In statistical thermodynamics, we know that a probability of a system having state **(j)** with energy **(E)** in a function of temperature **(T)** and a constant **(k)** in an ensemble will be proportional to:

$$a_j = e^{-\frac{E_j}{kT}} = e^{-\beta E_j}$$

Where the probability is defined as:

$$p_j = \frac{a_j}{\Sigma a_j} = \frac{a_j}{A} = \frac{a_j}{Q(N,V,\beta)}$$

Where **(Q)** is defined as partition function in which where the ensemble defined by several partition functions **(q)** with **(N)** number of particles (note that we use distinguishable particles because of the fact that they can have same energy like a boson):

$$Q = [\Pi q(V,T)]^N$$

And we can get the average of energy back by:

$$< E > = \Sigma p_j E_j = -\left(\frac{\partial \ln(Q)}{\partial \beta}\right)_{N,V}$$

Of course, under canonical ensemble N, V, T.

We also can define the heat capacity by using:

$$C_v = \left(\frac{\partial < E >}{\partial T}\right)_V$$

Figure 1. INDF.JK Historical Price Chart

If we analyze the stock market price, we could see the same state dependence behavior. For example, take this figure and analyze:

1. We can see that there are several major states where it behaves like a strong “Resistance” or a strong “Support”. But there are also weak spots where it behaves like a weak “Resistance” or a weak “Support”.
2. We might make hypothesis that these states are dependent due to some **fundamental** parameters (where in molecules we have vibration, rotation, electronic, and translation energies) that are affected by the **state of the company** with the number of particles analogous to shares outstanding amount **(N)** and $\boldsymbol{\beta}$ analogous to sector condition parameter **($\boldsymbol{\beta}$)** which is defined using **sector average condition**. The state of the company usually defined by **financial report condition**. Therefore, we can see every **company as a molecule type** inside an ensemble of N particles homogeneous inert gas inside a chamber with **other companies** which are in the same **sector** with same $\boldsymbol{\beta}$. These molecules experience pressure **(P)** due to the scarcity of volume **(V)**. Under the assumption of adiabatic chamber, pressure volume is defined by the amount of sector market capital with relation $PV = c$. Where **(c)** is **total sector market capital**. In this model we assume industry doesn’t contribute (negligible).
3. The market moves under influence of enthalpy **(H)** and entropy **(S)** which we will refer as a **process**. The Gibbs Free Energy **(G)** are used to measure the balance of the process. This process balance measurement also depends on $\boldsymbol{\Delta H}, \boldsymbol{\Delta S}, \boldsymbol{\beta}, \boldsymbol{P}, \boldsymbol{V}$.

So, we can conclude that (data are written in bold):

1. Fundamental parameters = **financial report of company** -> states -> state partition function -> partition function for N shares outstanding amount.
2. Sector condition parameter (β) = **sector average condition**.
3. P ~ 1/V = **total sector market capital**.
4. $H = \boldsymbol{\Delta < E > + P \Delta V}$
5. $S =$
6. $G = \boldsymbol{\Delta H - \beta \Delta S = \Delta < E > + P \Delta V - \beta \Delta S}$