Entrepreneurship & Inequalities in India: An ARDL Bounds Testing Approach

Poonam Sharma & Kajal Gupta

This study revisits the link between entrepreneurship and income inequalities in India over the period 1981-2017 using the Autoregressive Distributed Lag (ARDL) Bounds Testing Approach of Cointegration and Error Correction Model (ECM). The study is based on the registered manufacturing sector with Gini coefficient being used as a proxy of income inequality and gross capital formation and profits earned being used as an indicator of entrepreneurship. It finds that capital formation has a positive impact on Gini coefficient in the short-run; In the long-run, the impact is negative. It also reveals that an increase in Gini coefficient increases the profits in both short-run and long-run, the profits in turn decreases Gini coefficient in short-run. The study concludes that there exists a two-way association between entrepreneurship and income inequalities in India.

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Introduction

Entrepreneurship has been an intriguing area of research for many decades. It has been accepted as a way to stimulate the engine of the economy's growth. Many studies have related entrepreneurship to different concepts and theories. The evolution of entrepreneurship is credited to many researchers who have enriched this concept from time to time. Schumpeter (1934) related entrepreneurship with innovations. Davids and Bunting (1963) said that entrepreneurs are the one who undertakes business, Brockhaus (1980) pointed out that they are one who is a major owner of the business. On the other hand, Van Praag and Versloot (2007) concluded that entrepreneurs are a very crucial segment of the economy. Also, they have very specific functions like engendering produce and productivity growth, employment creation and commercialization of high-quality innovations. The list is too long, it is still increasing as entrepreneurship and economic growth; both are very related and complex issues of any economy.

Economic growth is thought to be the outcome of an increase in entrepreneurial ventures. Suggestions are given by economists and researchers to increase capital formation, trade openness and total factor productivity for economic development. The developing economies witness a chain of economic reforms because of the implementation of these suggestions. Therefore, these economies face the need for capital formation to keep the economy growing. The entrepreneurial activities are considered best to channelize the investment. Therefore, more capital formation in the economy is related to the increase in entrepreneurial activities (Bal, Dash & Subhasish, 2016).

Along with this, the relationship between economic growth and income inequality has also been a hot area of research. The study of Lewis (1954) and Kuznets (1955) occupy a central position in this area as they relate income inequalities with the dynamic characteristics of an emerging economy with a special focus on savings and structural transformation. Lewis (1954) argued that as developing economies undertake changes in their economic structure with the shift in labor force from a subsistence economy to a capitalistic economy, the share of national income devoted to the capitalists in terms of profit rises. This leads to changes in functional distribution of income in favor of the capitalistic class, as an increase in profits or capitalistic surplus will further lead to increase in savings, investment and hence capital accumulation which is considered as the main engine of economic growth in developing countries. It is only in the later stages when the increase in capital accumulation is faster than labor force growth that the functional distribution of income shifts in favor of the working class. While Lewis focused on the functional distribution of income, Kuznets (1955) focused on distribution of personal income. Kuznets also believed that the concentration of savings and hence accumulation of income generating assets among the upper income groups is one of the reasons for the increase in inequalities in developed countries. Similarly, Piketty (2014) in his famous book " Capital in the Twenty- First Century " considers that the increase in capital accumulation leads to concentration of income among the upper income groups. Particularly, it is due to the larger returns to capital in the form of rent, interest, profits and dividend as compared to the returns to labor in the form of wages that leads to increase in inequalities in a free market economy. Beside this, there are studies that also argue that an increase in economic growth comes with a simultaneous increase in income inequalities. In this respect, Kaldor (1956) and Galor and Moav (2004) consider higher savings and hence capital accumulation as one of the main channels through which inequality positively influences economic growth. The arguments in the line of economic growth via entrepreneurship and income inequalities is ambiguous and complex but, encouraging entrepreneurship for the growth of the economy has been a well-accepted remedy (Uddin & Khan, 2016). Carrera and Vega's (2018) objective was to determine whether income inequality is a significant determinant of gross capital formation. This research added a new determinant of capital formation in the literature in the form of income inequalities. But their relationship has hardly been studied. This research found that investment and income inequality are related and it affects economic growth significantly. Bengtsson and Waldenström (2018) used a long-run data set of 21 countries and concluded that capital shares and income inequality are strongly associated, even if the relationship varies across the regions and time periods. This study supported the view that capital-labour split is an important determinant of inequality. Mahmoud Sami (2012) found that the relationship of income inequality with economic growth is not neutral and the second level of development will lead to the disappearance of income inequalities. Lecuna (2020) revealed that entrepreneurship-related policies, particularly informal employment is important for reducing income inequalities. This was proved by using a panel data set of 54 countries. Ragoubi and Harbi (2017) undertook empirical research to examine the dynamic relationship between income inequality and entrepreneurship. Their study pointed towards the presence of significant direct and negative impact of income inequalities on entrepreneurial activities in middle-income countries. Also, middle and low-income countries may face significant negative spillover effects of income inequality on entrepreneurial activities. The confusing results create the need to investigate this mutual relationship between entrepreneurship and income inequalities more. Although, many researchers have already tried to decode this relationship even some have empirically (Halvarsson, Korpi & Wennberg, 2017) tested this relationship. But still, this relationship is debatable because entrepreneurship and income inequality finds mixed results in the literature.

