

The Working Conditions in India: Do amendments to the Factory Act successfully impact factory injuries and deaths?

Victoria Violet Evans,
BSc Economics 2022
School of Economics, The University of Kent

Abstract

In the last decade, significant changes to the regulation of labour have been implemented across states in India but the question still remains “Do amendments to the Factories Act successfully impact factory injuries and deaths?” In this paper, an investigation is conducted based on reported factory injuries and deaths and an index, created by using amendments to the Factory Act between 2003 to 2020. The ideas behind the investigation are tested using panel data. The results show pro- worker safety amendments cause a rise in the factory injuries and deaths, meaning that the act is in fact worsening the working conditions in India. This is a common controversy in economics, policies do often have the opposite effect to what they were set out to achieve. The importance of this investigation is repeatedly shown throughout the paper and with this being the first paper of its kind, it is evermore a vital piece of research. This paper provides crucial knowledge for the continuation of development in India.

Acknowledgements

I would firstly like to thank my supervisor Irma Clots-Figueras for providing me with guidance throughout the entirety of my dissertation and Amirapu, my lecturer for Development Economics. I would also like to thank my family: my parents and grandparents, my siblings and my boyfriend. These people have been my support throughout my university degree. Particularly during my dissertation, when I faced challenges they encouraged me and gave me the motivation to complete the paper to the best of my ability. Lastly, I would like to thank my Yiaya. Her final wish was to watch me and Alex graduate from University, she will not be watching me in the Cathedral but I do know she will be watching from above on graduation day.

1: Introduction

A growing concern in development economics is the working conditions in developing countries. These tend to be lower in such countries because of poverty, corruption, inequality and many other factors. It is crucial to investigate the reason behind the bad working conditions and whether adequate measures are being implemented to conquer them because, in the long run a poor working environment will be detrimental to a country's development.

A prime example of a country with poor working conditions is India. India is the second most populated country in the world holding a sixth of the world's population, with this large population it is inevitable that there will be some existence of inequality. (Demographics of India - Wikipedia, 2022). This is one of the reasons associated with the bad working conditions in India, particularly the difference between the rich and the poor and also between males and females. To this day, a cultural stigma remains which drives a hierarchy among the population, whereby individuals are treated differently because of their job and their gender. At a first glance at the structure of the economy in India, it can be seen that the top 10% of the population hold 77% of the total national wealth. (India: extreme inequality in numbers | Oxfam International, 2022). This demonstrates the extreme difference in wealth between the richest citizens in India (owners of large firms) and their employees. This difference instigates opposing objectives as employers aim to maximise profits to earn a higher salary whereas employees would prefer to have profits invested into improvements in safety measures and modernised machinery which incorporate health and safety advancements. For this reason, my dissertation will focus on India as the developing country and the working conditions taking place there.

The severity of how good or bad the working conditions are across different states in India will be distinguished using data on factory injuries and deaths. For example, a large number of factory injuries would suggest the working conditions are bad in this state and also a large influx in factory injuries would suggest an ineffective policy change.

This measure has been chosen because the manufacturing sector has become one of the fastest growing sectors in India and therefore a large proportion of the population find themselves working within a factory, therefore this measure will be representative of working conditions in India. The manufacturing sector continues to expand and in the years 2015 and 2016, there was a significant increase of 40% for the number of factory workers (Chandrasekhar and Ghosh, 2018). This means that as time goes on, an increased number of workers are exposed to the risks associated with working in a factory. This highlights the importance of this research happening now in order to prevent more workers from being exposed to the opportunity of having an accident as a result of a lack of health and safety.

Improvements to working conditions not only benefit the workers themselves but also are advantageous to the whole population. By improving the working conditions through measuring and reducing the number of factory injuries and deaths, India can progress in specialising in the manufacturing sector and developing their country as a whole. This is the reason factory injuries and deaths will be used as the measure for working conditions.

The government and individual states in India do already have policies in place to resolve the poor working conditions in factories. To measure whether these policies are in fact an effective solution to the problem is the key focus of this research. To truly analyse this, a regulatory measure will be established deeper in this paper, this will create an understanding of whether the objective of a state is achieved through a policy or instead it has the reverse effect. The main policy established in India to focus on working conditions is the Factory Act of 1948. This Act was formed to consolidate and amend the original law regulating labour in factories. It contains provisions for health and safety, working hours, leave and the welfare of workers including protocols and restrictions such as eight-hour shifts, the abolition of child labour, restriction on nightwork of women and the introduction of overtime pay. (2022) This Act will be used to form the regulatory measure.

The Factory Act was first implemented in 1881, in the first published version of the act it was mainly focused on prohibiting the employment of children under the age of five. Throughout time, a more accurate view of how staff should be treated and the standards of human wellbeing has developed. In turn, this act has been amended to incorporate advancements which adhere to these changes. As a result, the Factories Act of 1948 came into force on April 1, 1949. Since this critical amendment in 1948, many more amendments have been made to address current issues in factories.

This paper will introduce a regulatory measure using the amendments to The Factory Act between the years of 2003 to 2020 because this will produce a conclusion which can be used to provide insightful proposals and conclusions to benefit the development of India at this present time.

This is the only paper directly answering this research question, making these findings extremely valuable. There is concerns of whether the tool of amending the Factories Act is successfully influencing factory injuries and deaths in the desired way because if not then alternative solutions need to be constructed. This makes the research of interest to the individual states and the government because effective policies will lead to developments in their economy. Moreover, it is useful for other developing countries such as China who are in a similar development stage to India and also experience similar obstacles like inequality. That is not to say this paper is not relevant to developed countries, these findings will also demonstrate whether policies are successful in achieving the outcome desired.

