

The Spectre of Jobless growth and Income inequality - In light of globalization

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Abstract:

The growth of any economy is accompanied by the creation of jobs and growth in the incomes of the workforce of a country. The income growth is followed by rising consumption and in this way this virtuous cycle pushes people out of poverty and transforms developing emerging economies into developed ones. But the phenomena we are witnessing these days is somewhat different- job growth is hardly keeping pace with economic growth, and the problem of unemployment persists. The topic of trade and wage inequality already features a research agenda in contemporary trade theory. What we show in our paper is that trade policies often give rise to unemployment and a subsequent informalization of the economy, indicative of a structural shift in the economy. Accordingly, we consider two world economy- a home country and a foreign country. The home country is a SMOPEC and characterized by 3 sectors- Capital intensive sector (X), Medium and Small-Scale Sector (Y), and informal sector (Z). Hence our model takes into account 2 commodities and 1 service, with three factors of production. We assume full employment of factors in the economy and fixed factor coefficients. The price structure follows a perfectly competitive framework. Further we assume CRS production function and homothetic preferences. We assume that Sectors X and Y employ the vast majority of middle-income groups. We divide the middle class into upper middle class with the necessary skill set to classify as skilled workers and lower middle class comprising of unskilled workers operating under unionized conditions in sector Y and under a competitive framework in sector Z.

JEL CLASSIFICATION: - E24, F16,F14,F66

Keywords: International trade, Jobless Growth, Skilled Labour, Unskilled Labour.

Section 1 : Introduction to Jobless Growth, Income Inequality and International Trade

The topic of trade and wage inequality has already featured as an important research agenda in contemporary trade theory. Globalization, as we know, is a process of integrating a country's economy with the economies of other countries across the world. Such integration is facilitated by an increasing volume of foreign trade and investment. Major task of an economist is to work out the welfare implications and distributive perspective of such a transformation. With respect to the distributional effect in particular, there has been a noticeable empirical phenomenon that suggests a considerable decline in the income of unskilled labour and in the decline of their employment relative to the skilled segment of the labour force(Substantial research

work has been devoted to this topic Bhagwati (1995), Davis(1998), Margit Acharya(2003)). Hence, the general trend has been an increase in the ratio of skilled to unskilled wages.

During the last decade, we saw that the growth rate of labour force (2.33%) was significantly higher than the growth rate of employment (1.9%), which was several times less than the growth rate of the economy. According to the 2011 census, the growth in the economy was around 8% while the growth in employment stood at a measly 1.9%.

We also refer to the National Sample Survey Office (NSSO) data on employment that revealed that during the time periods of 2004-2005 and 2009-2010 only 1 million jobs were added while the economy averaged a record of 8.43% growth annually. Hence, we see that the economy could not accommodate the rapidly growing labour force. A HDFC Bank report on India's tanning jobs growth rate says that employment elasticity (percentage change in employment due to a 1% change in GDP) is almost zero. For every one-point rise in GDP, the growth in jobs is 0.15.

Rising middle class in India: intuitive rationale behind taking middle class as the target group of our analysis

In this paper our main focus has been to highlight the many layers within the middle class and to study the adverse effects of joblessness and income inequality on it. India's rapid rise and growing middle class has varied implications for evolution of democracy and economic choices. A large proportion of all services is produced by bankers, accountants, engineers, and scientists whose output is used by firms producing goods. Sector X in our model is service oriented and the skilled labour it uses comes from the middle class due to the economic rationale provided as above. These bankers, engineers, doctors constitute a major part of the middle-income group. Thus, it is safe to say that middle class forms a major portion of the services employment.

The explosive growth of India's service sector has helped pull millions of people out of poverty, creating a huge middle class. Half of India's population of 1.3 billion is now middle class. The Indian middle class has doubled in size over an 8-year period from 300 million in 2004 to 600 million in 2012.

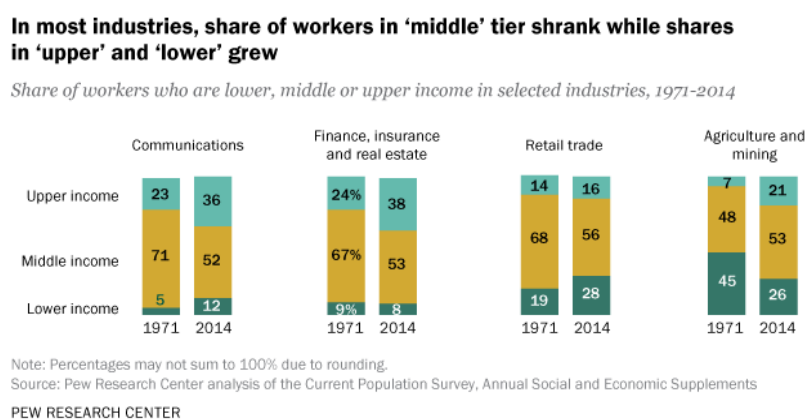


Fig:1

The above diagram shows that services like communications and finance, insurance and real estate employs more than 50% of their employees from the middle class. Any policy that affects trade in services has a huge impact on the middle class.

Not only in the case of service, but we can safely say that the unskilled workers employed in small and medium scale industry comes from the lower middle tier of the middle class and these are the industrial workers. Hence it is the middle class which is the focal point of our analysis. Conceptualizing the effect of trade, unemployment, jobless growth is our primary concern.

Section 2: Literature Review

There exists an extensive amount of literature on the subject of our paper.

We have drawn several references from Rajat Acharya and Sugata Margit's paper on "Trade Liberalization, Skill Linked Intermediate and Two-Sided Wage Gap" where wage gaps are shown to be an outcome of trade liberalization. We have also looked up Sheba Tejano's work on Jobless Growth in India(2015), where she finds that a shift in the composition of demand towards higher-productivity sectors and forces of international competition have generated pressures to adopt more capital-intensive techniques of production in India, causing growth without a rise in unemployment as well as a growing wage gap.

Section 3: The Theoretical Framework

We consider a dual globalist framework consisting of a Home Country and a Foreign Country. We consider the Home Country to be a SMOPEC. We consider 2 consumption goods (final consumption) and one service good, with 3 factors of production-skilled labour, unskilled labour and capital. Here, we assume explicitly that the labour force mentioned here is the middle-income bracket population spread across the formal and informal sectors. We assume full employment of resources and fixed factor coefficients. We consider a production structure, where the Home country exports X, Y is the import competing sector Z is the ideally non-traded sector. Initially our home country imposes an ad-valorem tariff on the import of Y from the foreign country, keeping in mind the adverse distributional consequences of a free trade regime in the developed world.

All the markets are assumed to be perfectly competitive, and the production function for the final goods and services exhibit CRS and diminishing marginal productivity. We assume homothetic preferences so that relative demand depends only on the relative price of the good. This standard HO assumption is employed to rule out any real income or country size effect and we keep our analysis simple.

One of the major features of our model is the inclusion of the segmented input market, which is a typical feature of many developing countries, hence the idea is extremely relevant. The formal unskilled labour market with the minimum wages coexists with the unorganized informal sector where the money wage varies with the demand-supply changes. In our model these are the 2 goods Y and Z. Informal Sector Z is characterized by a comparative lower wage than formal sector Y which is unionized.

Accordingly, we use our theoretical framework to put together asymmetric changes in the relative wages of workers, with different levels of skills and trends in the employment of unskilled labour.

Effect of liberalization of trade

In the simple model that we propose in the paper, fall in employment and the rising wage gap turns out to be an outcome of liberalizing trade. When trade is liberalized t falls as τ falls, domestic price of Y goes down. According to Stolper Samuelson Theorem, as price of commodity falls the return from the factor used relatively intensively in that sector must fall. Hence ' r ' falls. As ' r ' falls, foreign capital falls and consequently K falls, feasible production space for Y shrinks and what we get is a Rybzynski type effect, where the production of relatively capital-intensive Y must fall, hence sector Y shrinks.

