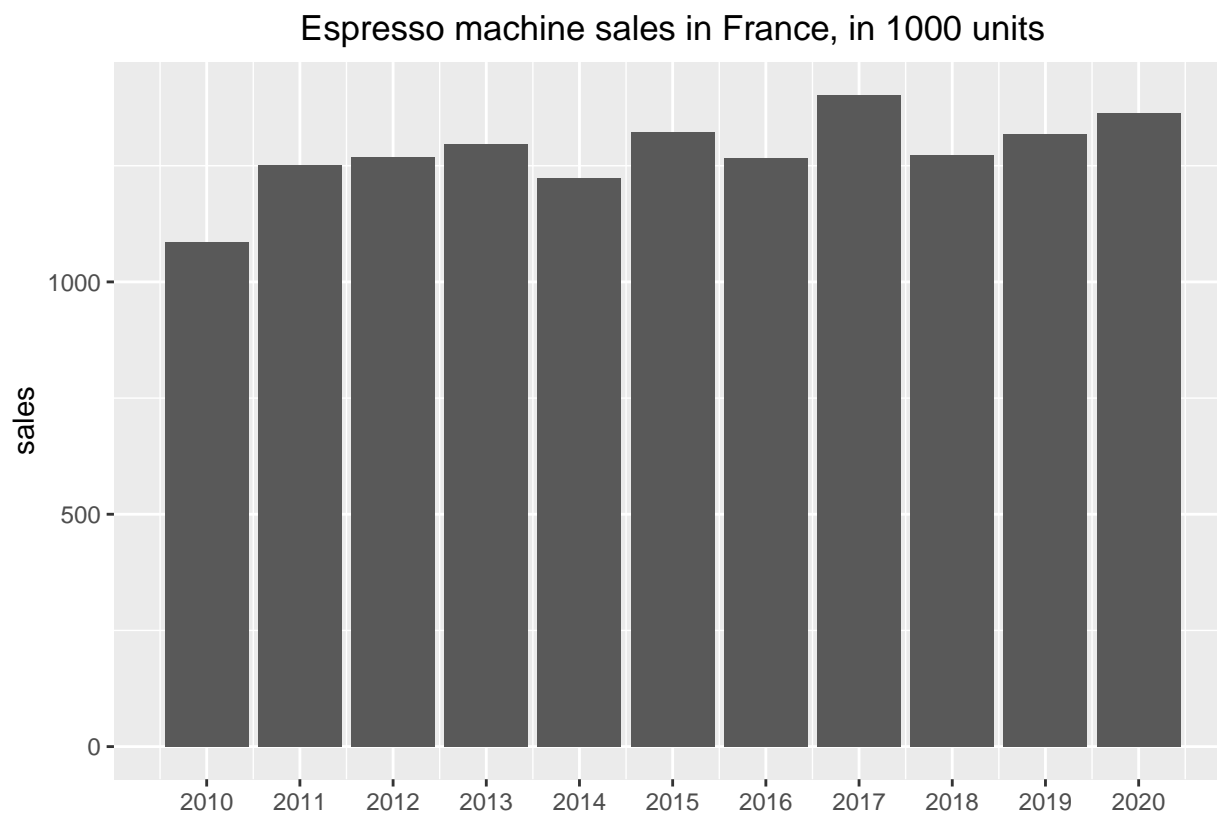
Superkop as mentioned above, is new developed machine for making espresso. Not much is mentioned in TIME's website, but the makers of Superkop say this espresso machine simplifies the process, and is so durable it can be passed down from generation to generation.

The look-alike innovation from the past is basically a standard espresso machine that is used in many places around the world. From Statista's page I got the needed data which represents the sales of espresso machines from 2010 to 2020 in France, in 1000 units.