The remainder of this paper is organised as follows. The next section (section two) is the literature review whereby related papers are discussed to provide guidance. Then, the methodology (section three) will exam how data has been collected for factory injuries and deaths cross different states in India, trace the amendments of the Factory Act for the last 20 years, detail how this regulatory change is captured and set out theoretical predictions of the regulatory changes on factory injuries and deaths. Section four is the results, this will discuss the empirical analysis of the effect of the amendments on the factory accidents. Section five will provide an evaluation of the results found. The last section will conclude the findings.

2: Literature review

The literature review will outline relevant papers carried out around the topic of working conditions in India, in particular those papers shedding light on factory injuries and deaths as

well as The Factories Act 1948. Currently, there is no other literature analysing this specific research question of whether amendments to The Factories Act 1948 have successfully influenced factory injuries and deaths of males and females. This is the primary reason why this research is of great importance and will be vital in the development of India.

Therefore, these papers analysed below are not the same as my research question but instead are used to aid the research, provide guidance throughout the investigation and to give ideas of relevant steps in my analysis. The literature relates to the different factors that make up the research question such as focusing on an act introduced in India or papers declaring the vast amount of factory injuries and deaths in India.

The driving force behind this study is to eliminate the poor working conditions in India and therefore one of the first useful readings was describing the working conditions in football manufacturing in China, India and Pakistan. (Lund-Thomsen et al., 2012) This paper gave the first initial insight into why many developing countries are used by large firms for the manufacturing process. Particularly in the football industry, India is used as a base for factories, stitching centres and home based settings. Large firms use India because their international labour standards and codes of conduct are lenient and the cost of land is affordable. This motive demonstrates that firms aim to produce a product at the lowest cost and not prioritise the welfare of employees. This study outlines that workers in the manufacturing of football products are amongst the “lowest paid and least skilled in their respective country”. The analysis uses detailed qualitative primary field research with football stitching workers and producers in three countries. The aim is to undertake a comparative investigation of the working conditions of football stitchers across the three countries. This is similar to the study conducted in this paper, comparing the working conditions of factory workers across the states in India. The results of the Lund- Thomsen paper discuss that the similarities and differences in working differences are due to industrial upgrading/downgrading, GVC governance, and different types of local production organisation. They find that codes of conduct that are designed to enforce labour standards do not improve the livelihoods of the workers or working conditions. This stimulates our study into identifying whether the amendments to the Factories act improve the working conditions in factories.

One way to capture the extend of the severity of working conditions in India is to analysis reports on factory injuries and deaths of males and females. This suggests that reading papers focusing on the rates of factory accidents would be a good place to start and solidify the foundations of why this research is important and necessary. To begin with, it is useful to understand the reasons behind the high number of factory accidents assumed to be experienced among the workers. The high risk of accidents taking place in the workplace in India due to a lack of health and safety is an important component in the poor working conditions in India. In the textile industry, work patterns vary in length and days of the week worked. (Nag and Patel, 1998). To examine the potential risks and accident patterns occurring amongst the monthly rotating shift workers and permanent nightshift workers in the city of Ahmedabad, India, a retrospective-cum prospective study took place in 11 different textile departments and was carried out on 3470 fatal and no fatal accidents. The detailed questionnaire survey on accidents entailed information such as: the organisation, the injured person, the date and time of accident, the nature and circumstances of injury, the working conditions. This study concluded that the work pattern experienced in the textile industry

does influence accidents. The causative factors highlighted were: human body struck by rotating/falling object, work overexertion, environmental stress, falls, time pressure etc, indicating the occurrence of accidents in the workplace is largely impacted by a lack of health and safety measures. The relevance of this study is that through organisations committing to higher standards of safety and joint optimisation of work time scheduling, it will coincide with a reduction in accidents. Likewise, by examining the impact of amendments to the Factories Act state-wise on the accidents within factories, it will indicate whether the changes reduce factory accidents.

Another contributing factor of this research question is the labour regulatory measure, in this case The Factory's Act 1948. Research has been carried out to identify the impact labour regulation has on economic performance, a topic that has been debated by many economists and is also relevant to this essay. Whether labour regulations have the desired effect they were set out to on an economy is of great importance to a country but also links to whether amendments in this regulatory measure will have the outcome predicted on the factory injuries and deaths of males and females in order to improve the poor working conditions among states. During the time period of 1958 to 1992 an investigation was conducted as a way of analysing the impact of the industrial relations climate in India on manufacturing growth. (Besley and Burgess, 2004) This paper uses data on state amendments to the Industrial Disputes Act of 1947 to measure labour regulation. This is similar to the research of this investigation whereby amendments to The Factory Act of 1948 is the regulatory measure and this signifies the severity of working conditions. Besley and Burgess then continue by reading the text of each amendment and ranking them either as pro worker (positive point awarded) , pro employer (negative point awarded) or neutral (no point awarded). These points awarded to each amendment of the Industrial Act are used to create an index which reflects who the legislation is benefiting. This is a step I later consider when deciding whether the amendment to The Factory Act were implemented as a means to improve worker safety or against worker safety. In addition, when using this regulatory measure in their econometric analysis based on panel data regressions, the regulatory measure is lagged one period to capture the gap between the enactment and implementation. This is another step that will be useful to incorporate into the investigation. The results of their investigation showed that amendments to the Industrial Act from a pro worker prospective would cause the state to suffer lower output, investment, employment and productivity. It was also found that these pro worker labour market regulations did not promote the interest of workers and that they have been a limitation on growth and poverty alleviation. These were unexpected consequences of the pro worker regulations and thus this new research presented in this dissertation is important to identify the effect of amendments to The Factory Act. The remaining concern in this paper by Besley and Burgess is endogeneity, there is still a concern that states which have experienced greater interest in manufacturing at the start of the period may have faced more pressure to amend the Industrial Disputes Act in a proworker direction, subsequently suffering with slower growth.

