India's Retail Sales of ECommerce: An Econometric Analysis

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Abstract- The paper studied the behavior of total retail sales of ecommerce in India during 2005-2020 with the help of semilog and exponential trend model and Bai-Perron(2003) test for structural shift and Hodrick-Prescott Filter (1989) model for smooth trend and ARIMA(1,1,1) model for stationary and we relates its relationship with internet users,credit and debit card users and GDP growth rate during 2005-2015 with the help of double log multivariable regression model although Johansen cointegration test(1988) and VEC model(1996)were applied to relate growth with retail sales of ecommerce.

The paper found out those retail sales of ecommerce in India during 2005-2020 has been increasing at the rate 41.93% per year which is significant and it is exponentially increases at the rate of 0.728% per year which is more acceptable and significant whose residual test confirmed that exponential series has heteroscedasticity , autocorrelation ,partial autocorrelation and serial correlation problems. The retail sales of ecommerce in India during 2005-2020 do not follow random walk and random walk with drift which is strengthened by variance ratio test but it consists of three upward structural breaks in 2007,2010 and in 2013.Yet it is turned into smooth trend line from cyclical path by H.P.Filter model. But its ARIMA(1,1,1) model showed the series is unstable and nonstationary.

The paper also showed that one percent hike in percent of population of internet users led to 1.931% increase in retail sales in ecommerce during 2005-2015 in India which is significant at 1% level. Besides, one percent increase in debit card users and GDP growth rate led to 1.267% increase and 1.768% decrease in retail sales in ecommerce significantly but it has insignificant positive relation with credit card users. When growth is dependent variable ,then growth and debit card users are significantly positively associated but when retail sales is dependent variable then internet users and retail sales are positively associated significantly. Granger Causality test confirmed that total retail sales in ecommerce(x_1) ,percent of population using internet(x_2), number of credit (x_3)and debit cards(x_4),GDP growth rate of India (y) during 2005-2020 showed bidirectional causality except X_2 does not Granger Cause $X_1$and x_2 and x_4 have no causality. Johansen cointegration test assures that GDP growth rate and retail sales in ecommerce are cointegrated in the order CI(1) in which VEC model is unstable, diverging and error correction is speedy and significant in the equation Δy_t.

The paper states that Ecommerce in India grew so fast that it ranks second preceded by China and it may constitute 4% of GDP within 2020 where India needs improved infrastructure,control fraud e payment and e security, develop e-Customs and e-taxation,minimize regulatory gap,and many others policies recommended by several institutions.

Index Terms- retail sales of ecommerce, internet users, credit and debit card users, GDP growth rate, structural break, Granger-Causality, cointegration , VECM
JEL-C32,M21,M31,M48

I. INTRODUCTION

E-commerce ─ broadly defined as the use of the Internet as a platform for sales, sourcing, and exchange of market information ─ is playing an important role in supporting global economic growth. Latest market research data predicts that the share of e-commerce of total sales will reach 12.4% in 2019. Industry surveys suggest that e-commerce industry is expected to contribute around 4 percent to the GDP by 2020. In comparison, according to a NASSCOM report, by 2020, the IT-BPO industry is expected to account for 10% of India's GDP, while the share of telecommunication services in India's GDP is expected to increase to 15 percent by 2015. With enabling support, the e-commerce industry too can contribute much more to the GDP. Around 90% of the global e-commerce transactions are stated to be in the nature of B2B, leaving meagre 10% as B2C e-commerce. Case of India is no different where most of such transactions are in the nature of B2B. Moreover Indian e-commerce industry is characterized by "Market Place" model. McKinsey Global Institute estimated that the Internet contributes an average 3.4 percent in developed countries and 1.9 percent of GDP in aspiring countries. In some aspiring countries, such as Taiwan and Malaysia, the Internet contributes to GDP at levels similar to those in developed countries. This is due to their strong net exports of ICT goods and services. In line with other aspiring countries, the Internet's contribution to India's GDP

— what we call its iGDP — is moderate today, at 1.6 percent, or $30 billion in GDP. At 1.6 percent of GDP, India's iGDP is comparable in size to key service sectors, such as hotels and restaurants, and utilities.India's share of Internet-linked GDP at about 3.2 percent.Even in 2015, when aggregate Internet penetration is projected to reach 28 percent, the penetration of India's rural population is likely to remain at a low 9 percent, compared with urban penetration of 64 percent. India's likely Internet penetration of 28 percent in 2015 will be far less than the projected global average of 43 percent. To achieve a penetration of nearly 40 percent by 2015, which would be similar to China's Internet penetration at that date, India would need to have notched up more than 500 million Internet users. Institute's projections indicate that by 2015 India is likely to have a base of more than 100 million Internet-enabled smart devices and more than 150 million consumers with low cost, high speed Internet

access. By 2015, India's 330 million to 370 million projected Internet users will constitute an estimated 12 to 13 percent of the global Internet user base, the second-largest national group of Internet users worldwide behind only China. If India puts itself on an accelerated trajectory towards higher penetration to reach 500 million Internet users by 2015, the iGDP could be as high as 3.3 percent.