Francese and Mulas-granados (2015) argued that the functional distribution of income is a good way to study the income inequalities. This approach has been regarded as being basic to study income (Cowell, 2007). But the functional distribution of income has witnessed a paradigm shift in the share of income between capital and labor. Modern economists have refused the idea of the clear presence of only two classes being capitalists; earning profits and being workers, earning only wages. Nevertheless, earnings also come from financial assets, home ownership and capital-funded pensions. Therefore, the division into pure workers, capitalists and landlords receiving only wages, profits and rents became unfeasible. The reason for this shift has been attributed to many factors. Some have attributed this shift to change factors like market structure, globalization and technical progress (Francese & Mulas-Granados, 2015). On the other hand, some economists and researchers have identified decreasing power of unions, decreasing part of the public sector, privatization and liberalization (Sharma & Sharma, 2019) as factors responsible for decreasing labor share and increasing the income of capital. Economists believe that inequality emerges when the share of wage taking class out of the final total output goes down and this share is transferred to the entrepreneurs in the name of more profits and capital formation. Most economies in the world are witnessing this trend because this is being used as a policy intervention where entrepreneurs' related laws and policies are continuously been inclined towards the entrepreneurial class (Giovannoni, 2010).

Capital formation in any economy is considered as a catalyst for economic growth.

Further, considering this problem the present study follows factors of production approach to defend the functional distribution of income. The incomes of four factors of production (land, labor, capital, and entrepreneurs) from the manufacturing sector have been taken to estimate the income inequality represented by Gini coefficient. Most countries have shown interest in encouraging entrepreneurial activities to stimulate the growth engine in the economy. The present paper aims to study the relationship between entrepreneurship and income inequalities in India. Capital formation has been related to entrepreneurs thus capital formation has been taken as an indicator of an increase in entrepreneurial activities. The lion share of market income goes to these entrepreneurs thus profits earned have been taken in the model for estimation of its role in affecting income inequalities. Giovannoni (2010) using a panel of twenty-five countries has argued that increasing capital share is accompanied by increasing income inequality. Capital formation in any economy is considered as a catalyst for economic growth (Bal et al., 2016). Therefore, an effort has been made in the present study to revisit the link between entrepreneurship and income inequalities in India by developing a model with proxies of entrepreneurship.