Since the endowment of unskilled labour does not change as Y falls, Z rises because of the assumption of the perfect mobility of unskilled labour between different sectors. The retrenched workers are absorbed by sector Z . The consequent reallocation of labour to Z results in the expansion of that sector. The growth of the informal sector Z coupled with the growing unemployment in the formal sectors can be called the 'informalization of the economy'.

Hence trade is responsible for the structural change of the economy, by pushing unskilled labourers away from the secured formal sectors into the insecure, low wage paying informal sectors. Our economy thereby observes a prospect of jobless growth that has ramifications for everyone.

However, since the price of good X remains unchanged, with the rate of return to capital falling, in such a setup this would lead to a rise in the skilled wage. Hence the change in the urban income is ambiguous, whereas the income of the capitalist is falling, that of the skilled workers are being benefited.

As sector Z expands, falls, wage of unskilled workers in the formal sector falls in order to absorb them. Hence increased foreign trade has increased wage inequality in almost every part of the globe. We observe that the relative wage ratio is steadily rising, creating a wedge between the upper middle class and the lower-middle- and lower-class income groups as the economy moves from free to restricted trade.

Income Inequality in the Economy:

Hence, from the above discussion we say that the mathematical interpretation concludes that the wage of skilled labour goes up and that of unskilled workers decreases in a liberalised trade regime. This means that the upper middle-income group benefits from trade liberalization as their income rises. The income gap between the lower class and the lower middle-class group is waning and that of the higher and upper middle class is shrinking leading to creation of a gripping hole of inequality within the middle class.

We illustrate our argument in the following graphs:

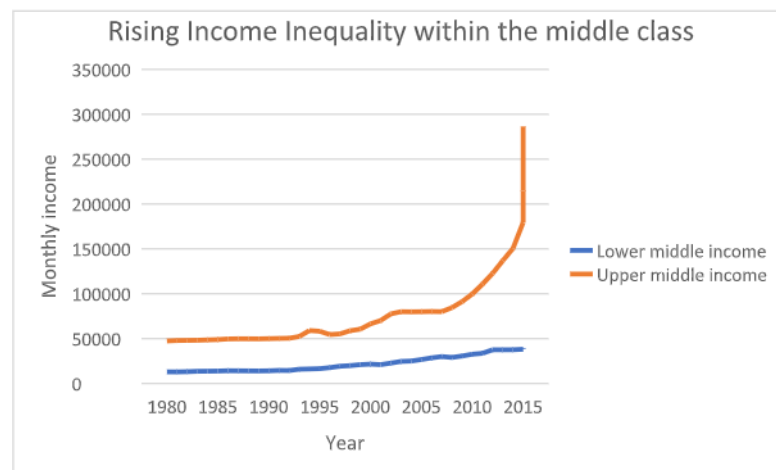
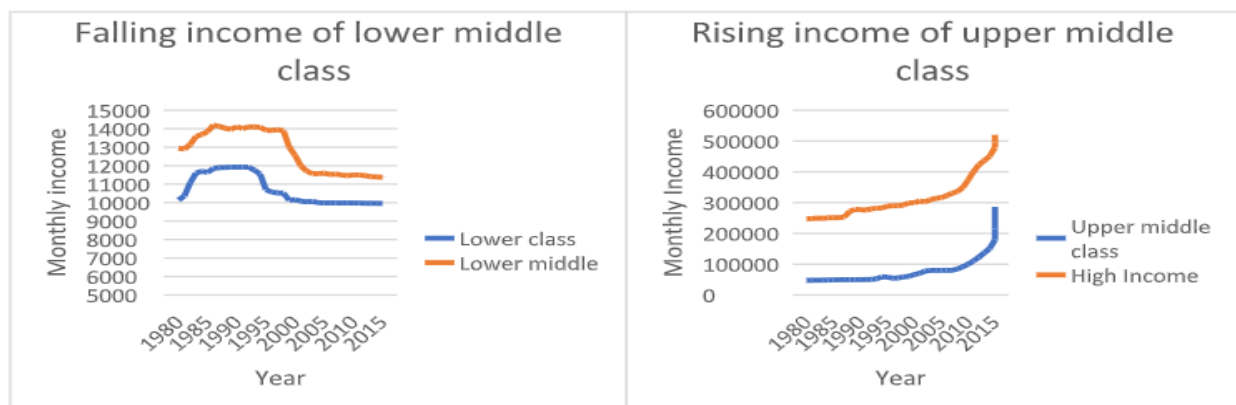


Fig:2



Source: https://www.ilo.org/ilostat/faces/wcnav_defaultSelection?_af7itgq_4

Fig:3

Rising income inequality in India and the rural-urban divide

Since the mid-1980s, Indian Government gradually adopted market-oriented reform policies leading to trade liberalization, resulting in rural urban inequalities. It is notable that during the reform period urban inequality in India was much higher than rural inequality. And this can be attributed to the rising wage gap between upper and lower middle class in urban population. In the following figure we have compared the urban and rural Gini coefficients over the years.

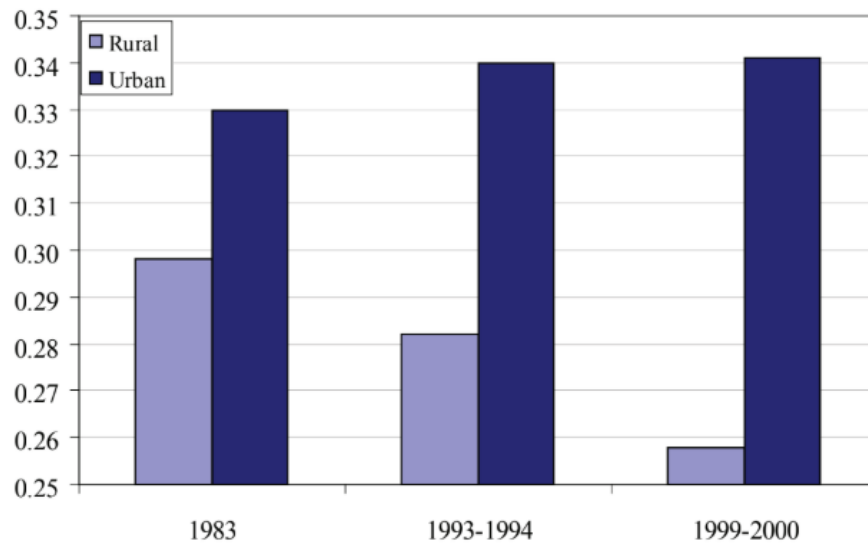


Fig:4

Also, the indices of rural per capita consumption by fractal group indicates the same phenomenon (Banerjee and Piketty (2001)). In the following figure we have highlighted disproportionate high income/consumption gain of the upper tier of population. Hence urban inequality has increased considerably.

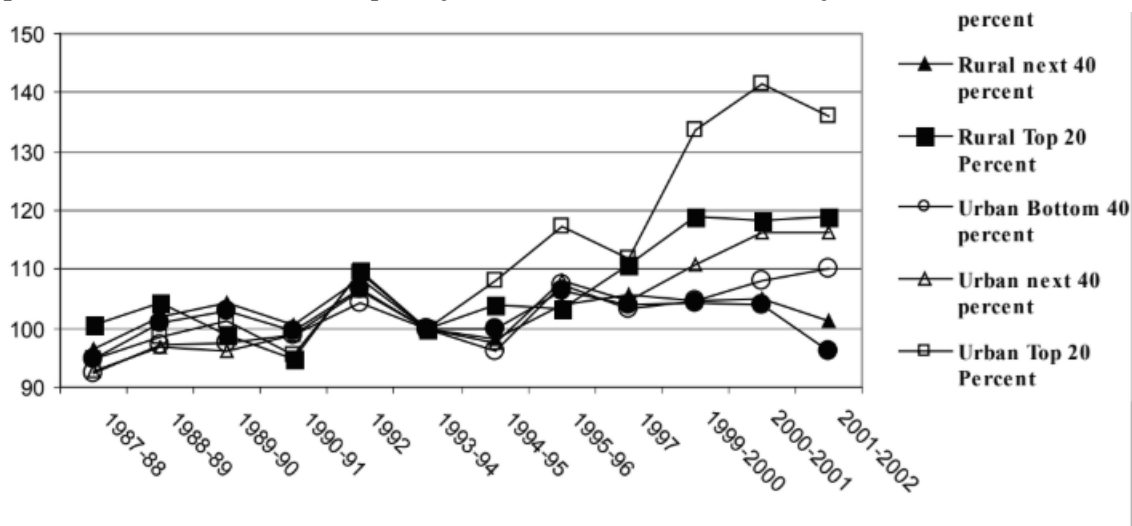


Fig:5

One of the major objectives of our paper is to understand the wage gap phenomenon. In developed countries like the US and European Union, we have seen that considerable decline in income of skilled labour and a decline in their employment relative to the more skilled segment of the workforce has roughly coincided with the phase of globalization and international trade.