Global Retail Development Index-2016 showed that China ranks one in this index followed by India. China scored 72.5 where as India scored 71.0.Chinese national retail sale stood 3.46 billion US dollar followed by 1009 billion US dollar of India. A.T. Kearney's 2016 FDI Confidence Index ranks China second- a signal of its continued attractions to foreign investors.GDP growth improved case of doing business and better clarity regarding FDI regulations puts India in second place. India is now the world's fastest growing major economy overtaking China. Retail demand is increasing driven by urbanization, an expanding middle class and more women entering the workforce. India's strong ranking reflects foreign retailer increased optimum in the 1 trillion US Dollar retail market and its vast potential. In ecommerce, government now permits 100% FDI for on line market places, with some caveats to create a level playing field.
In this paper, we endeavour to show the behavior of total retail sales of ecommerce during 2005-2020 and its nexus with internet users,credit and debit card users and GDP growth rate of India during 2005-2015

II. Literature Review

Sixun Liu(2013) estimated GDP as the dependent variable, the number of CN domain name ,the international outlet bandwidth, the number of Internet users , the number of online shopping users , the scale of online advertising and the number of websites as independent variables in China during 1997-2011 and found positive and significant relation from which it can be seen that the residual series is stationary, which also verify the co-integration relationship of the empirical model is correct.
Jing Huirong(2014) studied the relationship between the B2B (Business to Business) E-commerce transactions and GDP by applying cointegration test, Engle-Granger test. He found that there is not exist long-term and stable cointegration relationship between the B2B E-commerce transaction volume and GDP, GDP growth is caused the reason by B2B transactions, but GDP is not the cause of the B2B transaction volume increase in Beijing from 2001 to 2011. It is found that E-commerce is the Granger cause of the development of the logistics industry, and there are long-term co-integration between the E-commerce development and the development of the logistics industry.

Mohamed Sayed Abou(2014) studied the impact of electronic commerce on national economic growth in Saudi Arabia during the period (2001-2013). The study uses an econometric model to get empirical research between E-commerce development and economic growth using the latest data of Saudi E-commerce development. The regression estimation shows that capital-labor ratio, the size of the private sector, terms of trade, number of business transactions via internet, information and communication technology expenditure, and the number of credit cards (as a method of payment) have significant and positive impact on economic growth, while the size of public sector has significant and negative impact on economic growth.Morrison and Siegel (1997) studies find the positive effect of E-commerce on the productivity and the economic performance in USA manufacturing.

Purohit and Purohit(2005) showed that E-commerce has a tremendous growth potential and also generates economic growth in the country like India. The paper indicates as to how various factors related to e-commerce contribute to the growth of a vibrant and active electronic community, resulting in economic growth. Realizing the impact of e-commerce on economic growth, this study suggests a bottom up approach, wherein micro economic variables are used to prove the hypothesis.

Tryambak Hiwarkar (2013) found that E-commerce presents exclusive occasion for less developed countries to greatly expand their markets, both internally and externally. Externally, the Internet and other technologies may allow for low-cost international trade, even for small, local businesses. Internally, many groups of citizens who had been considered "marginalized" and "unbanked" may gain reasonable access to financial services, and may thus contribute more readily in all aspects of the economy.

III. Methodology and Data

To study the behavior of total sales in ecommerce in India during 2005-2020 , we used semilog linear model,exponential model,random walk with a drift model,variance ratio test,Bai-Perron (2003) test for structural breaks and Hodrick-Prescott Filter model for smooth trend and ARIMA (1,1,1)model for stationarity.To show relation among retail sales of ecommerce,percentage population internet users, number of credit and debit cards holders and GDP growth rate in India during 2000-2015,we used double log multiple regression model,Granger Causality test,Johansen cointegration test(1988) and VEC model(1996).Data have been collected from www. indiastat. com, www.statista.com, www.kpmg.com, www.cmocouncil.org, www.go-globe.com and from Digital Intelligence Special Report.