Data & Methodology

This study uses annual time series data of the registered manufacturing sector from 1981-2017. The Gini coefficient is used as a proxy for income inequality and gross capital formation and profits earned are used as an indicator of entrepreneurship. The Gini coefficient has been calculated by using the data of rent, interest, profits and total compensation to workers ('total emoluments', 'provident and other funds' and 'workmen and staff welfare expenses' as given in Annual Survey of Industries) with the formula (Lerman & Yitzhaki, 1984; Shalit, 1985):

$$G = 2\ cov\ [y, F(y)]/\bar{y}$$

where cov = covariance between the income (y) and ranks of each observation (R/n) which is the empirical representation of F(y); $\bar{y}$ = average income

The data were collected from the Annual Survey of Industries 2017-18, conducted by the Central Statistics Office, Ministry of Statistics and Program Implementation, Government of India. All the variables are expressed in their natural logarithmic values. The objective of this study is to investigate the relationship between income inequality and entrepreneurship expressed in equation (1), (2) and (3) as follows:

$$lnGINI_t=\alpha_0+\alpha_1 lnCF_t+\alpha_2 lnPR_t+\varepsilon_{1t}......(1)$$

$$lnCF_t=\beta_0+\beta_1 lnGINI_t+\beta_2 lnPR_t+\varepsilon_{2t}.......(2)$$

$$lnPR_t=\gamma_0+\gamma_1 lnGINI_t+\gamma_2 lnCF_t+\varepsilon_{3t}.........(3)$$

where $InGINI_t$= log of Gini coefficient; $InCF_t$ log of capital formation; $InPR_t$ log of profits; α_0, β_0 and γ_0= intercept; ε_{1t} ,ε_{2t} *and* ε_{3t} error term.

To investigate the existence of long-run relationships among the variables, the study uses Autoregressive Distributed Lag (ARDL) Bounds Testing Approach of Cointegration developed by Pesaran *et al.* (2001). This method does not require all variables to have the same order of integration and can be applied even if some variables are I (0) or I (1), but not I (2). It is also suitable when the sample size is small (Qamruzzaman & Wei, 2018).

In the ARDL analysis, the first step is to examine the stationarity of the variables. In this study the Augmented Dickey-Fuller (ADF) and Phillips –Perron (PP) unit root tests are used. However, these tests have low power in the presence of structural break (Perron, 1989) , which makes it suitable to apply breakpoint unit root tests in addition to the traditional unit root tests to confirm that none of the variables is I(2) (Menegaki, 2019). Therefore, in this study, the breakpoint unit root test developed by Perron (1989) is used. In the second step, the error correction regression represented in equation (4), (5) and (6) is estimated:

$$\Delta lnGINI_t=\alpha_0+\pi_1 D_{lnGINI}+\sum_{i=1}^{n}\delta_{1i}\Delta lnGINI_{t-i}+\sum_{i=0}^{n}\delta_{2i}\Delta lnCF_{t-i}+\sum_{i=0}^{n}\delta_{3i}\Delta lnPR_{t-i}+\sigma_1 lnGINI_{t-1}+\sigma_2 lnCF_{t-1}+\sigma_3 lnPR_{t-1}+\varepsilon_{1t}................(4)$$

$$\Delta lnCF_t=\alpha_1+\pi_2 D_{lnCF}+\sum_{i=1}^{n}\vartheta_{1i}\Delta lnCF_{t-i}+\sum_{i=0}^{n}\vartheta_{2i}\Delta lnGINI_{t-i}+\sum_{i=0}^{n}\vartheta_{3i}\Delta lnPR_{t-i}+\beta_1 lnCF_{t-1}+\beta_2 lnGINI_{t-1}+\beta_3 lnPR_{t-1}+\varepsilon_{2t}...........(5)$$

$$\Delta ln_{PRt}=\alpha_2+\pi_3 D_{lnPR}+\sum_{i=1}^{n}\varpi_{1i}\Delta lnPR_{t-i}+\sum_{i=0}^{n}\varpi_{2i}\Delta lnGINI_{t-i}+\sum_{i=0}^{n}\varpi_{3i}\Delta lnCF_{t-i}+\gamma_1 lnPR_{t-1}+\gamma_2 lnGINI_{t-1}+\gamma_3 lnCF_{t-1}+\varepsilon_{3t}.............(6)$$

where(δ_{1i}-δ_{3i},ϑ_{1i}-ϑ_{3i} and ϖ_{1i}-ϖ_{3i}= short-run coefficients of the model ; (σ_1-σ_3,β_1-β_3,and γ_1-γ_3) long-run coefficients; α_1,α_2 and α_3 drift components; D_{lnGINI}, D_{lnCF} and D_{lnPR}= dummy variable for a structural break; Δ first difference operator; ε_{1t};$\varepsilon_{2t}$and ε_{3t}= white noise error terms.