Although, further papers have been published which highlight the downfalls of the Burgess and Besley paper. These types of papers are key to read in order to take into consideration the improvements identified for new research. One paper that was found to be useful was the

Bhattacharjea article which criticised the above piece of work. (Bhattacharjea, A., 2021) The first problem Bhattacharjea identified from the Besley and Burgess paper was concerns over the index as it requires forming an index through a number of judgement calls. Even though this problem is present, it is a problem that is hard to overcome and the benefits of using an index are far greater than the problem associated with it. Therefore, this regulatory measure is still one considered for the research question in this dissertation. Secondly, another problematic aspect of the index is that it focuses only on the Industrial Disputes Act and thus does not consider other labour laws present at the time, these other laws can be impacting the state economy. Thirdly, a disapproval of the pro worker amendments analysed in the paper is that the 1980s was a period of weakening labour power and increased evasion of labour laws. This weakening labour power of unionised workers is shown by a fall in the wage share. Therefore, analysing the increased bargaining power of unionised workers at this time is implausible. This demonstrated the importance of researching other events happening during the time period of data collected for a study. Lastly, the Besley and Burgess paper has been highly condemned for omitted variable bias as many of the control variables have been suggested to have not been correctly controlled for. All of the above will be considered before conducting this study and valuable solutions will be provided to avoid, where possible, the same problems.

The literature discussed above has provided motivation and guidance for the research that will be carried out further in this paper. It clearly demonstrates the gap in the research for the question “Do amendments to the Factory Act of 1948 successfully affect the factory accidents and deaths” as a means of monitoring the working conditions in India. This new research can therefore be useful to further the development of India.

3: Methodology

The importance of improving the poor working conditions in India is critical to their development and therefore research into whether the state amendments to the Factory Act are successfully achieving their purpose is vital information. This next section outlines a description of the material and methods used to conduct this investigation.

Data Collection

The first stage of studying this research question is to find data. To begin with, searching for reports on the factory injuries and deaths in India for each state was a challenge. The number of reported factory accidents’ are not reported often and in cases where they are reported, these reports are often not released. This happens the majority of the time because of the corrupt systems. Employers often find it cheaper to pay a small compensation to the family and collude with the police and inspectors in order to eliminate the accident from any reports. Consequently, Indian firms chose not to invest in health and safety because this is a cheaper alternative rather than improving facilities to make the work environment safer. (Olazabal, 2019) The other reason is simply that each state and also the firms operating in the state, do not want others to recognise the poor working conditions their workers are exposed to and therefore would not report or release reports containing this information. After a thorough search, data of factory injuries and deaths state-wise for both males and females was found to be available on the National Crime Records

Bureau. (Accidental Deaths & Suicides in India (ADSI) | National Crime Records Bureau, 2022) This is the main data source used to investigate the accidental injuries and deaths in India 1953 to 2020 and is “collected by the State Crime Records Bureaux (SCRbX) from the District Crime Records Bureaux (DCRBx) and sent to NCRB at the end of the year under reference”. This is a reliable data set however, these results are still believed to be underreported. This study focuses on the reports during the time period of 2003 to 2020 because this recent time frame allows for a conclusion to be drawn which shall support future policy decisions.

The next step was to identify a law concentrating on rectifying the poor working conditions and thus should affect the factory injuries and deaths of the males and females. The main law which was put in place by the Indian government to combat poor working condition was The Factory Act in 1948, this is applied to the whole of India. It is set out to regulate labour in factories and essentially improve the working environment for workers. The act includes many factors which influence the working conditions in factories such as health, safety, working hours, leave and welfare of workers, the inspection staff, the provision of young people, women and children working in a factory. (Legal Mantra - Thinking Ahead. Legal Mantra, 2022) Since the implementation of this act, amendments have been made to move further towards a safe working environment, many states have made separate changes to the act in order to make alterations to correct problems specific to their state. This means that even though all 28 states in India had the same starting point to overcoming poor working conditions being the Factory Act 1948, they have diverged from one another over time through creating their own amendments relevant to what they deem important to change. In order to use this data successfully, a measurement of the purpose of the amendment needs to be created. Similar to the regulatory measure used in the Besley and Burgess paper ‘Can labour regulation hinder economic performance’, whereby they code each legislation based on their reading of all state level amendments to the Industrial Disputes Act of 1947, this study designs an index for amendments to The Factories Act. This study codes legislation based on our reading of all state amendments to the Factory Act of 1948. Each amendment is coded as being either pro worker safety or against worker safety. For the purposes of quantitative analysis, each decision in the amendment deemed as pro worker safety receives a code of positive one point, for each decision in the amendment that was against worker safety a code of minus one point was given and a zero for neutral decisions. This generates an index consisting of a code for each state amendment. As a result, states with a code consisting of a high positive number are deemed to have made multiple movements towards worker safety and states with a large negative code are viewed as having made multiple movements against worker safety. Even though this method requires personal judgement, there were found to be very few decisions of uncertainty regarding whether the amendment was pro worker safety or against worker safety.

Appendix table A contains a comprehensive list of all the amendments to the Factories Act between 2003-2020. For each amendment, the state, year and index code is given. Appendix table 2 provides a detailed description of each amendment to the Factory Act and a breakdown of how the index code was awarded.

Using both of these data sets, the reports of factory incidents and the index, a panel data set is created. This combines both of these data sets for all the states in India across the time period

of 2003 to 2020 in order to be able to analyse their relationship and eventually draw a conclusion.

The type of research

This is quantitative research because the process of analysing the research question is conducted with numerical data. In this study, the amendments were transferred into an index in order to convert the data into a numerical form. The quantitative research uses an experiment to test whether amendments to the Factories Act influence the factory injuries and deaths. This outlines the independent variable as the index and the dependant variable as the factory injuries and deaths. The research aims to examine whether there is a cause and effect relationship between these variables.