IV. Findings from Econometric Models

[A] Behavior of retail sales of ecommerce

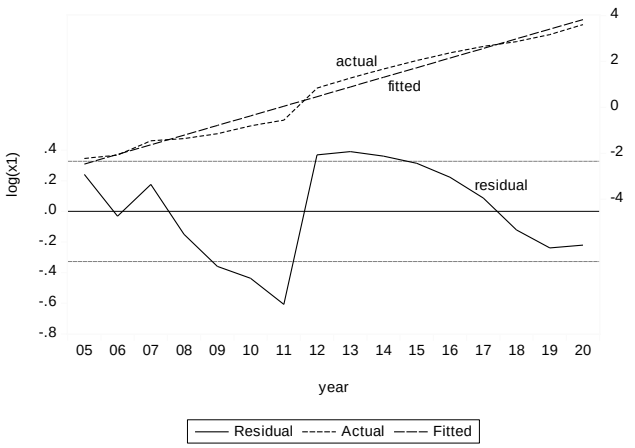
Total retail sales in ecommerce in India have been increasing at the rate of 41.93% per year during 2005-2020 which is significant at 5% level.

$\text{Log}(x_1)$=-4.983438+0.419346t
(-19.705)* (23.654)*

R^2=0.975 , F=559.55* , DW=23.65 , *=significant at 5% level. X_1= total retail sales in ecommerce. t=year

In Fig-1,the fitted trend line is shown clearly which is moving upward steeply.

Fig-1:Trend line of retail sales of ecommerce.



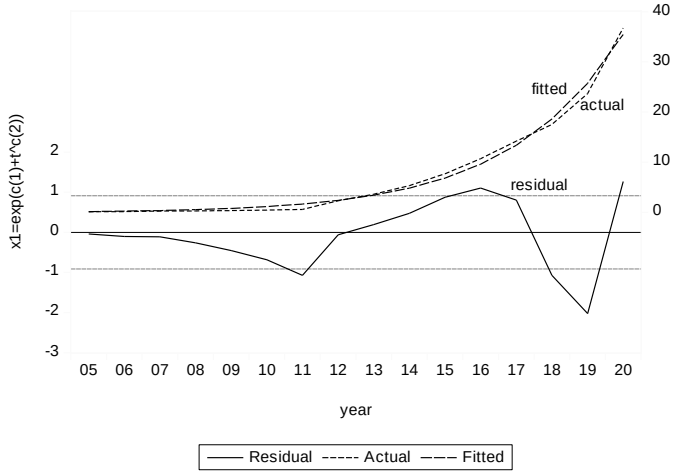
Source-Computed by author

Total retail sales of ecommerce in India are suitably fitted by exponential function during 2005-2020 which is significant at 1% level and it is exponentially increasing at the rate of 0.728% per year.

$$X1 = e^{-5.6088 + t^{0.728076}}$$

R^2=0.9930 ,DW=1.45 and the t values of -5.6088 and 0.728076 are -24.385 and 83.9214 which are significant at 1% level.

In Fig-2,the estimated exponential fitted trend line is plotted which is steeply rising.



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Although the residual test of this exponential trend of total retail sales suffer from heteroscedasticity which was verified by Breusch-Pagan-Godfrey test where nR^2=7.3353~$\chi^2(1)$ which is significant at 1% level where F=11.85203 that is significant at 1% level.

ε_t^2=-1.270906+0.148126t
(-2.07)* (3.44)*

R^2=0.458, F=11.85* , DW=2.0 , *=significant at 5% level

Residual test confirmed that it has serial correlation because nR^2=9.481683 ~$\chi^2(2)$ which is significant at 1% level where F=8.833 which is also significant at 1% level.It was verified by Breusch-Godfrey Serial Correlation LM test.

From the Table- 1 , it is confirmed that the exponential trend has problem of autocorrelation and partial autocorrelation where Q stats are insignificant.

Table-1: Residual test of AC and PAC

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob...
		1	0.189	0.189	0.6846	0.408
		2	-0.19...	-0.23...	1.4645	0.481
		3	-0.15...	-0.06...	1.9760	0.577
		4	-0.16...	-0.17...	2.6254	0.622
		5	-0.17...	-0.17...	3.4581	0.630
		6	-0.16...	-0.21...	4.2389	0.644
		7	0.012	-0.06...	4.2439	0.751
		8	0.171	0.016	5.2923	0.726
		9	0.001	-0.17...	5.2923	0.808
		1...	0.006	-0.03...	5.2943	0.871
		1...	-0.00...	-0.12...	5.2976	0.916
		1...	-0.01...	-0.05...	5.3051	0.947

*Probabilities may not be valid for this equation specification.
Source-Computed by author

Total retail sales of ecommerce do not follow random walk since the t value of the coefficient is significant.

Δx_{1t}=-0.034053+0.426327x_{1t-1}
(-0.081) (9.41)*

R^2=0.87 ,F=88.63* , DW=1.28 , *=significant at 5% level

But,the total sales of ecommerce in India during 2005-2020 do not follow random walk with a drift model.