The existence of a long-run relationship among the variables is examined through F-bounds test. In equation (4) the null hypothesis of no cointegration ($H_{01}:\sigma_1=\sigma_2=\sigma_3=0$) is tested against the alternative hypothesis of the presence of cointegration among the variables ($H_{11}:\sigma_1\neq\sigma_2\neq\sigma_3\neq0$). In equation (5) the null hypothesis of no cointegration ($H_{02}:\beta_1=\beta_2=\beta_3=0$) is tested against the alternative hypothesis of the presence of cointegration ($H_{12}:\beta_1\neq\beta_2\neq\beta_3\neq0$) and in equation (6) the null hypothesis of no cointegration ($H_{03}:\gamma_1=\gamma_2=\gamma_3=0$) is tested against the alternative hypothesis of the presence of cointegration ($H_{13}:\gamma_1\neq\gamma_2\neq\gamma_3\neq0$). The calculated F-statistic is then compared with the lower and upper bound critical values provided by Pesaran et.al (2001). If the calculated F-statistic is above the upper bound critical value then the null hypothesis (H_{01}, H_{02} and H_{03})is rejected which means that the variables are cointegrated. Likewise, if the calculated F-statistic is below the lower bound critical value then the null hypothesis (H_{01}, H_{02} and H_{03}) is not rejected which means that there is no cointegration among the variables. However, if the calculated F-statistic falls between the lower and upper bound value, then the test becomes inconclusive. If the existence of cointegration is confirmed, then the long-run parameters of the variables are estimated using the selected ARDL model with the optimum lag length determined by Akaike information criteria (AIC). In the final step, the Error Correction Model (ECM) represented in equation (7), (8) and (9) is estimated:

$$\Delta lnGINI_t = \upsilon_0 + \pi_1 D_{lnGINI} + \sum_{i=1}^{n} \kappa_{1i} \Delta lnGINI_{t-i} + \sum_{i=0}^{n} \kappa_{2i} \Delta lnCF_{t-i} + \sum_{i=0}^{n} \kappa_{3i} \Delta lnPR_{t-i} + \lambda_1 ECT_{t-1} + \theta_{1t} \ldots\ldots (7)$$

$$\Delta lnCF_t = \upsilon_1 + \pi_2 D_{lnCF} + \sum_{i=1}^{n} \chi_{1i} \Delta lnCF_{t-1} + \sum_{i=0}^{n} \chi_{2i} \Delta lnGINI_{t-i} + \sum_{i=0}^{n} \chi_{3i} \Delta lnPR_{t-i} + \lambda_2 ECT_{t-1} + \theta_{2t} \ldots\ldots (8)$$

$$\Delta lnPR_t = \upsilon_2 + \pi_3 D_{lnPR} \sum_{i=1}^{n} \psi_{1i} \Delta lnPR_{t-i} + \sum_{i=0}^{n} \psi_{2i} \Delta lnGINI_{t-i} + \sum_{i=0}^{n} \psi_{3i} \Delta lnCF_{t-i} + \lambda_3 ECT_{t-1} + \theta_{3t} \ldots\ldots (9)$$

where (κ_{1i}-κ_{3i},χ_{1i}-χ_{3i} and ψ_{1i}-ψ_{3i})= short-run coefficients of the model; θ_{1t}, θ_{2t},and θ_{3t},= white noise error term; λ_1, λ_2,and λ_3= coefficient of the lagged error correction term (ECT) which must be negative and significant. It measures the speed of adjustment towards the long-run equilibrium. Alternatively, $1/\lambda_1$, $1/\lambda_2$, and $1/\lambda_3$ indicate the years the system will take to restore to the long-run equilibrium in case any disequilibrium arises due to a short-run shock (Arora & Asghar, 2016).