Method

My econometric analysis is based on panel data regressions of the form:

$$y_{st} = \alpha_s + \beta_t + \mu r_{st-1} + \varepsilon_{st}$$

Whereby y_{st} is the (logged) outcome variable in a state (s) at a time (t), r_{st-1} is the regulatory measure which is lagged by one period to capture the enactment and implementation in a state (s), α_s is the state fixed effect and β_t is a year fixed effect. The state fixed effect captures state- specific factors, for example the location of the state. The year fixed effect captures common shocks such as other central Indian laws and policies.

Using the panel data set, the data was imported into the Stata software to begin the analysis. This software program is ideal for manipulating a dataset to perform data analysis. Once this data had been imported into Stata, each state was assigned a number to make the analysis simpler. Then, to gain a basic understanding of the relationship between the index and the factory accidents and deaths a standard fixed effects regression was conducted. This showed that there is a relationship between the two variables. Next, we experimented with a dummy variable for the index in order to look at specific types of amendments (e.g. only pro-worker safety). However, this was not found to provide an effective or useful insight so was not included in the final regression. Building upon the standard regression, stata was used to generate logged variables for the factory injuries and deaths for both males and females and then a regression was run with these logged variables and the index. This demonstrated results which are easier to understand and therefore was a useful step towards analysing the relationship between the index and factory injuries and deaths. A dummy variable for the year was then incorporated into the regression because this allows the study to control for shocks such as the COVID pandemic, particularly helpful for the end of the time period focused on in this investigation. Lastly, the study recognised that the index needed to be lagged by one period to take into account the gap between the passing of the amendment to the Factory Act in a state, and the time of when the amendment was put into effect. This regression

incorporating logged factory accidents and deaths, a year dummy variable and lagged regulatory measure, proved to be the best fit in obtaining results in order to examine this research question.

In addition, the study compares the results of this regression with all the states in India and the 16 most populated states in India. This decision was made due to the considerable research found into the income inequality across the 28 Indian states. The high income states in India have more than three times the income of low income states. (Vanneman and Dubey, 2013). It has been show that there is a clear pattern, there is a high income in the northwest (Punjab, Haryana, Delhi, and Himachal Pradesh) and along the west coast (Gujarat, coastal Maharashtra, Goa and Kerala) as well as high incomes in the Northeast because of the high levels of education and government employment. In comparison, there are low income levels in central India (eastern Uttar Pradesh, Bihar, Orissa, and many parts of Madhya Pradesh). Through comparing the most populated states (urban area) to all the states (also including rural areas) the study aims to capture whether income inequality disturbs the relationship between the index and factory injuries and deaths.

Another factor researched was any gender inequality occurring in the time period of 2003 to 2020. In the past 50 years there has certainly been a change in the role of women in society, from being a stereotypical housewife to now being accepted into the workplace. However, even with the advancements of women in society, the population of India are behind the rest of the world with many individuals still complying with their traditional cultural norms. The root of the problem is that women are restricted from a young age from participating in school and thus cannot gain the skills needed to work in a factory. The enrolment of young girls in education is increasing, but the gap still remains as for every 100 boys enrolled in primary school there is only 10 girls. This inequality feeds into adulthood whereby in rural areas, the labour force participation rate of women is 15.20% and men is 56.60% in 2016. (Jaggi, Bahl and Suri, 2016).

In the most recent years, the largest of the manufacturing companies have worked towards increasing the number of women in factories through policies such as diversity and inclusive (DiveIN) initiative. This is an objective of Daimler India Commercial Vehicles who took onboard 46 females to begin their plans of hiring more women until they reach 20% of the factories workforce. (Anand, 2021) This type of movement from large factories is what will drive India to value women as part of their workforce. With women contributing more to the workforce in urban areas, the research should take this into consideration when analysing the results.

The workforce ratio of males to females is a good indicator for economic development and therefore it is important for my research to also establish if the index is affecting factory injuries and deaths of females as well as males. This difference between males and females will be analysed in next section.

4: Results

This section will outline the findings of the relationship between the index and the factory injuries and deaths during 2003 to 2020. A comparison between all the states and the 16 most populated states will also be laid out.

With regards to the result when all the states are under review, the fixed effects model in table 1 shows that logged male injuries and logged total injuries are statistically significant. It appears that a 1% increase in the index (a pro worker safety direction) increases the male injuries by $e^{1.615}$ and increases total injuries by $e^{1.592}$. This demonstrates that across all states in India, the amendments to the Factory Act have the inverse effect on male injuries and total injuries because a pro worker safety amendment increases male injuries and total injuries. This may be the case because the majority of the Indian workforce is made up of male workers and therefore they will males will experience more injuries overall.

In comparison, the fixed effects model in table 2 shows that for the results of the 16 most populated states, the logged female deaths are statistically significant. This means that a 1% increase in the index (a pro worker safety direction) will increase the female deaths by $e^{4.815}$. One reason that this result has been detected for the 16 most populated state in India is because the most populated states employ more women. This is because states such as Haryana, Goa, Odisha have allowed for women to work night shifts in factories. This amendment encourages more women to work in factories because it allows women to work between 7pm and 6am with additional safety measures. Consequently, as more women are employed in populated areas, the likelihood is that more women will die from accidents taking place in the factory.

The standard error is an indication of the reliability of the mean. Thus a small standard error symbolises that the sample mean is a more accurate reflection of the actual population mean. Figure 1 shows a standard error of 0.687 for logged injured males and 0.683 for logged total injuries. The margin of error (at 95% confidence) for the mean is (roughly) twice that value (+/- 1.374 and +/- 1,366 respectively), hence the true mean is most likely between 0.265 and 2.965, and 0.249 and 2.935 respectively . These standard errors are small and therefore show the sample mean is a more accurate reflection of the actual population Figure 2 also shows the standard error for logged female deaths is 2.028. The margin of error (at 95% confidence) for the mean is (roughly) twice that value (+/- 4.056), hence the true mean is most likely between 2.168 and 3.703.