Δx_{1t}=1.158071+0.484106x_{1t-1}-0.109097t
(0.614) (4.829)* (-0.649)

R^2=0.876 , F=42.55* , DW=1.25 , *=significant at 5% level.

The variance ratio test of total retail sales in ecommerce in India during 2005-2020 states that it does not show random walk because z statistic is significant which means Matingate is accepted where z statistics of variance ratio in period 8 is significant in individual tests.

Table-1:Variance ratio test

Joint Tests	Value	df	Probability	
Max |z| (at period 8)*	3.597632	15	0.0010	
Individual Tests				
Period	Var. Ratio	Std. Error	z-Statistic	Probability
2	1.272839	0.254392	1.072514	0.2835
4	1.734724	0.396113	1.854834	0.0636
8	2.759089	0.488957	3.597632	0.0003

16	NA	0.606763	NA	NA

*=probability approximation using studentised modulus with parameter value 4 and finite degrees of freedom. Total retail sales in ecommerce during 2005-2020 in India showed three upward structural breaks in 2007,2010 and 2013 which were observed by Bai-Perron test which is significant at 5% level and sequential F statistic of break test are significant for those three breaks. HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 3.0000) technique was applied.

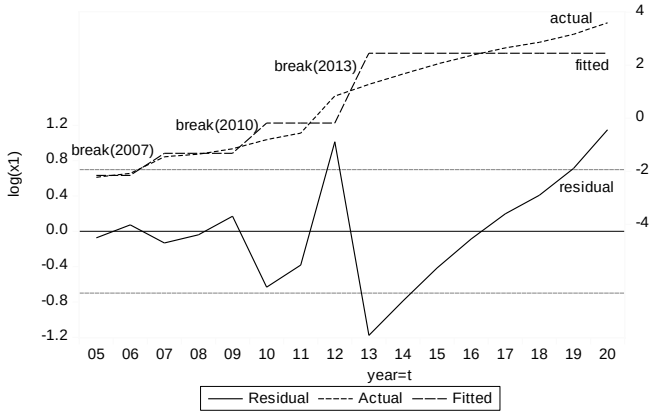
Table-2:Structural breaks($log(x_1)$)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
		2005 - 2006 -- 2 obs		
C	-2.152533	0.034456	-62.47275	0.0000
		2007 - 2009 -- 3 obs		
C	-1.319989	0.068008	-19.40931	0.0000
		2010 - 2012 -- 3 obs		
C	-0.176268	0.375232	-0.469759	0.6469
		2013 - 2020 -- 8 obs		
C	2.454698	0.413033	5.943105	0.0001
		R^2=0.904,F=37.95*,DW=1.43		
		Sequential F-statistic determined breaks		
Break Test	F-statistic	Scaled F-statistic	Value**	
0 vs. 1 *	39.99361	39.99361	8.58	
1 vs. 2 *	25.44364	25.44364	10.13	
2 vs. 3 *	38.61906	38.61906	11.14	
3 vs. 4	10.75099	10.75099	11.83	

*=significant at 5% level,**=Bai-Perron critical value,Source-Computed by Author

In Fig-3,three structural breaks in 2007,2010 and 2013 are clearly visible in the fitted line of $log(x_1)$ during 2005-2020 where all the breaks are upward.

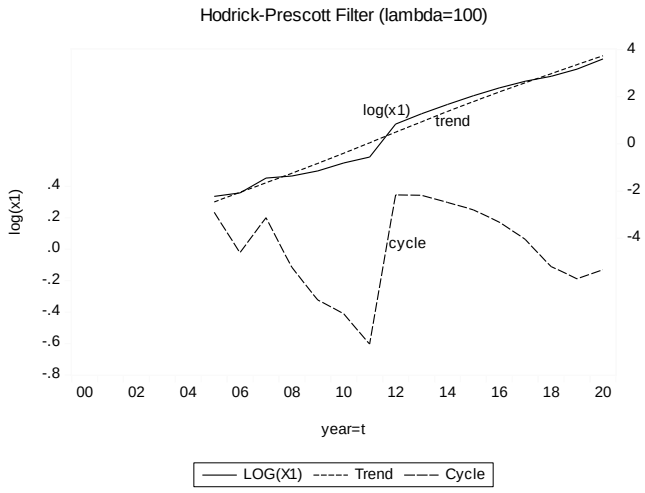
Fig-3:Structural breaks



Source-Computed by author

Hodrick-Prescott Filter model asserted that the log value of retail sales of ecommerce during 2005-2020 showed smooth trend line instead of cyclical pattern which is plotted in the Fig-4.