Empirical Results

The results of the Augmented Dickey-Fuller (ADF), Phillips –Perron (PP) unit root tests and breakpoint unit toot tests developed by Perron (1989) are summarized in Table 1. It indicates that the Gini coefficient is stationary at I (0) whereas capital formation and profits are stationary at I (1). The structural break in the Gini coefficient is observed in the year 2002, for capital formation, it is observed in 2005 and for-profits is observed in 1993. This necessitates including a dummy variable for the selected break date in cointegration analysis. Therefore as none of the variables is I (2), we can proceed with the ARDL analysis.

The results of the F-bounds tests are given in Table 2. The optimum lag length is determined by using the Akaike information criteria (AIC). It reveals that in all the three models, the value of F-statistic is above the upper bound critical value at 5% level of significance. This rejects the null hypothesis of no cointegration which means that there exists a long-run relationship among the variables in all the three models.

Table 1 Unit Root Tests

Variable	ADF test		PP test		Perron Breakpoint unit root test		Break Date
	Level	First Difference	Level	First Difference	Level	First Difference	
lnGINI	-2.999138**		-1.727480	-5.440959***	-4.238048*		2002
	(0.0453)		(0.7181)	(0.0000)	(0.0882)		
lnCF	-2.159714	-6.869851***	-2.330589	-6.830756***	-4.708063	-7.174501***	2005
	(0.4966)	(0.0000)	(0.4077)	(0.0000)	(0.1548)	(0.0000)	
lnPR	-2.160367	-5.289654***	-2.226500	-5.289654***	-4.336961	-5.787303***	1993
	(0.4958)	(0.0001)	(0.4613)	(0.0001)	(0.3174)	(0.0000)	

Note: Figures in parentheses are p-values; ***, ** and * denotes significance at 1%, 5% and 10% level, respectively.
Source: Author's Calculations

Table 2 F-Bounds Test

Estimated Model	Model 1: $DV_{\Delta lnGINIt}$ ARDL (1,4,2)		Model 2: $DV_{\Delta lnCFt}$ ARDL (3,4,0)		Model 3: $DV_{\Delta lnPRt}$ ARDL (3,3,3)	
Test Statistic	Value		Value		Value	
F-statistic	11.12722		9.784652		5.513530	
Critical Value Bounds	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
5%	3.88	4.61	3.10	3.87	3.10	3.87
10%	3.38	4.02	2.63	3.35	2.63	3.35

Source: Asymptotic critical values are obtained from Pesaran et.al (2001)

$DV_{\Delta lnGINIt}$: Table CI(iv) Case IV: Unrestricted intercept and restricted trend

$DV_{\Delta lnCFt}$ and $DV_{\Delta lnPRt}$: Table CI(ii) Case II: Restricted intercept and no trend
Note: DV stands for Dependent Variable
Source: Author's Calculations

After the confirmation of cointegration among the variables, the next step is to estimate the long run and short-run coefficients of the selected ARDL model. The results are summarized in Tables 3 and 4 respectively. It is seen that in model 1, the coefficient of capital formation is statistically significant, both in the short-run and long-run. This indicates that a 1% increase in capital formation leads to a 0.07% increase in Gini coefficient in short-run. However, in long-run, capital formation will alleviate inequalities as a 1% increase in capital formation leads to a 0.65% decrease in the Gini coefficient. Further, the lagged impact of capital formation is also positive and significant in short-run. On the other hand, the coefficient of profit is statistically significant in the short run, but insignificant in the long-run. This indicates

A 1% increase in capital formation leads to a 0.07% increase in Gini coefficient in short-run.

that a 1% increase in profits reduces the Gini coefficient by 0.14% in short-run, but in long-run, the impact of profits is negligible. Thus, both capital formation and profits influence inequality in the short-run, however, in the long run; it is the capital formation that helps in reducing inequalities. Likewise, the coefficient of the lagged error correction term (ECT) is -0.323070 and is statistically significant, which indicates that if any disequilibrium arises in the long-run relationship due to a short-run shock then it will take about 3.09 years ($1/\lambda_1$) to restore to the long-run relationship.

