

Statistical measures of the impact of the actual rate of inflation on the stabilization of the expected rate of inflation

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Abstract: One of the techniques of studying the deterministic dynamics of the expected rate of inflation due to a changing duration of business in the unit of weeks depends on the process of mathematical modelling. The statistical measures of the impact of the actual rate of inflation on the stabilized steady-state expected rate of inflation were systematically calculated and discussed in this paper in the context of stabilizing this economic system. When the expected rate of inflation is 1.44, the statistical measures of the range, mean, variance, standard deviation and kurtosis are 0.44417472004, 0.27038055356, 0.01910049264, 0.13820453192 and 1.81433937992 indexed for the period of twenty (20) weeks when the initial expected rate of inflation is 0.035. We would expect this novel contribution to strength the other related knowledge-based results in numerical simulations, economic planning and economic policy on the control of the twin effects of inflation and unemployment on the social losses.

I. Introduction

In the original deterministic model description of the expected rate of inflation in terms of the actual rate of inflation and the initial expected rate of inflation (Chiang, 1992), the impact of the actual rate of inflation on the stabilization of the expected rate of inflation has recently been quantified. (Agwu, Asiegbu, Effiong, 2012) studied deterministic mathematical model of the interactions of price and quantity of a commodity. (Asiegbu, Agwu, Okafor, Nwogwugwu, Nwaogbe, 2014) examined a differential equation of a neoclassical model of Economic growth. Stabilizing a mathematical model of population systems was investigated by (Yan and Ekaka-a, 2011)

However, the open strategic problem of calculating the statistical measures of this idea will be the central core of this present contribution.

II. Mathematical Formulation

Following Chiang (1992), the evolution of the expected rate of inflation (π) over a finite time t is defined as follows

$$\frac{d\pi}{dt} = j(p - \pi)$$

Here, the variable j is assumed to satisfy the inequality $0 < j \leq 1$ and also on the simplifying assumption that the actual rate of inflation p exceeds the expected rate of inflation such that the expected rate of inflation is said to be an underestimate. The deterministic parameter values are assumed to be $j = 0.02$ and $p = 0.48$. At a steady-state solution when the value of j is not equal to zero, we can see that the only unique positive steady-state solution is p .

III. Method of Statistical Measures

The statistical measures of central tendency and spread which are popular ideas were used to calculate the impact of the actual rate of inflation on the stabilization of the expected rate of inflation for the scenario when the length of the duration of business time is 20 weeks with the initial expected rate of inflation being 0.035. The results that we have obtained on the application of this method are presented and discussed in the Table below.

IV. Results and Discussion

Apart from the first example that corresponds to the situation when the actual rate of inflation is 0.48, for the next twenty (20) typical examples, the actual rate of inflation ranges from the value of 0.048 to 1.44 for which the range for these simulated time series data increases monotonically ranging from the value of 0.00410980168 to 0.44417472004 whereas the mean increases monotonically ranging from the value of

0.03717789836 to 0.27038055356. Similarly, the variance of these time series monotonically increasing simulated data ranges from the value of 0.00000163522 to 0.01910049264 whereas the standard deviation ranges from the value of 0.00127876079 to 0.12876137529.

Table: Statistical measures due to the length of the business duration of 20 weeks and the initial expected rate of inflation value of 0.035

Example	Actual rate of inflation p	Statistical measures due to the length of the business duration of 20 weeks and the initial expected rate of inflation value of 0.035				
		Range	Mean	Variance	Standard Deviation	Kurtosis
1	0.48	0.14068167289	0.10955113618	0.00191607251	0.04377296562	1.81433937989
2	0.048	0.00410980168	0.03717789836	0.00000163522	0.00127876079	1.81433937988
3	0.072	0.01169712785	0.04119863379	0.00001324632	0.00363954995	1.81433937988
4	0.096	0.01928445403	0.04521936922	0.00003600406	0.00600033910	1.81433937988
5	0.12	0.02687178021	0.04924010466	0.00006990846	0.00836112826	1.81433937988
6	0.144	0.03445910639	0.05326084009	0.000114959510	0.01072191742	1.81433937988
7	0.168	0.04204643257	0.05728157553	0.00017115721	0.01308270658	1.81433937988
8	0.192	0.04963375875	0.06130231096	0.00023850156	0.01544349573	1.81433937988
9	0.216	0.05722108493	0.06532304640	0.00031699256	0.01780428489	1.81433937988
10	0.240	0.06480841111	0.06934378183	0.00040663021	0.02016507405	1.81433937988
11	0.264	0.07239573728	0.07336451727	0.00050741451	0.02252586321	1.81433937988
12	0.288	0.07998306346	0.07738525270	0.00061934546	0.02488665236	1.81433937988
13	0.312	0.08757038964	0.08140598814	0.00074242306	0.02724744152	1.81433937988
14	0.336	0.09515771582	0.08542672357	0.00087664732	0.02960823068	1.81433937988
15	0.360	0.10274504200	0.08944745900	0.00102201822	0.03196901984	1.81433937988
16	0.384	0.11033236818	0.09346819444	0.00117853578	0.03432980899	1.81433937988
17	1.056	0.32277750118	0.20604878661	0.01008656762	0.10043190540	1.81433937985
18	1.152	0.35312680590	0.22213172835	0.01207252925	0.10987506203	1.81433937989
19	1.248	0.38347611061	0.23821467009	0.01423683730	0.11931821866	1.81433937992
20	1.344	0.41382541533	0.25429761182	0.01657949176	0.12876137529	1.81433937992
21	1.44	0.44417472004	0.27038055356	0.01910049264	0.13820453192	1.81433937992

At the instance when the stabilization of the steady-state expected rate of inflation value sets in, the time series simulated data tend to spread out better for p equal to 1.44 than the value of p equal to 0.048 provided the length of the duration of business is twenty (20) weeks and the initial expected rate of inflation is 0.035.

V. Conclusion

We have successfully used a numerical scheme based on the MATLAB in-built statistical tool box to calculate the statistical measures of the impact of the actual rate of inflation on the stabilization of the expected rate of inflation which the original researcher did not consider. The statistical calculations conducted in this present study form a cutting-edge contribution over the previous contribution. The present contribution complements the earlier results on the several other extensions of the dynamics of the interaction between inflation and employment.

Reference(s)

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