Fig-4:H.P.Filter of $log(x_1)$



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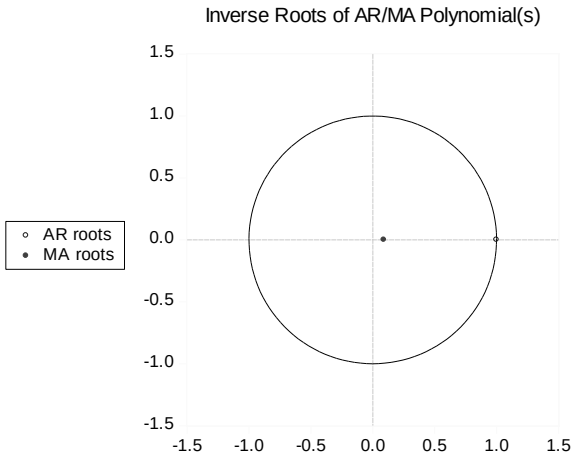
The estimated ARIMA(1,1,1) model of total retail sales of ecommerce in India during 2005-2020 remains nonstationary since AR(1) process is divergent and nonstationary which is significant but MA(1) process is covergent and nonstationary which is insignificant.

$Logx_{1t}$=-1085.537+1.000359logx_{1t-1}+ε_t-0.090359ε_{t-1}
(-0.008) (23.48)* (0.759)
R^2=0.974 ,F=231.66* ,DW=1.94 , inverted AR root=1.0 , inverted MA root=0.09 ,*=significant at 5% level.

Yet this ARIMA(1,1,1) process is unstable which was verified by its one root is outside and other root is inside of the unit root circle which is seen in the Fig-5.

Fig-5:Unit root circle of ARIMA(1,1,1)



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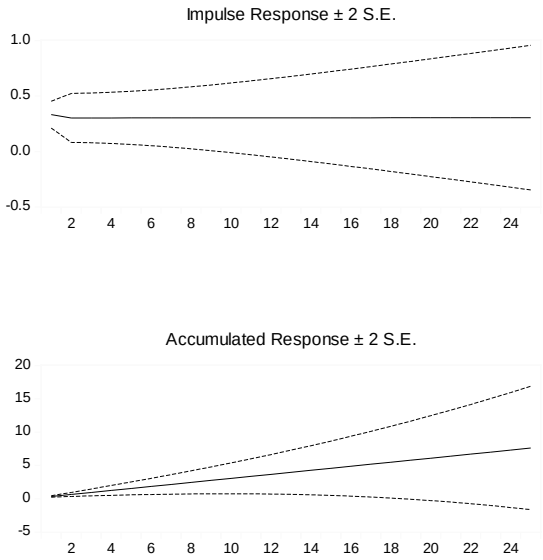
The impulse response functions of ARIMA(1,1,1) confirmed that any exogenous shock could not back it into equilibrium, thus it is nonstationary and diverging which is shown in Fig-6.

Fig-6:IRF of ARIMA(1,1,1)



Source-Computed by author

[B] Nexus of retail sales of ecommerce with internet users, credit and debit card users and GDP growth rate

One percent increase in the percentage of population in internet users led to 1.931 percent increase in retail sales of ecommerce in India during 2005-2015 which is significant at 1% level.

Log(x_1)=-4.211429+1.931884log(x_2)
(-13.029)* (12.74)*
R^2=0.947 ,F=162.35* , DW=0.983,*=significant at 1% level where x_2= percent of population using internet.

Double log multiple regression model states that one percent hike in growth rate of GDP and debit card per year led to -1.7686% decrease and 1.26743% increase in retail sales in ecommerce per year during 2005-2020 which are significant at 5% level but one percent increase in credit card led to 0.07844% increase in total retail sales in ecommerce in India during the same period which is insignificant at 5% level.

Log(x_1)=-22.05374+0.078443log(x_3)+1.267432log(x_4)-1.768675log(y)
(-1.229) (0.0676) (6.421)* (-2.519)*

R^2=0.883 , F=17.6* , DW=1.06 , *=significant at 5% level, where x_3= number of credit cards,x_4=number of debit cards , y=GDP growth rate.

On the other hand, if we assume GDP growth rate is the dependent variable and retail sales of ecommerce, internet users, credit and debit cards users are the independent variable, then the estimates showed that one percent change in retail sales, internet users, and credit card users per year led to 0.0254% increase ,0.827% decrease, and 0.1309% increase in GDP growth rate per year respectively during 2005-2015 which are insignificant at 5% level but one percent increase in debit card users per year led to 0.525% increase in GDP growth rate per year during the said period which is significant at 5% level.