Thus, both capital formation and profits influence inequality in the short-run, however, in the long run; it is the capital formation that helps in reducing inequalities.

Table 3 ARDL Long-Run Estimates

Estimated Model	Model 1: $DV_{\Delta InGINIt}$		Model 2: $DV_{\Delta InCFt}$		Model 3: $DV_{\Delta InPRt}$	
Variable						
$InGINI_t$			-0.282581	(0.5451)	0.601743**	(0.0382)
$InCF_t$	-0.653049**	(0.0105)			1.286669***	(0.0000)
$InPR_t$	0.040093	(0.7649)	0.444472***	(0.0000)		
Trend	0.058544**	(0.0265)				
Constant			8.513677***	(0.0000)	-4.806318***	(0.0001)
Diagnostic Tests						
Serial correlation ($\chi2$)	6.588085	(0.0863)	5.244427	(0.3868)	7.452386	(0.1138)
Heteroscedasticity ($\chi2$)	10.67315	(0.4710)	9.675840	(0.4694)	7.366589	(0.8325)
Normality ($\chi2$)	2.645611	(0.2663)	0.539401	(0.7636)	0.125053	(0.9393)
Functional form (F-stat)	1.164815	(0.3609)	1.086719	(0.3564)	0.564778	(0.5777)

Note: Figures in parentheses are p-values; ***, ** and * denotes significance at 1%, 5% and 10% level, respectively.
Source: Author's Calculations

In model 2, the Gini coefficient is statistically significant in the short-run but insignificant in the long-run. This indicates that a 1% increase in the Gini coefficient leads to a 1.27% increase in capital formation in short-run. However subsequently, as Gini coefficient increases capital formation declines as seen by lagged impact of Gini coefficient which is negative and statistically significant. Further, the coefficient of profits is statistically significant in the long-run which indicates that a 1% increase in profits increases capital formation by 0.44%. Further, the coefficient of ECT is -0.799021 and is statistically significant, which indicates that if any disequilibrium arises due to a short-run shocks then it will take about 1.25 years ($1/\lambda_2$) to restore to the long-run relationship.

In model 3, the Gini coefficient is statistically significant, both in the short-run and long-run. It indicates that in the short-run, a 1% increase in Gini coefficient will lead to increase in profits by 1.18% and

Table 4 ARDL Short-Run Estimates

Estimated Model					
Model 1: $DV_{\Delta InGINIt}$ ARDL (1,4,2)		Model 2: $DV_{\Delta InCFt}$ ARDL (3,4,0)		Model 3: $DV_{\Delta InPRt}$ ARDL (3,3,3)	
Variable	Coefficient	Variable	Coefficient	Variable	Coefficient
$\Delta InCF_t$	0.078937** (0.0121)	$\Delta InCF_{t-1}$	0.113392 (0.3420)	$\Delta InPR_{t-1}$	0.728221*** (0.0011)
$\Delta InCF_{t-1}$	0.117198*** (0.0099)	$\Delta InCF_{t-2}$	0.322623** (0.0105)	$\Delta InPR_{t-2}$	0.498805** (0.0215)
$\Delta InCF_{t-2}$	0.093631** (0.0300)	$\Delta InGINI_t$	1.273737*** (0.0056)	$\Delta InGINI_t$	0.964716 (0.1900)
$\Delta InCF_{t-3}$	0.133905*** (0.0010)	$\Delta InGINI_{t-1}$	-0.342156 (0.3822)	$\Delta InGINI_{t-1}$	1.180267** (0.0401)
$\Delta InPR_t$	-0.149587*** (0.0002)	$\Delta InGINI_{t-2}$	-1.846798*** (0.0000)	$\Delta InGINI_{t-2}$	1.964956*** (0.0025)
$\Delta InPR_{t-1}$	-0.042391 (0.1792)	$\Delta InGINI_{t-3}$	-0.702734* (0.0754)	$\Delta InCF_t$	0.473622** (0.0124)
DinGINI	0.118439*** (0.0000)	D_{inCF}	0.671977*** (0.0000)	$\Delta InCF_{t-1}$	-0.801620*** (0.0045)
ECT_{t-1}	-0.323070*** (0.0000)	ECT_{t-1}	-0.799021*** (0.0000)	$\Delta InCF_{t-2}$	-0.581730*** (0.0078)
				D_{inPR}	0.687284*** (0.0000)
				ECT_{t-1}	-1.306780*** (0.0001)