It is crucial to stress the importance of finding this negative impact the amendments to the Factory Act have on the factory injuries and deaths. The fact that decisions made by states in a pro worker direction are causing an increase in the factory accidents and deaths of a particular group of individuals is a concern for the state governance. It suggests to states that they need to take alternative actions, it also indicates who these actions should target.

5: Discussion

This section will evaluate the way in which this investigation was conducted to answer the research question. It will distinguish whether the results are an accurate representation of the

working conditions across India and outline why these results are useful. Most importantly, this section will solidify the importance of obtaining the results to this research question.

This research has been conducted using methods discussed in section 3 (the methodology) and therefore has followed a robust structure and methodical steps to reach the relationships between the index and factory injuries and deaths discussed in section 4 (the results). Although, it is expected that academic research will have some limitations. It is important to recognise these errors for future research.

The strengths of this study

The comparison between all the states and the 16 most populated states is a good aspect of this study as the results become more accurate. This is because through reducing the number of states to the 16 most populated states, the states being analysed are more comparable. These states have similar populations and are more likely to have similar education and healthcare levels etc. As these states are similar it makes comparing their factory injuries and deaths more realistic and accurate. In addition, comparing the two different datasets for all states and the 16 most populated states is advantageous because, as discussed in the results section, the relationship between the index and factory injuries and deaths differs. This could be for reasons provided when discussing the results found or it may be a different cause. This is scope for further research into the cause of why the relationship differs between gender when comparing all states and the most populated states.

Secondly, by analysing all the amendments to the Factories Act from 2003 to 2020 for all states, this research is representative of the whole of India. This means that the results found can be applied to the country and therefore policy ideas are relevant to all states in India. In addition, this research is of value to all countries because it demonstrates that policies can have the opposite effect to that was wished for. For that reason, without this new research, India and other countries may be unaware that their efforts to reduce fatalities in factories and ultimately improve working conditions are ineffective. This means other actions need to be implemented that are more successful. As a result, the research is incredibly valuable for the state governance to improve their policy decisions.

Improvements for this study

For future research into this research question, an improvement that would gain a further insight into the trends occurring would be to conduct this method for a larger time period. This would allow for historical changes to the Factories Act to be captured in order to recognise the effect these amendments have had previously on the factory injuries and deaths. Looking at past events can help guide the states in what amendments are successful and those which are less effective. Consequently, this will avoid future mistakes in the implementation of amendments to the Factories Act. It would also be interesting to identify whether historical amendments created a distinct difference in the treatment of males and females. In many developing countries, particularly in India, gender inequality is present today and even more so in previous years.

Endogeneity

One remaining concern is that states who have/are experiencing corruption within their governance at the beginning of the period will not have the same interest in resolving the bad working conditions and therefore are more likely to pass amendments against worker safety. Consequently, states with corruption will experience a higher number of factory injuries and deaths. This is supported by theoretical arguments which suggest that corruption plays a key role in the under development of India. For example, in the paper ‘Labour Regulations and the Cost of Corruption: Evidence from the Indian Firm Size Distribution’ (Amirapu, A. and Gechter, M., 2020) the variable τ is used and is found to show a positive association with two measures of corruption. To develop this research, this variable can be used as a proxy for corruption or poor state governance.

Overall, it is clear to recognise that this research has made a considerable discovery into the working conditions in India and provided sufficient evidence to suggest to states they need to change their strategy.

6: Conclusion

This paper has examined the link between the amendments to the Factory Act and factory injuries and deaths between 2003 and 2020. The evidence discussed shows that regulation is a key factor in the development of working conditions in India. Regulations conducted in a pro worker safety direction were originally associated with reducing factory injuries and deaths. There were also thought to improve the working conditions among each state.

The results determine that this is not the case. Instead the amendments to the Factory Act in the pro worker safety direction have increased the factory injuries and deaths. This is the opposite effect than predicted at the beginning of this paper. It is apparent that the reasoning from state governance behind labour regulation was some of bad judgement and led to outcomes that contradict their original objectives.

This paper finds little evidence that the pro worker safety labour regulations have promoted the best interests of factory workers and concerningly, that they have been a constraint on factory injuries and deaths as well as overall working conditions.

The analysis solidifies that state regulation in India does not always promote worker welfare. The example used here of factory workers, demonstrates that amendments to the Factory Act cannot be used to reduce factory injuries and deaths. Future progress will likely focus on improving knowledge on why this relationship exists and alternative policies states have/can implement. After this additional knowledge, the correct action can be taken by states to overcome the important concern of working conditions and excel the development of India.

References

Amirapu, A. and Gechter, M., 2020. Labor Regulations and the Cost of Corruption:

Evidence from the Indian Firm Size Distribution. *The Review of Economics and*

Statistics, 102(1), pp.34-48.

Kent Economics Undergraduate Research Journal. Volume 1, 2022

Anand, S., 2021. Bringing more women to the factory floor in India.

Besley, T. and Burgess, R., 2004. Can Labor Regulation Hinder Economic Performance? Evidence from India. *The Quarterly Journal of Economics*, 119(1), pp.91-134.

Bhattacharjea, A., 2021. Labour Market Regulation and Industrial Performance in India--A Critical Review of the Empirical Evidence.

Chandrasekhar, C. and Ghosh, J., 2018. Factory workers in India.

Deskera Blog. 2022. Factories Act 1948 - An Overview. [online] Available at:

<<https://www.deskera.com/blog/factories-act-1948/>> [Accessed 29 April 2022].

En.wikipedia.org. 2022. Demographics of India - Wikipedia. [online] Available at:

<https://en.wikipedia.org/wiki/Demographics_of_India> [Accessed 24 April 2022].