According to the Gini coefficient, income inequality in India has been rising since the 1980s when 30-35% of national income went to 10% of earners and it has been steeply increasing after the period of globalization and liberalization. One of the reasons we have considered India to illustrate our case, is that the issue of poverty and inequality is far more important in developing countries because of the alarming and overwhelming proportion of population below the poverty line.

GDP has grown at more than 5% since the 1980s. The acceleration in growth rate was more than 9% in 2005-06. The upward trend is noticeable from the following diagram:

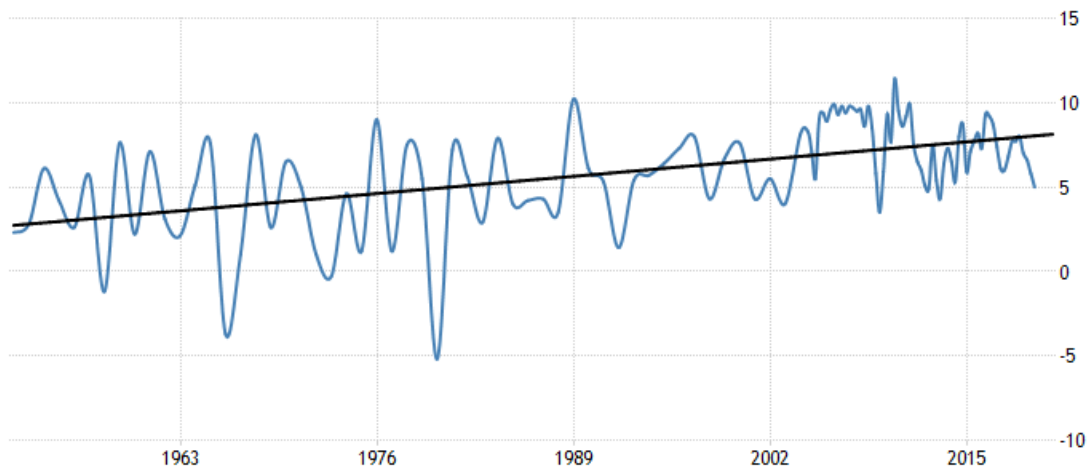


Fig 6

What is noticeable that the rise in GDP has been accompanied by a steep rise in the increasing concentration of wealth among the top. The top 1% now accounts for more than 1/4 th of the total wealth as evident from the following figure.

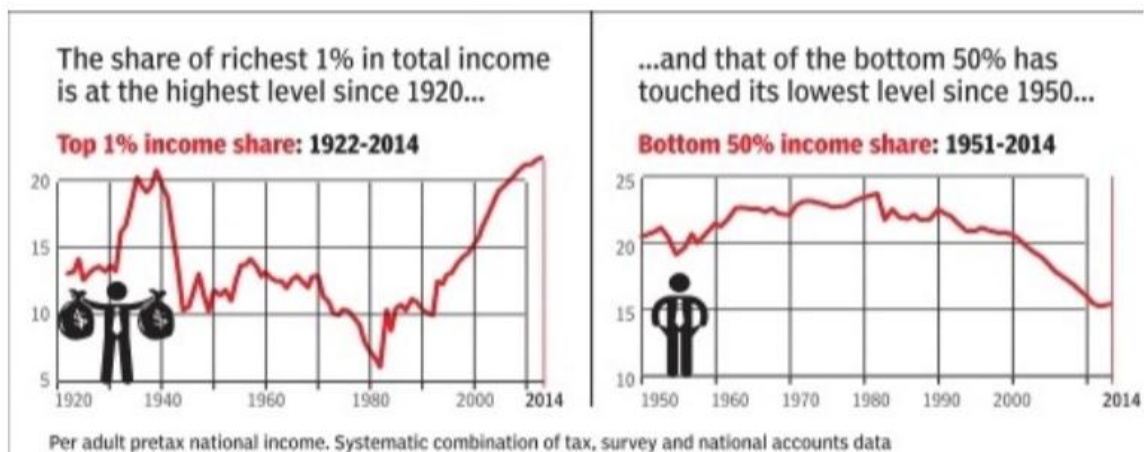


Fig.7

We see that the income of the bottom 50% has touched its lowest level.

Computing the income bracket of these high earners and low earners to their job profile, it is realized that while the low earners are ones engaged in small factories and construction workers, high earnings are capitalist earning and skilled labour, i.e., the urban middle class group. This is line with the findings of the paper.

Theil's Index:

In our previous section we have measured inequality with the help of the Gini Coefficient, which, as we know is the most commonly used measure of inequality and shows income distribution by plotting population percentage in cumulative figures and similarly for the income figures as well. However, one of the major drawbacks is that it concentrates more on the share of income rather than the absolute value.

Also, it is sensitive to inequality between rich and poor. In our paper since our major objective is to analyse the rising income inequality between the members of a particular class and thus, we use the Theil's index to address this issue.

Formula

Theil's index T of inequality within a group is calculated as:

For a population of N individuals each with income x, the situation may be represented by the list x_i ($i=1,2,\dots,N$) where x_i is the income of individual i

$$T = \frac{1}{N} \sum_{i=1}^N \frac{x_i}{\mu} \ln \left(\frac{x_i}{\mu} \right)$$

where μ is the mean income

$$\mu = \frac{1}{N} \sum_{i=1}^N x_i$$

Theil's index T_T of inequality between groups is calculated as:

$$T_T = \sum_{i=1}^m s_i T_i + \sum_{i=1}^m s_i \ln \frac{\bar{x}_i}{\mu} \quad \text{for} \quad s_i = \frac{N_i}{N} \frac{\bar{x}_i}{\mu}$$

Where the population is divided into m subgroups and

s_i is the income share of group i

N is the total population and N_i is the population of group i

T_i is the Theil index for that subgroup

$\bar{x}_i$ is the average income in group i

μ is the average income of the population

(For large populations, classify the population into k mutually exclusive and mutually exhaustive categories of relatively homogenous income groups and treat these categories as individuals while calculating Theil's index T_i for a sub-group)

Dividing the entire population into 3 broad groups-lower income, middle income and high income

The trend in Theil's index between these groups was seen as follows:

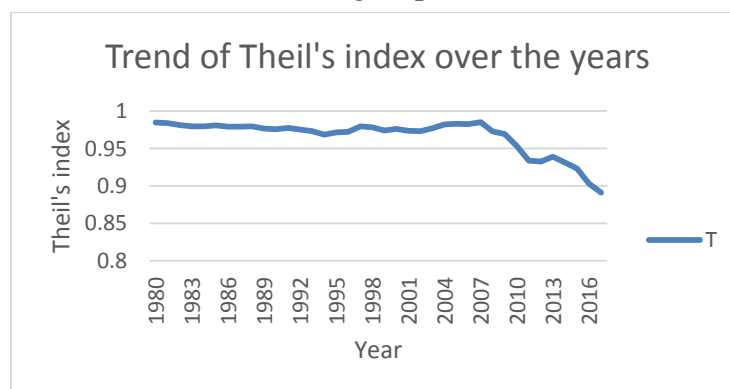


Fig:8

Thus, we can see that income inequality *between* the groups shows a downward trend, painting a rosy picture of the society. But on a closer look, we find that the income inequality *within* the middle class is rising substantially.

(We have calculated the Theil's index T_i for middle income group by taking the population as that of the middle-income group and individuals as – lower middle, middle and upper middle-income earners.)