Log(y)=-8.458387+0.025447log(x_1)-0.827156log(x_2)+0.130953log(x_3)+0.525421log(x_4)
(-1.33) (0.125) (-1.65) (0.326) (3.00)*
R^2=0.66 ,F=2.95,DW=2.14,*=significant at 5% level , x_2= percent of population using internet

Now,if we assume retail sales of ecommerce is the dependent variable and internet users,credit and debit card users and GDP growth rate are the independent variable,then one percent hike in the percentage population of internet users per year led to 2.261% increase in retail sales of ecommerce per year during 2005-2015 in India which significant at 5% level but one percent increase in credit and debit card users and GDP growth rate per year will lead to 0.0576 % increase,0.245% decrease and 0.1036% increase in retail sales of ecommerce per year respectively during the specified period in India which are insignificant at 5% level.

$Log(x_1)$=-1.420587+2.26142log(x_2)+0.057678log(x_3)-0.245231log(x_4)+0.103622log(y)
(-0.097) (2.847)* (0.0705) (-0.446) (0.125)
R^2=0.95 ,F=28.65* ,DW=1.16 , *=significant at 5% level

Granger Causality test confirmed that total retail sales in ecommerce(x_1) ,percent of population using internet(x_2),number of credit (x_3)and debit cards(x_4),GDP growth rate of India (y) during 2005-2020 showed bidirectional causality except X_2 does not Granger Cause $X_1$and x_2 and x_4 have no causality which are shown in the Table-3.

Table-3:Granger Causality test

Null Hypothesis:	Obs	F-Statistic	Prob.
X_2 does not Granger Cause X_1	10	8.35047	0.0233
X_1 does not Granger Cause X_2		0.00032	0.9863
X_3 does not Granger Cause X_1	10	0.16904	0.6933
X_1 does not Granger Cause X_3		0.20265	0.6662
X_4 does not Granger Cause X_1	10	4.64880	0.0680
X_1 does not Granger Cause X_4		1.22442	0.3051
Y does not Granger Cause X_1	15	0.04758	0.8310
X_1 does not Granger Cause Y		0.00066	0.9799
X_3 does not Granger Cause X_2	13	1.81827	0.2073
X_2 does not Granger Cause X_3		0.45863	0.5136
X_4 does not Granger Cause X_2	13	11.9366	0.0062
X_2 does not Granger Cause X_4		6.05235	0.0337
Y does not Granger Cause X_2	15	0.83201	0.3797
X_2 does not Granger Cause Y		0.07780	0.7851
X_4 does not Granger Cause X_3	13	0.04876	0.8297
X_3 does not Granger Cause X_4		0.00405	0.9505
Y does not Granger Cause X_3	13	0.78291	0.3970
X_3 does not Granger Cause Y		0.73379	0.4117
Y does not Granger Cause X_4	13	2.63821	0.1354
X_4 does not Granger Cause Y		0.05542	0.8186

Source-Computed by author

Johansen cointegration test assured that GDP growth rate and total retail sales of ecommerce during 2007-2020 in India are cointegrated in the order one because both Trace and Max-Eigen statistic have one cointegrating equation each which are significant at 5% level .

Table-4:Johansen test

Hypothesised No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.789358	23.31100	15.49471	0.0027
At most 1	0.101904	1.504692	3.841466	0.2199
		Max-Eigen Statistic		
None *	0.789358	21.80631	14.26460	0.0027
At most 1	0.101904	1.504692	3.841466	0.2199

*=denotes rejection of the hypothesis at 0.05 level,**=Mackinnon-Haug-Michelis(1999) p values
Source-Computed by author

Since GDP growth rate and retail sales in ecommerce are cointegrated then we have to verify the vector error correction estimates and the process of error corrections.

Δx_{1t}=-0.672305+1.954944Δx_{1t-1}-0.205805Δy_{t-1}-0.041124EC
(-1.03) (6.17)* (-0.877) (-0.85)
R^2=0.87 ,F=23.03* , SC=3.94 , AIC=3.76
Δy_t=1.700-1.101977Δx_{1t-1}+0.704046Δy_{t-1}+0.259584EC
(2.86)* (-3.8)* (3.28)* (5.88)*
R^2=0.79 , F=12.96 , SC=3.76,AIC=3.58

Both the VEC estimates are of good fit in which Δy_t is very much significant because t values of all coefficients are significant at 5% level even its error correction process is very faster than that of Δx_{1t} whose error correction term is insignificant and slow.