India government website. 2022. [online] Available at:

<https://labour.gov.in/sites/default/files/Factories_Act_1948.pdf> [Accessed 21 April 2022].

Jaggi, S., Bahl, S. and Suri, S., 2016. Women Vs Men in Manufacturing Sector. *IRAJ International Journal of Management & Social Sciences* (ISSN 2455-2267), 3(2).

L&E Global Knowledge Centre. 2022. Working Conditions in India. [online] Available at: <<https://knowledge.leglobal.org/working-conditions-in-india/>> [Accessed 26 April 2022].

Legal Mantra. 2022. Legal Mantra - Thinking Ahead. Legal Mantra. [online] Available at: <<https://www.legalmantra.net/blogdetail/factoriesact#:~:text=The%20Factories%20Act%2C%201948%20is%20a%20beneficial%20legislation,hygiene%20and%20welfare%20at%20their%20places%20of%20work.>> [Accessed 13 March 2022].

Lund-Thomsen, P., Nadvi, K., Chan, A., Khara, N. and Xue, H., 2012. Labour in Global Value Chains: Work Conditions in Football Manufacturing in China, India and Pakistan. *Development and Change*, 43(6), pp.1211-1237.

Nag, P. and Patel, V., 1998. Work accidents among shiftworkers in industry.

International Journal of Industrial Ergonomics, 21(3-4), pp.275-281.

Ncrb.gov.in. 2022. Accidental Deaths & Suicides in India (ADSI) | National Crime Records Bureau. [online] Available at: <<https://ncrb.gov.in/en/accidental-deathssuicides-india-ads>> [Accessed 8 November 2021].

Olazabal, V., 2019. The silent death of workers in India. *Equal Times*, [online] Available at: <<https://www.equaltimes.org/the-silent-death-of-workersin?lang=en#.YmKwyoXMKUc>> [Accessed 22 April 2022].

Oxfam International. 2022. India: extreme inequality in numbers | Oxfam

International. [online] Available at: <<https://www.oxfam.org/en/india-extremeinequalitynumbers#:~:text=%20India%3A%20extreme%20inequality%20in%20numbers%20%201,on%20governments%20to%20invest%20more%20in...%20More%20>> [Accessed 29 April 2022].

Preetha, M., 2022. Factories Act, 1948 - History, Objective & Applicability. [online] Legal Bites - Law And Beyond. Available at: <<https://www.legalbites.in/factories-act-1948>> [Accessed 9 April 2022].

PRS Legislative Research. 2022. Relaxation of labour laws across states. [online] Available at: <<https://prsindia.org/theprsblog/relaxation-of-labour-laws-across-states>> [Accessed 11 May 2022].

VANNEMAN, R. and DUBEY, A., 2013. Horizontal and vertical inequalities in India.

Stanford (CA): Stanford University Press.

Appendix

APPENDIX TABLE A: REGULATORY CHANGE IN INDIA: 2003-2020

| State | Change Year | Amendments | Codes |
|----------------|--------------------|-----------------------------------------------|--------------|
| Andhra Pradesh | 2015 | The Factories (Andhra Pradesh Amendment) Bill | -1 |
| Haryana | 2018 | The Factories (Haryana Amendment) Bill | -1 |
| Goa | 2019 | The Factories (Goa Amendment) Bill | 3 |
| Andhra Pradesh | 2019 | The Factories (Andhra Pradesh Amendment) Bill | 0 |
| Assam | 2020 | The Factories (Assam Amendment) Ordinance | -1 |
| Odisha | 2020 | The Factories (Odisha Amendment) Ordinance | -1 |
| Gujarat | 2020 | The Factories (Gujarat Amendment) Ordinance | -1 |
| Punjab | 2020 | The Factories (Punjab Amendment) Ordinance | -3 |
| Bihar | 2020 | The Factories (Bihar Amendment) Ordinance | 0 |

| | | | |
|------------------|------|------------------------------------------------------|----|
| Goa | 2020 | The Factories (Goa Amendment) Ordinance | 0 |
| Himachal Pradesh | 2020 | The Factories (Himachal Pradesh Amendment) Ordinance | -1 |

APPENDIX 1 PROVIDES AN OUTLINE OF EACH AMENDMENT TO THE FACTORY ACT MADE DURING 2003 TO 2020 STATEWISE. THE SPECIFIC NAME OF THE AMENDMENT AND THE INDEX CODE BASED ON WHETHER CHANGES ARE PRO WORKER SAFETY OR AGAINST WORKER SAFETY.

APPENDIX 2: DESCRIPTIONS OF STATE AMENDMENTS TO THE FACTORY ACT: 2003-2020

| Amendment | Description |
|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2015: The Factories (Andhra Pradesh Amendment) Bill | <p>Under sub clauses (i) and (ii) of clause (m) of section 2 of the Factories Act,1948 the definition of a “factory” was altered.</p> <p>The original definition of a factory was a premise with ten or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with twenty or more workers as part of a manufacturing process without the aid of power.</p> <p>The amendment has redefined a factory to a was a premise with twenty or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with forty or more workers as part of a manufacturing process without the aid of power.</p> <p>The definition of a “factory” was changed by the state of Andhra Pradesh because before small units were classified as factories. The motivation behind this change was to encourage the creation of small manufacturing unit and hence increase employment. (-1)</p> |