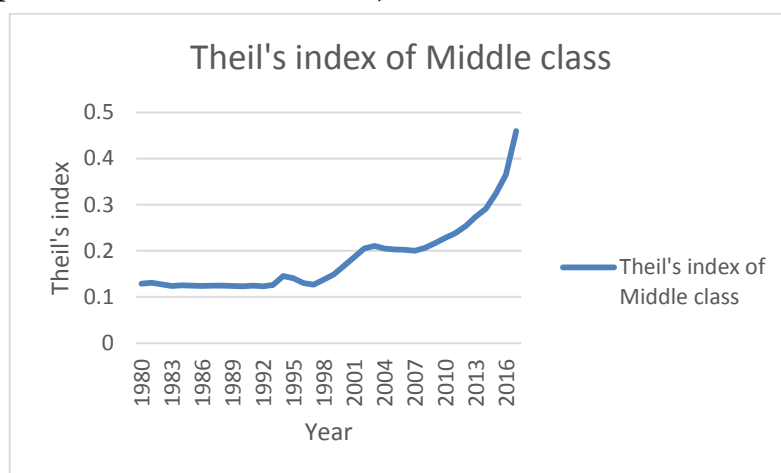


Fig 9

The rightward shift in the demand for skilled labour creates an increase in the relative wages of the skilled compared to unskilled workers. Hence, the income gap among workers also has widened. The upward trend of the above graph shows the rise in inequality of the middle class.

Section 4: Estimating employment elasticity of growth for the Indian economy

In this section we investigate the relationship between output growth and employment growth in the Indian economy. This paper also provides updated estimates on employment elasticity- aggregate as well as sector specific. The aggregate employment elasticity estimates for India have declined over the decades and vary from 0.18(arc elasticity) to 0.20(point elasticity). Sector wise, while agriculture has witnessed negative elasticity, manufacturing sector also witnessed the same result in the given accounting period. Mining, quarry and private service sector have also been employment intensive. Thus employment intensive growth is crucial for India to meet the demographic divide challenge.

Indian economy which has grown at an average rate of over 7% since year 2000 displays a skewed output employment structure. Services make up the largest share of output, while output is concentrated mostly in agriculture and largely informal in nature. Economic growth has provided prosperity for some as the gap between upper and lower class incomes has widened over time representing a growing social and political problem in the economy.

Against this backdrop, the paper aims to compute elasticities for the Indian economy more specifically for the 2000's using the latest available data.

Formal Employment and Output: Our paper stresses on the question whether the formal sector is generating enough employment as they are generally associated with higher pay, greater job security and better overall benefits. However the anomaly

between output and employment growth in India becomes obvious as we see the trend growth rate of output was a healthy 6.2% while formal employment was 0.2%. We refer to the figure below.

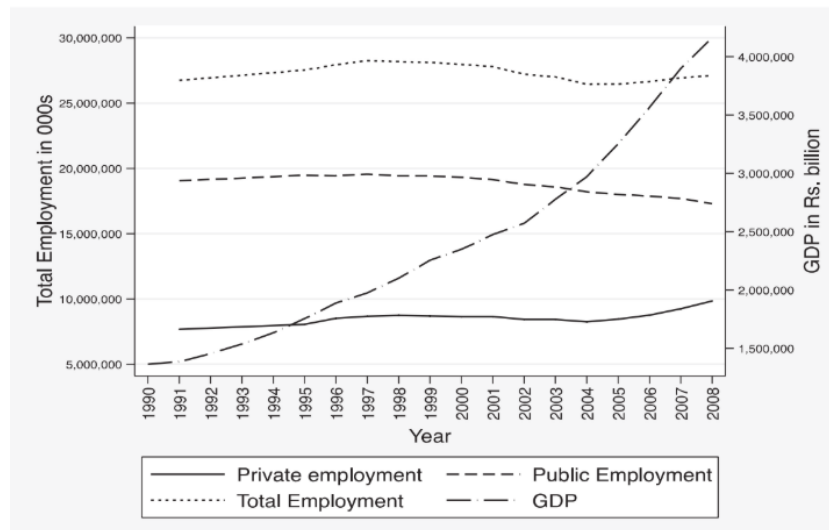


Fig 10

Employment elasticity of growth: It is defined as the percentage change in employment as a result of 1% increase in growth.

In empirical literature there have been 2 methods generally used for the calculation of employment elasticities. These are based on compound annual growth rate (CAGR approach) which gives the arc elasticities and regression approach which gives the point elasticities.

That is, $e = \frac{\frac{\Delta L}{L}}{\frac{\Delta Y}{Y}} \dots\dots(x_i)$, where, “L” denotes labour and “Y” denotes GDP

In the following table, since we have showed employment and GDP data for every 5 years hence the CAGR approach has been used first to calculate the elasticity of sectors

GROWTH OF EMPLOYMENT

TABLE 1							
SECTOR	72-73/77-78	77-78/83	83/87-88	87-88/93-94	93-94/99-2000	99-00/04-05	04-05/09-10
Primary Sector	1.78	1.56	0.28	2.16	0.05	1.4	-1.63
MiningQuarrying	4.36	7.14	5.34	1.69	-2.11	2.41	3
Manufacturing	5.43	3.08	4.66	0.05	1.62	5.06	-1.06
Construction	1.67	6.84	13.91	-0.11	6.38	8.18	11.29
Trade	6.4	2.87	3.96	3.62	6.28	4.01	1.1
Financing	6.84	7.68	1.41	5.24	5.28	9.62	5.77
Tertiary Sector	4.86	3.46	2.11	5.03	2.85	4.08	1.59
Total	2.61	2.19	1.53	2.39	1.04	2.81	0.22

Fig 11

GROWTH OF GDP

TABLE 2							
SECTOR	72-73/77-78	77-78/83	83/87-88	87-88/93-94	93-94/99-2000	99-00/04-05	04-05/09-10
Primary Sector	4.34	2.47	-0.03	4.67	3.31	1.56	3.1
Mining and quarry	4.94	7.28	5.58	6.51	5.2	4.8	4.11
Manufacturing	4.83	5.06	4.62	5.15	6.9	6.46	9.5
Construction	4.57	1.34	4.3	5.26	6.36	9.17	9.23
Trade	6.02	4.53	5.65	5.54	9.29	7.87	9.07
Financing	4.39	6.23	8.77	9.28	7.78	6.71	12.3
Tertiary Sector	4.7	5.15	6.9	6.37	8.35	7.58	11.15

Fig 12

EMPLOYMENT ELASTICITY WITH RESPECT TO GDP

TABLE 3							
SECTOR	72-73/77-78	77-78/83	83/87-88	87-88/93-94	93-94/99-2000	99-00/04-05	04-05/09-10
PrimarySector	0.41	0.63	-9.10	0.46	0.02	0.9	-0.53
Mining	0.88	0.98	0.96	0.26	-0.41	0.5	0.73
Manufacturing	1.12	0.61	1.01	0.01	0.24	0.78	-0.11
Construction	0.37	5.09	3.23	-0.02	1	0.89	1.22
Trade	1.06	0.63	0.7	0.65	0.68	0.51	0.12
Financing	1.56	1.23	0.16	0.56	0.68	1.43	0.47
TertiarySector	1.03	0.67	0.31	0.79	0.34	0.54	0.14
Total	0.57	0.56	0.38	0.42	0.16	0.47	0.02

Source: data is collected from <https://m.rbi.org.in/Scripts/PublicationsView.aspx?id=15763>

Fig 13

The long-term trend of a decline in the rate of employment growth cannot be ignored. What is intriguing is that this growth has been accompanied by acceleration. The above tables show the growth of employment and output in the time period of 1972-1973 to 2009-2010.

Employment elasticity with respect to GDP has been calculated using CAGR approach for some key sectors in the third and last table. The declining trend of the ratio of employment growth to growth in value added has been clearly evident from the above tables.

We see that GDP was growing at 4.6% pa in 1972-1973 but employment growth was a meagre 2.4% .As GDP growth rose to 5%, employment growth declined and this declining trend is quite evident as it is clearly seen in the values of employment elasticity. In the period 2004-05/2009-10 GDP growth has increased to 9% and that for employment is as insignificant is 0.22%.