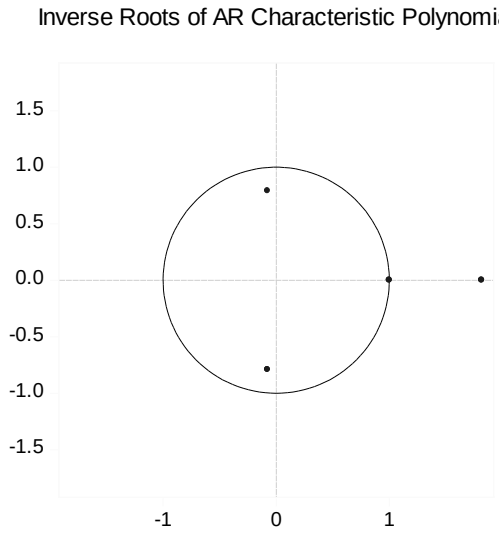
This VEC model has four roots of which one is greater than one ,one root is unit and other two are less than one, therefore one root lies outside the unit root circle and thus why the VECM is unstable.

Table-5:Values of roots

Root	Modulus
1.817124	1.817124
1.000000	1.000000
-0.075881 - 0.791756i	0.795384
-0.075881 + 0.791756i	0.795384

Source-Computed by author

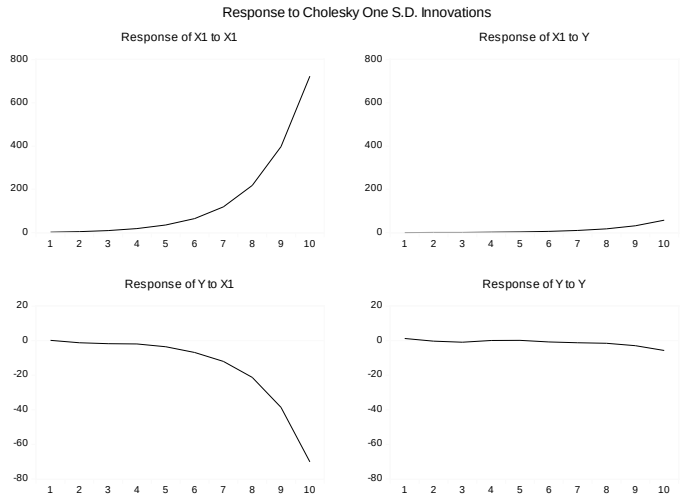
Fig-7:Unit root circle



Source-Computed by author

This VECM is unstable, nonstationary and divergent which are verified by impulse response functions that moved away from zero.

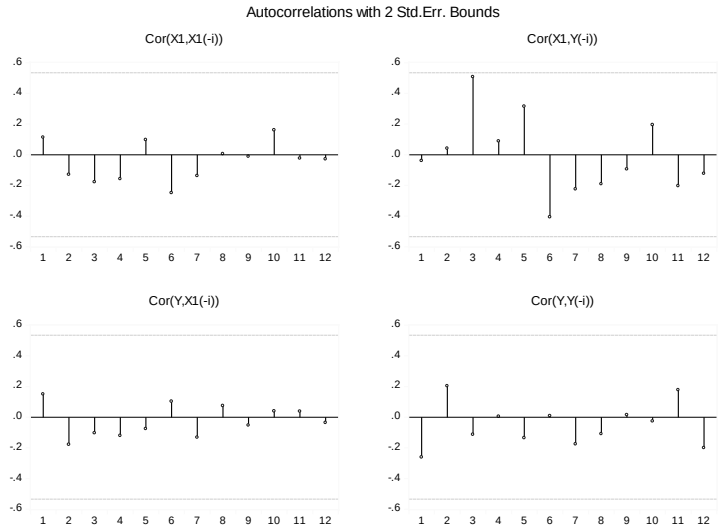
Fig-8:Impulse Response Functions



Source-Computed by author

Residual test of this VEC model showed that it has problem of autocorrelations which were seen by correllogram.

Fig-9:Autocorrelation



Source-Computed by author

It has serial correlation problem which is proven by Serial correlation LM test which is rejected as Ho=no serial correlation at lag-1.

Table-6: VEC Residual Serial Correlation LM Tests

Lags	LM-Stat	Prob
1	1.271597	0.8662
2	1.645791	0.8005
3	5.095778	0.2776
4	1.290397	0.8630
5	1.788431	0.7746
6	4.345199	0.3613
7	1.663917	0.7973
8	1.469175	0.8321
9	0.662507	0.9559
10	11.58849	0.0207
11	5.959485	0.2022
12	15.31546	0.0041

Source-Computed by author

VEC residual normality test by Doornik-Hansen method showed that all component and joint skewness ,kurtosis are insignificant as $\chi 2$ distribution, and all components and joint of Jarque-Bera are also insignificant from H0=residuals are multivariate normal.