Manipulating the data. As I had some issues with the actual file from Statista, I just made a new Excel file, where I added the values from the downloaded file. I changed the last value from 1564 to 1364 because it seemed like the problem was coming from that value.

```
## # A tibble: 11 x 2
##   Year Sales
##   <dbl> <dbl>
## 1  2010  1086
## 2  2011  1251
## 3  2012  1268
## 4  2013  1296
## 5  2014  1223
## 6  2015  1323
## 7  2016  1267
## 8  2017  1403
## 9  2018  1272
## 10 2019  1319
## 11 2020  1364
```

Visualizing the sales of espresso machines from 2010 to 2020 in France, in 1000 units



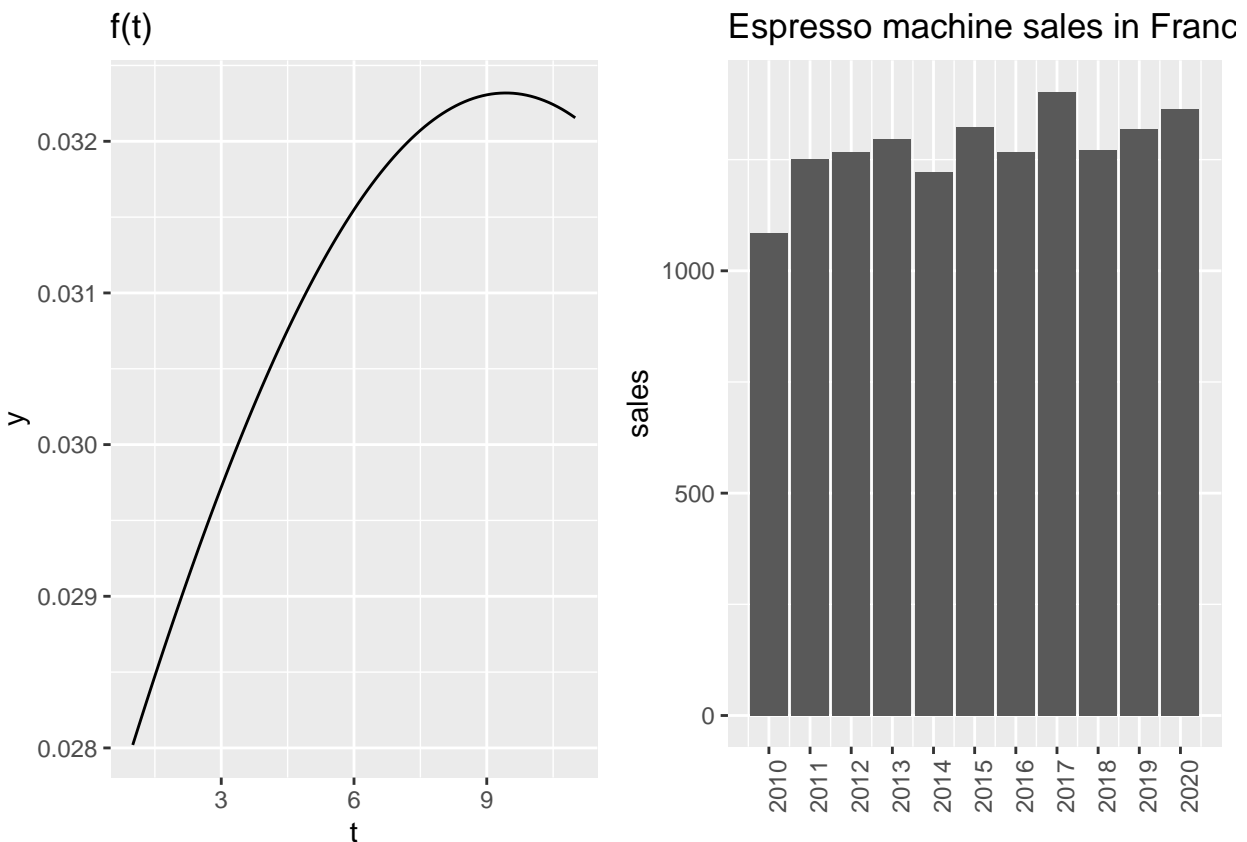
Bass model parameters for the espresso machine Defining $f(t)$ and $F(t)$ functions.

bass.f - the fraction of the total market that adopts at time t ; bass.F - the fraction of the total market that has adopted up to and including time t ; p - innovation rate; q - imitation rate

Getting the Bass model parameters

```
##
## Formula: sales ~ m * (((p + q)^2/p) * exp(-(p + q) * t))/(1 + (q/p) *
##      exp(-(p + q) * t))^2
##
## Parameters:
##      Estimate Std. Error t value Pr(>|t|)
## m 4.132e+04  1.549e+04   2.667  0.0285 *
## p 2.706e-02  9.091e-03   2.977  0.0177 *
## q 6.365e-02  2.760e-02   2.306  0.0500 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 60.13 on 8 degrees of freedom
##
## Number of iterations to convergence: 6
## Achieved convergence tolerance: 9.781e-06
```