Note: Figures in parentheses are p-values; ***, ** and * denotes significance at 1%, 5% and 10% level, respectively.
Source: Author's calculations

1.96% after the first and second lag respectively, and in the long run, the profits will increase by 0.60%. Likewise, the coefficient of capital formation is statistically significant, both in the short-run and long-run. This shows that a 1% increase in capital formation leads to an increase in profits by 0.47% in the short-run, and in the long-run, the profits increase by 1.28%. However, the lagged impact of capital formation is negative and statistically significant in short-run. Further, it confirms that the model is stable as the coefficient of ECT is -1.306780 and statistically significant. It indicates that speed of adjustment is high (Bist & Bista, 2018) and if any disequilibrium arises due to short-run shocks then in less than 1 year the long-run relationship will re-establish (Olczyk & Kordalska, 2017). In our case, it will take around 9.18 months ($12/\lambda_3$) to restore back to the long-run relationship.

To ensure that the estimated ARDL models are robust, various diagnostic tests such as Breusch-Godfrey Serial Correlation LM Test, Breusch-Pagan-Godfrey Test for Heterosce dasticity, Jarque-Bera Normality test and Ramsey RESET Test for Functional Form has been used. The results summarized in Table 3 indicates that all the models successfully pass the various diagnostic tests. Lastly, to ensure that the estimated ARDL models are stable, the Cumulative Sum (CUSUM) of Recursive Residuals and Cumulative Sum of Squares (CUSUMSQ) of Recursive Residual Tests developed by Brown, Durbin and Evans (1975) are also performed. It can be seen from Figs 1, 2 and 3 that the plots of both CUSUM and CUSUMSQ tests are well within the 5% significance limits, thus indicating that estimated models are stable.

Fig. 1 The plot of CUSUM and CUSUMSQ for Gini Coefficient Equation

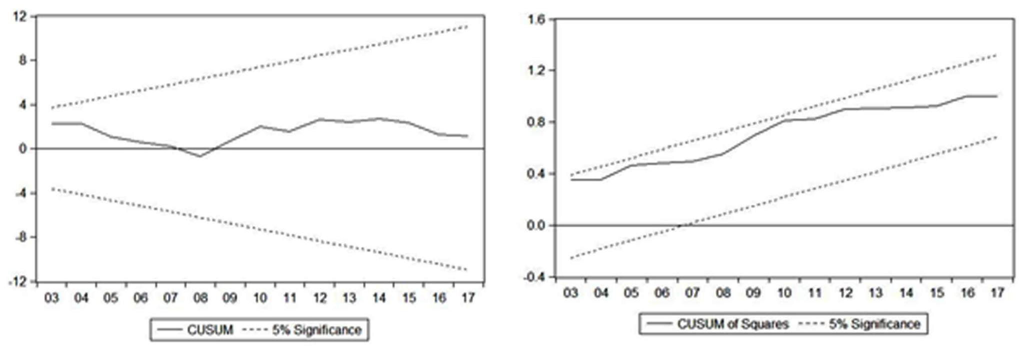
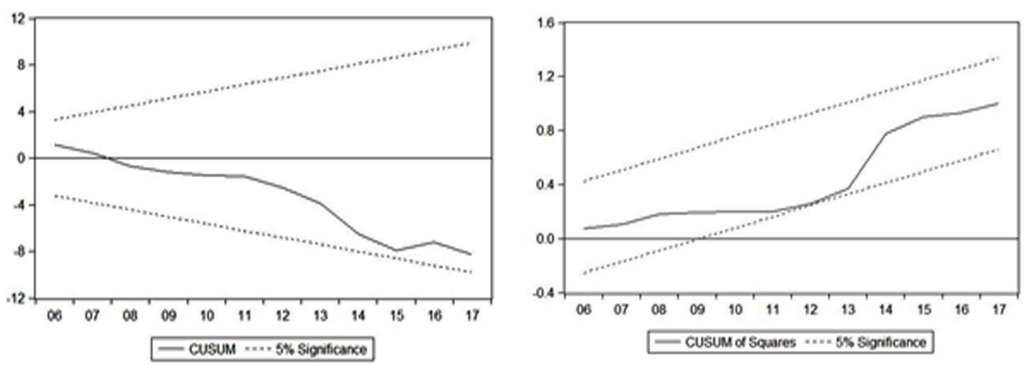