| | |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>2018: The Factories (Haryana Amendment) Bill</p> | <p>Under sub clauses (i) and (ii) of clause (m) of section 2 of the Factories Act,1948 the definition of a “factory” was altered. The original definition of a factory was a premise with ten or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with twenty or more workers as part of a manufacturing process without the aid of power. The amendment has redefined a factory to a was a premise with twenty or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with forty or more workers as part of a manufacturing process without the aid of power. The state of Haryana made this amendment to relax constraints of small- scale industries such as labour laws, finance, skilled manpower technology etc. (-1) A decision to amend the clause (iv) of sub-section 3 of section 65 of the Factories Act, 1948. This addresses the overtime of workers, this amendment increases the allowed overtime of factory workers. This decision was made in the best interest of productivity as the motive was to allow factories to complete orders before target times. (-1) A change to amend the clause (b) of sub-section 1 of section 66 of the Factories Act, 1948 to allow employ women workers in the factories during night shift i.e. 7.00 P.M. to 6.00 A.M. This will abolish the restriction in Haryana for the employment of women as before they were forbidden from working a nightshift. This amendment was made in response to the “Right to Work” provided by the Constitution of India. (1)</p> |
| <p>2019: The Factories (Goa Amendment) Bill</p> | <p>This amendment by Goa to amend section 65 of the said Act, was made to empower the Chief Inspector to exempt, on such terms and conditions as specified in the rules, any or all of the adult male workers in any factory or group or class or descriptions of factories from the provisions of section 51, 52, 54 and 56 of the Act to deal with an exceptional press of work, and also to</p> |
| | <p>enhance the total hours of work per week from 60 to 72 and the total hours of overtime in any quarter from 75 to 125. (1) A change to amend the clause (b) of sub-section 1 of section 66 of the Factories Act, 1948 to allow employ women workers in the factories during night shift i.e. 7.00 P.M. to 6.00 A.M. This will abolish the restriction in Goa for the employment of women as before they were forbidden from working a nightshift. This amendment was made in response to the “Right to Work” provided by the Constitution of India. (1) The Bill also seeks to add an additional section 92A in the Factory Act, to enable compounding of certain offences before or after the institution of prosecution. The amendment also attempts to amend section 105 of the Act, to enable the Chief Inspector, to file complaint under the Act before the Court. The Act sets out to amend section 106 of the said Act, to enhance the time allowed for making complaint from three months to six months. (1)</p> |

| | |
|------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>2019: The Factories (Andhra Pradesh Amendment) Bill</p> | <p>The first element to the Factories (Andhra Pradesh Amendment) Bill 2018 is to enhance the limit of overtime hours from the present limit of fifty hours per quarter to fifty hours per month. (-1) The state no longer need to notify exempted factories(-1) The amendment aims to bring extreme pressure of work provision to maintain uniformity (1) To provide a level of safeguarding for night employment of women workers. (1)</p> |
| <p>2020: The Factories (Assam Amendment) Ordinance</p> | <p>In the principal Act, after section 5, the following new section 5A will mean the government can prohibit new entrants into the opening of factories in order to create more employment and economic activity. (0) Under sub clauses (i) and (ii) of clause (m) of section 2 of the Factories Act,1948 the definition of a “factory” was altered. The original definition of a factory was a premise with ten or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with twenty or more workers as part of a manufacturing process without the aid of power. The amendment has redefined a factory to a was a premise with twenty or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with forty or more workers as part of a manufacturing process without the aid of power. (-1)</p> |
| <p>2020: The Factories (Odisha Amendment) Ordinance</p> | <p>Under sub clauses (i) and (ii) of clause (m) of section 2 of the Factories Act,1948 the definition of a “factory” was altered. The original definition of a factory was a premise with ten or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with twenty or more workers as part of a manufacturing process without the aid of power. The amendment has redefined a factory to a was a premise with twenty or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with forty or more workers as part of a manufacturing process without the aid of power (-1) In the principal Act, after section 5, the following new section 5A will mean the government can prohibit new entrants into the opening of factories in order to create more employment and economic activity (0)</p> |

| | |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>The first element to the Factories (Andhra Pradesh Amendment) Bill 2018 is to enhance the limit of overtime hours from the present limit of fifty hours per quarter to fifty hours per month. (-1)</p> <p>A change to amend the clause (b) of sub-section 1 of section 66 of the Factories Act, 1948 to allow employ women workers in the factories during night shift i.e. 7.00 P.M. to 6.00 A.M. This will abolish the restriction in Goa for the employment of women as before they were forbidden from working a nightshift. This amendment was made in response to the “Right to Work” provided by the Constitution of India. (1)</p> <p>Annual leave (0)</p> <p>Higher threshold of workers to be considered a factory (-1)</p> <p>In the principal Act, after Section 92, the following section will be added: “Any person who fails to comply with an order made by the officer referred to in sub-section (1), shall be liable to pay a sum equivalent to twenty per cent of the maximum fine provided for the offence, in addition to such fine.” (1)</p> |
| <p>2020: The Factories (Gujarat Amendment) Ordinance</p> | <p>Under sub clauses (i) and (ii) of clause (m) of section 2 of the Factories Act,1948 the definition of a “factory” was altered.</p> <p>The original definition of a factory was a premise with ten or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with twenty or more workers as part of a manufacturing process without the aid of power.</p> <p>The amendment has redefined a factory to a was a premise with twenty or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with forty or more workers as part of a manufacturing process without the aid of power (-1)</p> |
| <p>2020: The Factories (Punjab Amendment) Ordinance</p> | <p>Under sub clauses (i) and (ii) of clause (m) of section 2 of the Factories Act,1948 the definition of a “factory” was altered.</p> <p>The original definition of a factory was a premise with ten or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with twenty or more workers as part of a manufacturing process without the aid of power.</p> <p>The amendment has redefined a factory to a was a premise with twenty or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with forty or more workers as part of a manufacturing process without the aid of power (-1)</p> <p>In the principal Act, in section 65, in sub-section (3), in clause (iv),working overtime is increased from seventy five to one hundred and fifteen consecutive days. (-1)</p> <p>Higher threshold of workers to be considered a factory (-1)</p> |
| <p>2020: The Factories (Bihar Amendment) Ordinance</p> | <p>Under sub clauses (i) and (ii) of clause (m) of section 2 of the Factories Act,1948 the definition of a “factory” was altered.</p> <p>The original definition of a factory was a premise with ten or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with twenty or more workers as part of a manufacturing process without the aid of power.</p> <p>The amendment has redefined a factory to a was a premise with twenty or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with forty or more workers as part of a manufacturing process without the aid of power (-1)</p> |