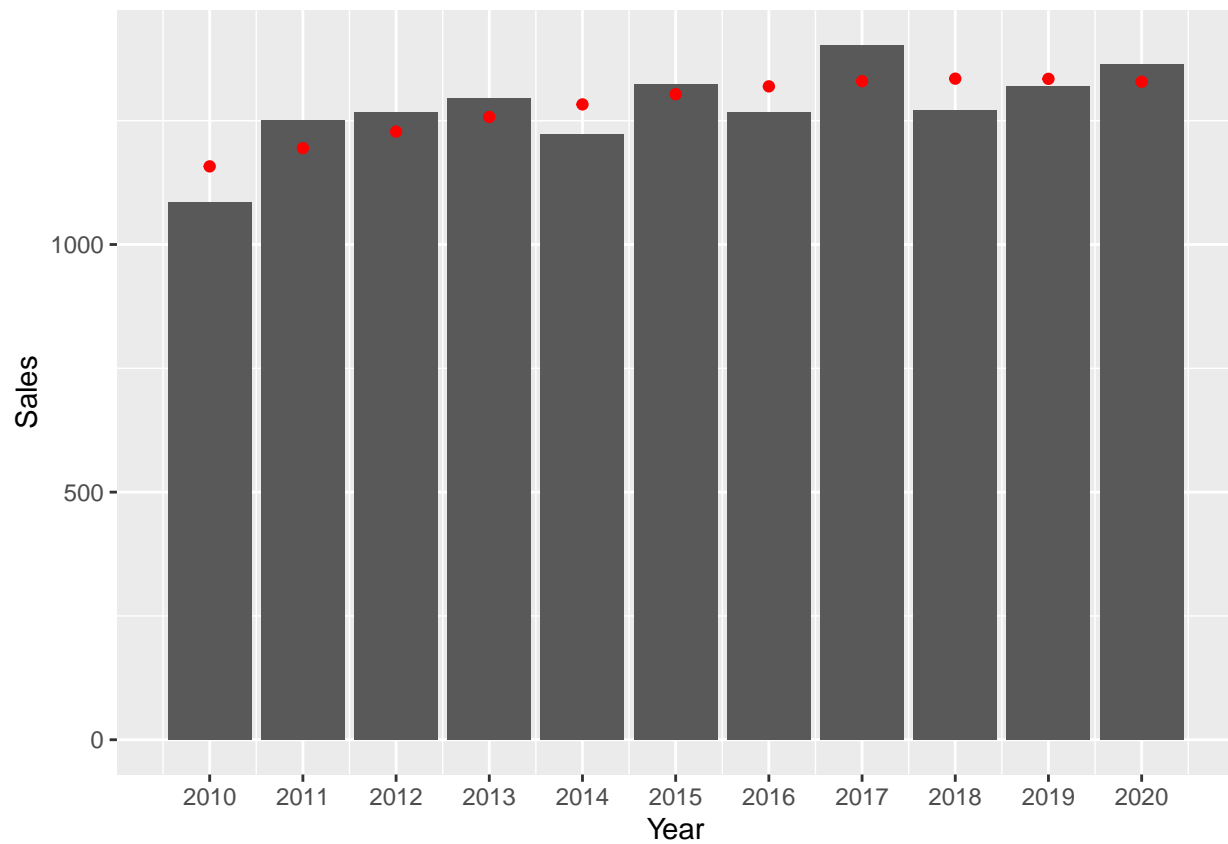
From the summary, we can see that the values for innovation rate, imitation rate and market potential are 0.02706, 0.06365 and 41320 respectively. We take these values and plot the $f(t)$ on the left side of the plot, and on the right side you can see the bar plot of espresso machine sales in France, in 100000 units.



```
## bass model
##
## Parameters:
##               Estimate p-value
## p - Coefficient of innovation    0.0289    NA
## q - Coefficient of imitation     0.0637    NA
## m - Market potential            39476.6842    NA
##
## sigma: 51.5325
```

We got nearly the same values as for Method 1. I will choose the ones from the first method.

Estimated number of adopters by time



Sources

The innovation

<https://time.com/collection/best-inventions-2023/6327675/superkop/>

The look-alike product's data

<https://www.statista.com/statistics/746442/sales-volume-espresso-machines-france/>