SECTION 5: Estimating a Log Linear Regression

An alternative way to calculate the elasticity is to estimate a log log regression model between employment and GDP. Note that this generates the point elasticity of employment. The conventional form of equation looks like

$$\ln L = \alpha + \beta \ln Y$$

Where “L” and “Y” denote Labour and GDP respectively and “ln” stands for natural logarithm. According to the

Model, the regression coefficient β gives us the employment elasticity.

$$\ln L = \alpha + \beta \ln Y \dots \dots \dots (xii)$$

Taking differentials on both sides, $\frac{1}{L} dL = \beta \frac{1}{Y} dY$

Therefore, $\frac{\frac{dL}{L}}{\frac{dY}{Y}} = \frac{d \ln(L)}{d \ln(Y)} = \beta \dots \dots \dots (xiii)$

International Labour Organizations like the (ILO) have estimated employment elasticities for different regions of the world. Several studies have been conducted to explain the cross-country variations in the employment elasticities. We present a cross country comparison in the following table for reference purpose.

	Employment elasticity				Average annual GDP growth rate			
	1992-96	1996-00	2000-04	2004-08	1992-96	1996-00	2000-04	2004-08
WORLD	0.3	0.4	0.3	0.3	3.1	3.7	3.3	4.4
Developed Economies & European Union	0.3	0.3	0.2	0.5	2.4	3.3	1.9	2.2
Central & South-Eastern Europe (non-EU)	0.2	0.2	0.2	0.2	-5.5	3.2	6.0	6.7
East Asia	0.1	0.2	0.1	0.1	10.2	7.0	7.8	9.3
South-East Asia & the Pacific	0.3	0.1	0.3	0.4	7.8	1.6	4.9	5.8
South Asia	0.3	0.4	0.4	0.3	6.0	5.4	5.5	8.4
Latin America & the Caribbean	0.6	0.9	0.8	0.5	3.3	3.0	2.3	5.0
Middle East	1.1	1.5	0.7	0.7	2.9	3.3	5.1	5.7
North Africa	0.8	0.6	0.8	0.7	2.3	4.3	4.3	5.6
Sub-Saharan Africa	0.7	0.7	0.5	0.5	2.9	3.0	6.0	6.1

Source: Employment Elasticities Indicator KILM 19 (2009), International Labour Organization (ILO)

Fig 14

While our paper does use the regression approach, we must mention beforehand that this approach is not very popular in India.

REGRESSION ANALYSIS

The following regression analysis is carried out based on time series data on labour input starting from 2001-2002 to 2010-2011.

EMPLOYMENT ELASTICITY BASED ON LOG-LOG REGRESSION	
SECTORS	LOG LOG OLS REGRESSION COEFFICIENTS
AGRICULTURE	-0.05
MINING AND QUARRYING	0.34*
MANUFACTURING	-0.33**
CONSTRUCTION	1.08**
SERVICES	0.47
ALL SECTORS	0.19*
NOTE 1: * AND ** IMPLIES SIGNIFICANCE AT 5 PERCENT AND 1 PERCENT, RESPECTABLY.	
SOURCE: DATA OF EMPLOYMENT AND GDP FROM data.gov.in (EMPLOYMENT AND UNEMPLOYMENT) AND THAT OF GROSS DOMESTIC PRODUCT	
https://data.gov.in/sites/default/files/datafile/GDP_and_Major_Industrial_Sectors_of_Economy_Data_set.xls	
NOTE 2: GDP IS MEASURED IN CONSTANT PRICES (2004-05) AND MEASURED IN RS. CRORE. WHEREAS EMPLOYMENT IS IN THOUSANDS	

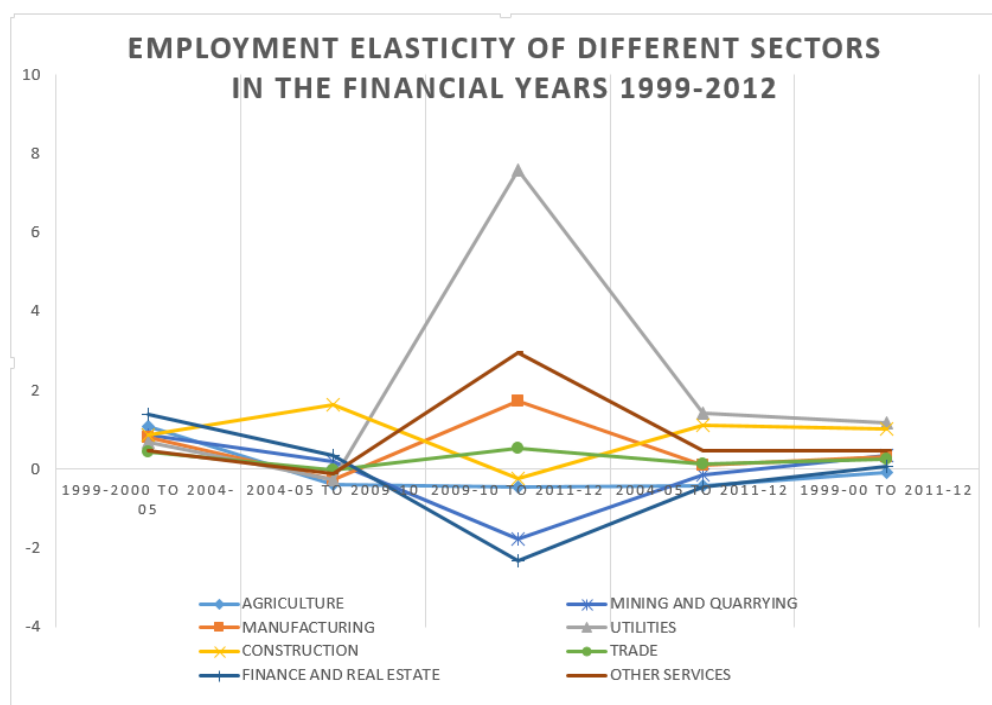
Fig 15

Refer to the Appendix for data (1,2,4,5,6,7,8,9)

Employment elasticity has been calculated by running a log-log regression of sectoral employment figures generated (dependant variable) and GDP (independent variable).

The analysis for the different sub sectors has been conducted for the period 2001-2002 to 2010-2011. The aggregate elasticity has been observed to be 0.19.

Accordingly the log-log OLS regression coefficient for the agricultural and manufacturing sectors has come out to be negative (-0.05 and -0.33 respectively). There has been an established consensus that organized industrial sector growth has been jobless. Also for the agricultural sector the elasticity turns out to be negative, it is not statistically significant. It is in line with the general consensus that agricultural growth has not been employment intensive in India. Elasticity has been observed to be highest for construction followed by service sector and mining and quarrying. Manufacturing and construction are observed to be highly statistically significant whereas service and agriculture are statistically insignificant.



Source: Sector wise classification as mentioned by planning commission. Data is provided in the appendix. (3)

Fig 16

Using the sector wise employment figures for the period of 1992-2000 the employment elasticity has been computed. As we have already said employment elasticity in India varies from 0.18(arc elasticity) to 0.2(point elasticity) during the post reform period elasticities do vary across sectors. Observing the sector wise, employment elasticities we witness that it is in the negative zone for the agriculture sector which results in a migration of labour into other sectors of the economy in search for gainful employment. Elasticity is significantly higher for utilities which generally comprises of electricity gas, water supply and waste management. In case of manufacture unlike 1990's that practically witnessed jobless growth, 2000's has been job creating, however the second half did witness some job losses.

SECTION 6: THE ROLE OF INFORMAL SECTOR:

The main aim of our paper was to focus on the shrinking organized sector and the rise of unorganized sector, a phenomenon which we have referred to as informalization of the economy. Over the years the unorganized sector has expanded rapidly in the context of Indian economy. In this section we have tried to measure the economic significance of the unorganized sector in Indian economy by its share, growth, and composition in comparison with the organized sector under liberal foreign policy regime. In this section we mainly focus on a comparative analysis between the organized and unorganized sector at aggregate level and for that net domestic product has been divided into organized and unorganized sector as given below. The estimates of factor incomes for the economy as a whole alongside its distribution by organized and unorganized sectors has been given below.