Table-7:Normality test

Component	Skewness	Chi-sq	df	Prob.
1	-0.202482	0.160856	1	0.6884
2	0.146801	0.084779	1	0.7709
Joint		0.245634	2	0.8844
Component	Kurtosis	Chi-sq	df	Prob.
1	2.736651	0.894500	1	0.3443
2	2.660271	0.747150	1	0.3874
Joint		1.641651	2	0.4401

Component	Jarque-Bera	df	Prob.	
1	1.055356	2	0.5900	
2	0.831929	2	0.6597	
Joint	1.887285	4	0.7565	

Source-Computed by author

V. Limitations and Future Scope

Since the period of study is short so that we failed to fit VAR and VEC model taking all the variables at a time and even we failed to fit Johansen cointegration test. On the other hand,we can take more variables which influences ecommerce in various dimensions. Comparative study can be easily included here easily such as India vs China and USA where ecommerce flourished tremendously.

VI. Policy Recommendations

[1] Improve the infrastructure of e-commerce systems, and increase government expenditures.
[2] It is strongly suggested to establish uniform standards as soon as possible for on line payment system either in interbank or cross country payment.
[3] Establish online security certification system and promote business investment.
[4] Promote the building of logistics system and increase business investment
[5]Governments must allow for new, innovative e-payments solutions and avoid the vested interests of incumbents
[6]Tackle the multi-ministerial oversight challenge. Make e-commerce and cross-border e-commerce a national policy priority and a priority in the education agenda
[7] Get ahead of m-commerce. Work with leading firms to create policy frameworks to support and guide the development of m-commerce.
[8] Engage in more public and private dialogues and partnerships on cross-border e-commerce
[9] Engage in cross-industry and cross-economy dialogues on establishing mutually agreed upon standards and frameworks for cross-border e-commerce.
[10] Sign more FTAs with language specific to e-commerce.Keep an up-to-date database with all regulations and laws related to foreign market access
[11]Control fraud epayment because Fraud in e-payments is the biggest barrier to their growth.
[12]Minimise regulatory gap because Regulations are not keeping pace with technological and business model innovations or with advances in cyber-crime.
[13]Develop education seminar in conjunction with government platforms and industry associations.
[14]Encourage universities to train experts and build a talent pool prepared to develop businesses and to train their peers in ecommerce
[15]Provide co-working space, monitoring opportunities, and incumbator facilities to facilitate the sharing of ideas and resources.
[16]It is essential to remove deficiencies in the existing laws and to seek convergence of media and technologies as early as possible.
[17]Coordinate efforts by export and import countries, online platform providers and
intermediaries such as the express industry to both raise awareness and facilitate compliance with revenue, safety and security obligations
[18]Develop e-customs and e-taxation solutions that are paper-less, connect with all relevant stakeholders and use intelligence-led and risk-based selectivity and targeting to improve the identification and targeting of high-risk shipments;
[19]Consider negotiating multilateral or plurilateral trade rules to promote and facilitate ecommerce.

VII. Conclusion

The paper concludes that retail sales of ecommerce in India during 2005-2020 has been increasing at the rate 41.93% per year which is significant and it is exponentially increases at the rate of 0.728% per year which is more acceptable and significant whose residual test confirmed that exponential series has heteroscedasticity ,autocorrelation ,partial autocorrelation and serial correlation problems. The retail sales of ecommerce in India during 2005-2020 do not follow random walk and random walk with drift which is strengthened by variance ratio test but it consists of three upward structural breaks in 2007,2010 and 2013.Yet it is turned into smooth trend line from cyclical path by H.P.Filter model. But its ARIMA(1,1,1) model showed the series is unstable and nonstationary.

The paper also concludes that one percent hike in percent of population in internet users led to 1.931% increase in retail sales in ecommerce during 2005-2015 in India which is significant at 1% level. Besides, one percent increase in debit card users and GDP growth rate led to 1.267% increase and 1.768% decrease in retail sales in ecommerce significantly but it has insignificant positive relation with credit card users. When growth is dependent variable ,then growth and debit card users are significantly positively associated but when retail sales is dependent variable then internet users and retail sales are positively associated significantly. Granger Causality test confirmed that total retail sales in ecommerce(x_1) ,percent of population using internet(x_2), number of credit (x_3)and debit cards(x_4),GDP growth rate of India (y) during 2005-2020 showed bidirectional causality except X_2 does not Granger Cause $X_1$and x_2 and x_4 have no causality. Johansen cointegration test assures that GDP growth rate and retail sales in ecommerce are cointegrated in the order CI(1) in which VEC model is unstable, diverging and error correction is speedy and significant in the equation Δy_t.

The paper states that Ecommerce in India grew so fast that it ranks second preceded by China and it may constitute 4% of GDP within 2020 where India needs improved infrastructure, control fraud e payment and e security, develop e-customs and e-taxation, minimize regulatory gap, and many others policies recommended by several institutions.

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