| | |
|------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <p>In the principal Act, after section 5, the following new section 5A will mean the government can prohibit new entrants into the opening of factories in order to create more employment and economic activity. (0)</p> <p>A higher threshold means more workers are employed by the owner rather than only working with permission from the owner. Owners having more responsibility will enable greater safety measures being met.(1)</p> |
| 2020: The Factories (Goa Amendment) Ordinance | <p>Under sub clauses (i) and (ii) of clause (m) of section 2 of the Factories Act,1948 the definition of a “factory” was altered.</p> <p>The original definition of a factory was a premise with ten or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with twenty or more workers as part of a manufacturing process without the aid of power.</p> <p>The amendment has redefined a factory to a was a premise with twenty or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with forty or more workers as part of a manufacturing process without the aid of power. (-1)</p> <p>In the principal Act, after section 5, the following new section 5A will mean the government can prohibit new entrants into the opening of factories in order to create more employment and economic activity. (0)</p> <p>A higher threshold means more workers are employed by the owner rather than only working with permission from the owner. Owners having more responsibility will enable greater safety measures being met.(1)</p> |
| 2020: The Factories (Himachal Pradesh Amendment) Ordinance | <p>Under sub clauses (i) and (ii) of clause (m) of section 2 of the Factories Act,1948 the definition of a “factory” was altered.</p> <p>The original definition of a factory was a premise with ten or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with twenty or more workers as part of a manufacturing process without the aid of power.</p> <p>The amendment has redefined a factory to a was a premise with twenty or more workers whereby the manufacturing process is carried out with the aid of power. Alternatively, a premise with forty or more workers as part of a manufacturing process without the aid of power. (-1)</p> <p>In the principal Act, in section 65, in sub-section (3), in clause (iv),working overtime is increased from seventy five to one hundred and fifteen consecutive days. (-1)</p> <p>Greater fines imposed for factories not abiding by this Act. (1)</p> |

THIS IS A TABLE OUTLINING THE AMENDMENTS MADE BY EACH STATE IN INDIA DURING THE TIME PERIOD 2003 TO

2020. THE NUMBERS IN PARENTHESES AND BOLD ARE THE INDEX CODE FOR EACH DECISION AND THESE MAKE UP THE INDEX CODE FOR EACH AMENDMENT. AN INDEX CODE OF 1 IS PRO WORKER SAFETY, AND INDEX CODE OF 0 IS NEUTRAL AND INDEX CODE OF -1 IS AGAINST WORKER SAFETY.

List of Figures

| Figure 1: Labour Regulation and Factory injuries and Deaths of all states in India: 2003-2020 | | | | | | | |
|-----------------------------------------------------------------------------------------------|-----------|-------------------|---------------------|--------------------|-----------------|-------------------|------------------|
| | Log cases | Log injured males | Log injured females | Log total injuries | Log male deaths | Log female deaths | Log total deaths |
| Labour regulation (t-1) | 0.277 | 1.615** | 0.0321 | 1.592*** | 0.179 | -0.00833 | 0.166 |
| | 0.436 | 0.687 | 0.475 | 0.683 | 0.398 | 0.497 | 0.416 |
| Observations | 493 | 493 | 493 | 493 | 493 | 493 | 493 |
| Number of state_ID | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| R-squared | 0.061 | 0.079 | 0.065 | 0.08 | 0.064 | 0.063 | 0.061 |
| F-Stat | 1.697 | 2.244 | 1.813 | 2.296 | 1.803 | 1.755 | 1.703 |
| Prob > F | 0.0403 | 0.00315 | 0.0242 | 0.00242 | 0.0253 | 0.0314 | 0.0392 |
| Degree of Freedom | 447 | 447 | 447 | 447 | 447 | 447 | 447 |

FIGURE 1 : SEE THE APPENDIX FOR THE FORMULATION OF THE INDEX. THE DATA IS FOR ALL THE STATES IN INDIA. STANDARD ERROR ARE IN PARENTHESIS. *** P<0.01, ** P<0.05, * P<0.1

| Figure 2: Labour Regulation and Factory injuries and Deaths for the 16 most populated states in India: 2003-2020 | | | | | | | |
|------------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------------------|--------------------|-----------------|-------------------|------------------|
| | Log cases | Log injured males | Log injured females | Log total injuries | Log male deaths | Log female deaths | Log total deaths |
| Labour regulation (t-1) | 0.767 | 2.821 | 0.329 | 2.4 | 0.746 | 4.815** | 0.881 |
| | 1.49 | 2.785 | 2.132 | 2.738 | 1.271 | 2.028 | 1.352 |
| Observations | 272 | 272 | 272 | 272 | 272 | 272 | 272 |
| Number of state_ID | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| R-squared | 0.086 | 0.185 | 0.125 | 0.187 | 0.061 | 0.129 | 0.068 |
| F-Stat | 1.33 | 3.202 | 2.016 | 3.234 | 0.907 | 2.083 | 1.029 |
| Prob > F | 0.174 | 0.0000348 | 0.0112 | 0.0000295 | 0.566 | 0.0083 | 0.427 |
| Degree of Freedom | 239 | 239 | 239 | 239 | 239 | 239 | 239 |

Figure 2: SEE THE APPENDIX FOR THE FORMULATION OF THE INDEX. THE DATA IS FOR THE 16 most populated STATES IN INDIA. STANDARD ERROR ARE IN PARENTHESIS. *** P<0.01, ** P<0.05, * P<0.1