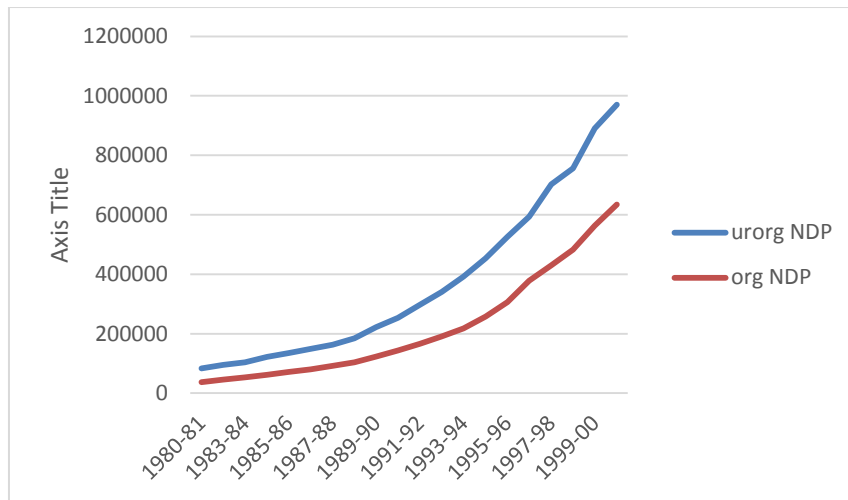
STATEMENT 1.1 : FACTOR INCOMES: SUMMARY RESULTS

	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90
1. Net Domestic Product:Total	120784	141073	157032	184217	206297	229132	254746	288611	345156	396568
1.1 Comp. of employees	46516	53357	60468	70703	81794	90962	103439	119069	137458	158072
1.2 Operating surplus	9414	13381	15947	18504	20416	23152	26336	28218	36227	44272
1.3 Mixed Income	64855	74334	80617	95010	104086	115019	124971	141323	171471	194223
2. Net Domestic Product:Organised Sector	37477	45741	53442	62314	71406	79856	92045	104332	122838	143232
2.1 Comp. of employees	28063	32360	37495	43810	50990	56704	65709	76114	86611	98960
2.2 Operating surplus	9414	13381	15947	18504	20416	23152	26336	28218	36227	44272
2(A) Public Sector	20472	25436	31315	36976	42119	49013	58154	67571	80550	93380
2(A).1 Comp. of employees	18811	21626	25400	29726	34436	40090	45925	54493	62857	72810
2(A).2 Operating surplus	1661	3810	5915	7250	7682	8923	12229	13078	17693	20570
2(B) Private Organised Sector	17006	20305	22127	25338	29288	30843	33891	36761	42288	49852
2(B).1 Comp. of employees	9252	10734	12095	14084	16554	16614	19784	21621	23754	26150
2(B).2 Operating surplus	7753	9571	10032	11254	12734	14229	14107	15140	18534	23702
3. Net Domestic Product: Unorganised Sector	83307	95332	103590	121903	134890	149277	162701	184279	222317	253335
3.1 Comp. of employees	18452	20998	22973	26892	30804	34258	37729	42955	50847	59112
3.2 Mixed Income	64855	74334	80617	95010	104086	115019	124971	141323	171471	194223

	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
1. Net Domestic Product:Total	463954	532197	609389	711268	831417	972163	1132320	1258185	1453881	1605104
1.1 Comp. of employees	184554	209614	238565	258786	304187	366716	415307	479062	552596	622569
1.2 Operating surplus	51480	60766	68857	103289	131871	161368	188048	201189	230847	255853
1.3 Mixed Income	227921	261817	301967	349192	395358	444079	528965	577934	670438	726682
2. Net Domestic Product:Organised Sector	166108	191433	217404	257831	305840	378242	430243	482474	563696	634767
2.1 Comp. of employees	114628	130667	148548	154541	173968	216874	242195	281285	332848	378914
2.2 Operating surplus	51480	60766	68857	103289	131871	161368	188048	201189	230847	255853
2(A) Public Sector	105835	125983	143386	164453	191718	226628	245414	292533	337584	383305
2(A).1 Comp. of employees	81619	93084	106496	117223	132955	160340	181176	215672	261180	296636
2(A).2 Operating surplus	24217	32899	36890	47230	58763	66289	64238	76861	76404	86669
2(B) Private Organised Sector	60273	65450	74018	93378	114122	151613	184829	189941	226112	251462
2(B).1 Comp. of employees	33010	37583	42052	37318	41014	56534	61019	65613	71669	82278
2(B).2 Operating surplus	27263	27867	31967	56060	73109	95079	123810	124328	154443	169184
3. Net Domestic Product: Unorganised Sector	297846	340764	391984	453437	525577	593922	702076	775711	890185	970337
3.1 Comp. of employees	69925	78948	90018	104245	130219	149842	173112	197777	219747	243655
3.2 Mixed Income	227921	261817	301967	349192	395358	444079	528965	577934	670438	726682

Fig 17

The trends of organized and unorganized sector NDP is shown in the following figure



Source: National Accounts Statistics 2008: The central statistical organization Department of Statistics. Factor incomes base year 1999-2000

Fig 18

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	11.14359	0.018557	600.504	3.57E-40	11.10461	11.18258	11.10461	11.18258
X Variable 1	0.133248	0.001549	86.01572	5.42E-25	0.129994	0.136503	0.129994	0.136503

By estimating the above equation for the unorganized sector we get the following results. The positive and statistically significant coefficients of regression reflect a definite and significant increase in unorganized sector with the passage of time. From the above estimate we see that the growth rate of unorganized sector is given by estimated 'b'.

The contribution of organized and unorganized sector's NDP can be described by percentage share in total NDP and presented in the following figure. It is evident that unorganized sector has the maximum share.

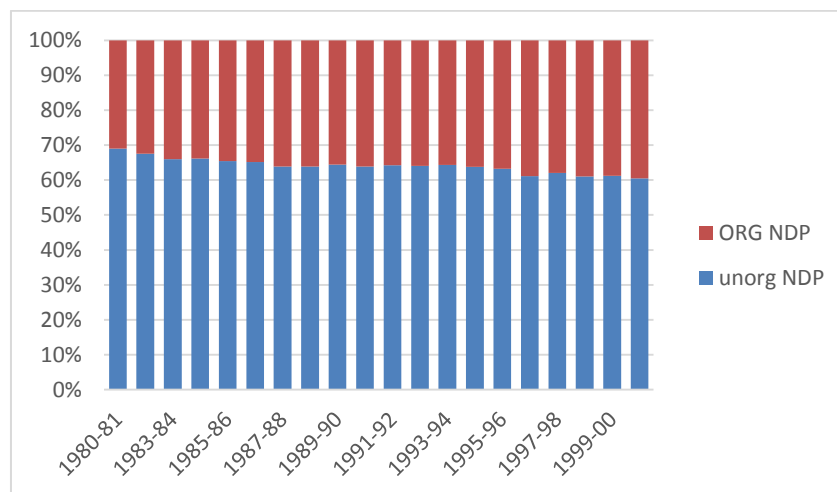


Fig 19

Hence we conclude by saying that growth unorganized sector overall has an increasing trend at an aggregate level post liberalization which is also in tandem with the theoretical finding of our paper which stresses on the ‘informalization ‘ of the economy.

SECTION 7: CONCLUSION

Lastly, we would like to say that although our prime motive is to investigate the intrinsic underlying currents triggering jobless growth, we have made significant references to stark increases in wage inequality in our structurally changed economy. This is so because jobless growth and income inequality always go in tandem and their mutual association invalidates the idea of treating them as independent identities.