Fig. 2 The plot of CUSUM and CUSUMSQ for Capital Formation Equation

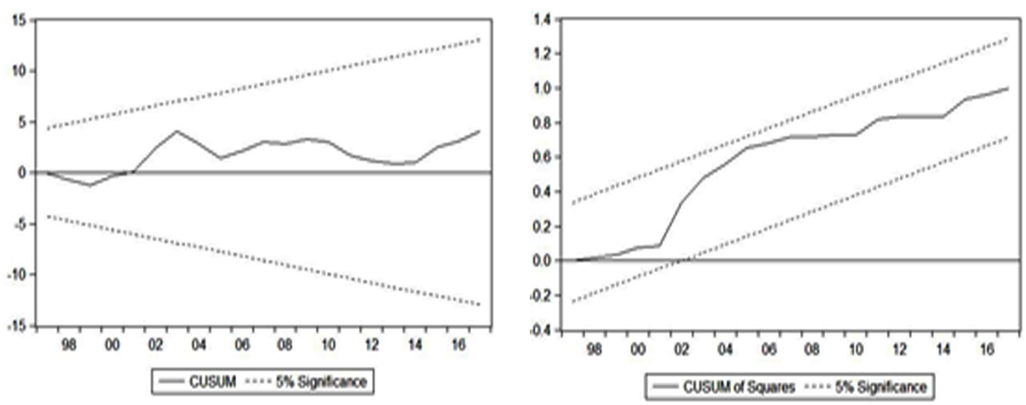


Conclusion & Policy Implications

The main objective of this study is to empirically examine the mutual relationship between entrepreneurship and income inequalities in India. The summarized study is based on the registered manufacturing sector wherein two proxies representing entrepreneurship, namely capital formation and profits used. The relationship under consideration is examined using ARDL bounds testing approach of cointegration and error correction model (ECM). The study found that both capital formation and profits influence inequality in the short-run, however, in the long run; it is the capital formation that helps in reducing inequalities. Further, increase in profits significantly increases the capital formation in the long run. This empirical finding is an outcome of inclined policies towards entrepreneurs. The entrepreneurs are taking away a major share of value-added which has been the trend in India in the last three to four decades (Sharma & Sharma, 2019). The results also indicate that an increase in the Gini coefficient increases the profits earned by the entrepreneurs in the short-run as well as in the long-run, the profits in turn decreases Gini coefficient in the short-run. Overall it can be concluded that there exists a two-way association between entrepreneurship and income inequalities in India.

Overall it can be concluded that there exists a two-way association between entrepreneurship and income inequalities in India.

Fig. 3 Plot of CUSUM and CUSUMSQ for Profits Equation



Our empirical findings suggest that policies which aim at reducing inequalities should focus on its relationship with entrepreneurship as well. As there exists a two-way relationship between entrepreneurship and income inequalities, a minimum amount of inequality is necessary as this will boost the earning of profits which will lead to accumulation of capital and hence economic growth. This, capital accumulation will further influence the job creation in the economy and ultimately in the long-run the benefits will be shared by all, as inequalities will decline. This has also been acknowledged by Ragoubi and Harbi (2017) that considered the importance of income inequality in the process of job creation via entrepreneurship. Thus, businesses either small or large can be a remedy for overcoming the problem of income inequality and encouraging entrepreneurship hand in hand.

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