The problem of wage gap and inequality assumes significance since the wages of the skilled labourers increase while the unskilled labourers are forced to work in the informal sector at a subsistence wage. Hence, we conclude that the idea of a segmented labour market is extremely relevant, and we bring this aspect into the standard model of trade to explain jobless growth and the rise of the informal sector. Hence our paper throws light on the impact of trade and liberalization on organized sector employment. Though this analysis does not address how trade affects the informal sector which provides a significant proportion of the total employment in developing countries, it helps to analyze how trade might displace labour from the organized sector and push them into the insecure informal markets. The model theoretic framework presented in our paper confirms that tariff liberalization and inflow of voluminous amounts of foreign capital in the form of FDI sets the stage for an upward drift to wage inequality which ultimately culminates in the form of accelerating joblessness, and this has proven to be true especially in developing countries like India characterized by high growth rates under the penumbra of acute inequality and obnoxious poverty. Thus, we can say that This increased access to world markets does not manifest into overall economic growth when one takes income inequality into consideration. Increased trade liberalization may reduce overall inequality but drastically increases inequality within the middle class. All these effects have been shown to be significant in our Statistical Analysis in the following sections. Our paper has provided estimates for employment elasticity in India in the aggregate level as well as for broad sectors through different approaches. We can further compute employment elasticities at greater disaggregation- state wise and sector wise estimates which could be a further extension of the paper.

References:

- 1) Acharya Rajat, Marjit Sugata: Globalization and Inequality: An analytical perspective;
- 2) Chancel Lucas, Piketty Thomas: Indian Income Inequality, 1922-2015, From British raj to billionaire Raj? Online Publication: 5th September,2017.
- 3) “Home - ILOSTAT - The Leading Source of Labour Statistics.” *ILOSTAT*, <https://ilostat.ilo.org/>. Accessed 7 August 2019.
- 4) Jobless growth in India: An investigation: <https://www.researchgate.net/publication/277972471>

- 5) MARJIT SUGATA, ACHARYYA RAJAT: Trade liberalization_Skilled-Linked intermediate and two-sided wage gap
- 6) Papola T.S, IJSD, Working Paper No.2013/01: Institute for Services in the Industrial Development
- 7) The Indian Experience; ECONOMIC GROWTH AND EMPLOYMENT LINKAGES
- 8) Azam Mehtabul and Vipul Bhatt Spatial Income Inequality in India (1993-2011) :A District Level Decomposition.

APPENDIX:

(1)

	TOTAL GDP(AT CONSTANT PRICES 2004-05)in Rs crore	EMPLOYMENT ACROSS VARIOUS SECTORS(in thousands)				
FINANCIAL YEAR	TOTAL GDP(AT CONSTANT PRICES)	AGRI	MINING AND QUARRYING	(MANUFACTURING)	SERVICE SECTOR	CONSTRUCTION
2001-02	24,72,052	483	861	1,350	8,432	56
2002-03	25,70,690	506	847	1,260	8,421	44
2003-04	27,77,813	490	1,030	1,190	8,250	50
2004-05	29,71,464	500	1,010	1,130	8,450	50
2005-06	32,53,073	470	1,150	1,090	8,810	50
2006-07	35,64,364	470	1,140	1,090	9,270	70
2007-08	38,96,636	470	1,120	1,040	9,840	70
2008-09	41,58,676	480	1,110	1,060	10,380	80
2009-10	45,16,071	480	1,100	1,070	10,850	90
2010-11	49,37,006	480	1,090	1,020	11,450	100

(2)

FINANCIAL YEARS	LN(GDP)	LN(AGRI)	LN(MINING AND QUARRYING)	LN(MANUFACTURING)	LN(SERVICES)	LN(CONSTRUCTION)
2001-02	14.72055912	6.180016654	6.758094504	7.207859871	9.039789271	4.025351691
2002-03	14.75968484	6.226536669	6.741700695	7.138867	9.038483865	3.784189634
2003-04	14.83717452	6.194405391	6.937314081	7.081708586	9.017968479	3.912023005
2004-05	14.90456532	6.214608098	6.91770561	7.029972912	9.04192172	3.912023005
2005-06	14.99511064	6.152732695	7.047517221	6.993932975	9.083642719	3.912023005
2006-07	15.08649615	6.152732695	7.038783541	6.993932975	9.134538659	4.248495242
2007-08	15.17562428	6.152732695	7.021083964	6.946975992	9.19421099	4.248495242
2008-09	15.2407073	6.173786104	7.012115294	6.966024187	9.247636157	4.382026635
2009-10	15.32315293	6.173786104	7.003065459	6.975413927	9.291920359	4.49980967
2010-11	15.41226963	6.173786104	6.993932975	6.927557906	9.345745009	4.605170186
	LOG LOG COEFF:	-0.05	0.345288775	-0.336317605	0.47783051	1.08

(3)

FINANCIAL YEAR	AGRICULTURE	MANUFACTURING	MINING AND QUARRYING	UTILITIES	CONSTRUCTION	TRADE	FINANCE AND REAL ESTATE	OTHER SERVICES
1999-2000 to 2004-05	1.09	0.8	0.87	0.67	0.88	0.45	1.4	0.46
2004-05 to 2009-10	-0.39	-0.27	0.2	-0.27	1.63	-0.02	0.34	-0.11
2009-10 to 2011-12	-0.44	1.74	-1.76	7.6	-0.25	0.54	-2.32	2.96
2004-05 to 2011-12	-0.41	0.1	-0.14	1.42	1.12	0.13	-0.45	0.48
1999-00 to 2011-12	-0.08	0.33	0.34	1.17	1.01	0.25	0.06	0.47

(4)

SUMMARY OUTPUT		TOTAL ELASTICITY		0.1986572							
Regression Statistics											
Multiple R	0.859515006										
R Square	0.738766046										
Adjusted R Square	0.706111802										
Standard Error	0.017278313										
Observations	10										
ANOVA											
	<i>df</i>		<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>					
Regression	1		0.006754138	0.006754138	22.62389051	0.001433					
Residual	8		0.002388321	0.00029854							
Total	9		0.009142459								
	<i>Coefficients</i>		<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	8.508381994		0.360056033	23.63071639	1.09436E-08	7.678091	9.338673	7.678091	9.338673	9.731158244	
log (GDP)	0.198657246		0.023928334	4.756457769	0.001433307	0.058635	0.168993	0.058635	0.168993	0.167928749	

(5)

SUMMARY OUTPUT		CONSTRUCTION									
Regression Statistics											
Multiple R	0.923134488										
R Square	0.852177283										
Adjusted R Square	0.833699443										
Standard Error	0.115499377										
Observations	10										
ANOVA											
	<i>df</i>		<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>					
Regression	1		0.615230756	0.615230756	46.11888068	0.000139082					
Residual	8		0.106720848	0.013340106							
Total	9		0.721951604								
	<i>Coefficients</i>		<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>		
Intercept	-12.19026458		2.406846537	-5.064828353	0.000971215	-17.74046265	-6.640066516	-17.74046265	-6.640066516		
LN(GDP)	1.086250897		0.159952403	6.791088328	0.000139082	0.717399994	1.4551018	0.717399994	1.4551018		

(6)

SUMMARY OUTPUT		AGRICULTURE									
Regression Statistics											
Multiple R	0.525698										
R Square	0.276358										
Adjusted R	0.185903										
Standard Error	0.023131										
Observations	10										
ANOVA											
	<i>df</i>		<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>					
Regression	1		0.001635	0.001635	3.055195	0.118609					
Residual	8		0.00428	0.000535							
Total	9		0.005915								
	<i>Coefficients</i>		<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>		
Intercept	7.010234		0.475321	14.74841	4.39E-07	5.914141	8.106326	5.914141	8.106326		
LN(GDP)	-0.05494		0.031431	-1.74791	0.118609	-0.12742	0.017542	-0.12742	0.017542		

(7)

SUMMARY OUTPUT								
				MINING				
<i>Regression Statistics</i>								
Multiple R	0.764921							
R Square	0.585105							
Adjusted R	0.533243							
Standard Error	0.076345							
Observations	10							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	0.065758	0.065758	11.28197	0.009949			
Residual	8	0.046629	0.005829					
Total	9	0.112387						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	1.678211	1.568847	1.06971	0.31596	-1.93956	5.295979	-1.93956	5.295979
LN(GDP)	0.348457	0.103742	3.358864	0.009949	0.109226	0.587687	0.109226	0.587687

(8)

SUMMARY OUTPUT								
				MANUFACTURE				
<i>Regression Statistics</i>								
Multiple R	0.914181							
R Square	0.835727							
Adjusted R	0.815193							
Standard Error	0.038738							
Observations	10							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	1	0.061074	0.061074	40.69937	0.000214			
Residual	8	0.012005	0.001501					
Total	9	0.073079						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	12.10401	0.796035	15.20537	3.47E-07	10.26835	13.93967	10.26835	13.93967
LN(GDP)	-0.33582	0.052639	-6.37961	0.000214	-0.4572	-0.21443	-0.4572	-0.21443

(9)

SUMMARY OUTPUT		SERVICES							
<i>Regression Statistics</i>									
Multiple R		0.966113684							
R Square		0.933375651							
Adjusted R Square		0.925047607							
Standard Error		0.032633082							
Observations		10							
ANOVA									
		<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression		1	0.119352	0.119351986	112.0762193	5.54E-06			
Residual		8	0.008519	0.001064918					
Total		9	0.127871						
		<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept		3.171783373	0.564185	5.621887726	0.000497402	1.870771	4.472796	1.870771	4.472796
X Variable 1		0.41379438	0.039087	10.58660566	0.567849647	0.323661	0.503928	0.323661	0.503928

APPENDIX

Calculation of Theil's Index within middle class

Year	Lower middle class	Middle class	Upper middle class	μ
1980	12945.35526	24089.74561	47354.2653	28129.79
1981	12900.12568	24398.31002	47856.1303	28384.86
1982	13145.00155	24732.6126	48002.3265	28626.65
1983	13589.5641	24689.14563	48175.00126	28817.9
1984	13689.58423	24578.54615	48563.2585	28943.8
1985	13847.12335	24716.64643	48915.3256	29159.7
1986	14198.56463	24978.6463	49632.1452	29603.12
1987	14125.6465	25198.64946	49810.2356	29711.51
1988	14032.54631	25314.6498	49796.1254	29714.44
1989	13965.4523	25631.3265	49732.15687	29776.31
1990	14112.46313	25812.6562	49968.1266	29964.42
1991	14009.3155	25964.21565	50213.65632	30062.4
1992	14102.32655	26589.35158	50421.46324	30371.05
1993	14099.652	28569.32584	52352.8793	31673.95
1994	14087.165	30950.5842	58993.48313	34677.08
1995	13921.1654	32645.25212	58213.49623	34926.64
1996	13905.3545	31320.3586	54469.98463	33231.9
1997	13954.1556	34689.35105	55264.57632	34636.03
1998	13895.5851	35651.35971	58789.64623	36112.2
1999	12997.2822	38698.6511	60494.64631	37396.86
2000	12564.5851	41254.36582	66412.97862	40077.31
2001	11983.267	40352.21544	70123.46233	40819.65
2002	11698.65496	43489.2541	77542.64632	44243.52
2003	11569.1542	44987.35712	80001.65632	45519.39
2004	11567.65633	48596.35712	79856.65463	46673.56
2005	11598.6533	50268.68422	79996.54631	47287.96
2006	11523.54121	52469.2842	80215.97632	48069.6
2007	11548.4596	55369.51214	80012.3532	48976.77
2008	11496.1648	60796.3511	84484.56463	52259.03
2009	11458.2154	64655.697	91234.76313	55782.89

Year	Lower middle class	Middle class	Upper middle class	μ
2010	11501.2365	68924.26842	99657.65613	60027.72
2011	11495.3264	80682.2597	110654.5465	67610.71
2012	11462.3254	81654.25415	-265639.5744	34360.43
2013	11402.3265	81256.316	-265791.9826	34208.02
2014	11395.12596	82142.56322	-265500.2488	34499.75
2015	11371.359	85632.65462	179483.5463	92162.52
2016	11375.1235	85998.65316	214532.3217	103968.7
2017	11356.3569	87612.6659	286431.2453	128466.8

Lower middle		Middle		Upper middle		
xi/μ	$\ln(xi/\mu)$	xi/μ	$\ln(xi/\mu)$	xi/μ	$\ln(xi/\mu)$	Ti
0.460200942	-0.77609206	0.856378476	-0.15504	1.683421	0.520828	0.128946
0.454472131	-0.78861869	0.859553791	-0.15134	1.685974	0.522343	0.130722
0.459187609	-0.77829642	0.863971694	-0.14622	1.676841	0.516911	0.127689
0.471566713	-0.7516947	0.856729411	-0.15463	1.671704	0.513843	0.124014
0.472971275	-0.74872062	0.849181838	-0.16348	1.677847	0.517511	0.125119
0.474871966	-0.74471006	0.847630385	-0.16531	1.677498	0.517303	0.12467
0.479630703	-0.73473884	0.843784283	-0.16986	1.676585	0.516759	0.123554
0.475426737	-0.74354248	0.848110682	-0.16474	1.676463	0.516686	0.124328
0.472246695	-0.75025377	0.851930892	-0.16025	1.675822	0.516304	0.124802
0.469012158	-0.75712659	0.860795877	-0.1499	1.670192	0.512939	0.124191
0.470974087	-0.7529522	0.86144368	-0.14915	1.667582	0.511375	0.123219
0.466007952	-0.76355258	0.863677526	-0.14656	1.670315	0.513012	0.124831
0.464334552	-0.76714997	0.875483531	-0.13298	1.660182	0.506927	0.122985
0.445149751	-0.80934454	0.901981713	-0.10316	1.652869	0.502512	0.125753
0.406238531	-0.90081478	0.892537275	-0.11369	1.701224	0.531348	0.145509
0.398583037	-0.91983943	0.934680635	-0.06755	1.666736	0.510867	0.14057
0.418433939	-0.87123625	0.942478742	-0.05924	1.639087	0.49414	0.12985
0.402879791	-0.90911705	1.001539535	0.001538	1.595581	0.467238	0.12693
0.384789247	-0.9550595	0.987238735	-0.01284	1.627972	0.487335	0.137731
0.347550095	-1.05684647	1.034810175	0.034218	1.61764	0.480968	0.148712

Lower middle		Middle		Upper middle		
xi/μ	$\ln(xi/\mu)$	xi/μ	$\ln(xi/\mu)$	xi/μ	$\ln(xi/\mu)$	Ti
0.313508695	-1.15992818	1.029369635	0.028947	1.657122	0.505082	0.167711
0.29356615	-1.22565228	0.988548828	-0.01152	1.717885	0.541094	0.186114
0.264415114	-1.33023501	0.982951981	-0.0172	1.752633	0.561119	0.204933
0.254158819	-1.36979594	0.988311968	-0.01176	1.757529	0.563909	0.21044
0.247841761	-1.3949648	1.041196799	0.040371	1.710961	0.537055	0.205062
0.245277085	-1.40536675	1.063033442	0.061127	1.691689	0.525728	0.203214
0.239726169	-1.42825797	1.09152736	0.087578	1.668746	0.512073	0.202574
0.235794611	-1.44479415	1.13052589	0.122683	1.633679	0.490835	0.199963
0.219984288	-1.51419915	1.163365542	0.151317	1.61665	0.480356	0.206502
0.205407339	-1.58276025	1.159059612	0.147609	1.635533	0.491969	0.216869
0.191598755	-1.65235191	1.148207329	0.138202	1.660194	0.506934	0.227902
0.170022268	-1.77182586	1.193335474	0.176752	1.636642	0.492647	0.238654
0.333590903	-1.09783988	2.376404039	0.865588	0.290005	-1.23786	0.128946
0.33332322	-1.09864263	2.375358827	0.865149	0.291318	-1.23334	0.128946
0.330295888	-1.10776639	2.380961034	0.867504	0.288743	-1.24222	0.128946
0.123383768	-2.09245571	0.929148364	-0.07349	1.947468	0.66653	0.323863
0.109409116	-2.21266107	0.827159074	-0.18976	2.063432	0.724371	0.365215
0.088399188	-2.4258925	0.681987065	-0.38274	2.229614	0.801828	0.460065