Effect of Minimum Wages on Automation and Offshoring Decisions of Firms: Evidence from India[*]

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Abstract

This study explores the effects of rising minimum wages on Indian firms' automation and offshoring decisions, venturing into the less examined impact of minimum wage hikes on firms' capital investment and labor adjustments. By analyzing firm-level data against changes to ***industry-specific*** minimum wages, it unveils how firms realign their investments in machinery, computers, and labor strategies in response to higher labor costs. It reveals varied responses across industries: average industries not focused on routine or offshorable tasks boost continue their usual capital investments but replace payroll workers with managers and informal contract workers. Firms in routine-intensive sectors increase their investment in technology to cut down on payroll positions, while those in industries with offshorable tasks reduce computer investment and payroll employment, possibly shifting tasks like data analysis offshore. The paper proposes a task-based production model to predict firms' input adjustments and empirically tests these predictions, finding broad alignment. The paper deepens our understanding of how labor costs drive shifts in automation and offshoring and contributes to discussions on the structural transformation of developing economies.

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1 Introduction

Rising wages in an industry can lead firms to seek labor-saving alternatives to their existing modes of production. As a result, firms in that industry may innovate, invest in capital-intensive technologies, and/or offshore part of their production (Acemoglu (2010), Grossman and Rossi-Hansberg (2008), Hornbeck and Naidu (2014)). Doing so may expand firms' production capacity, and alter the importance of different industries in the share of aggregate output, thus affecting the structural transformation of nations (Acemoglu and Guerrieri (2008)). In this paper, I focus on Indian firms' decisions to automate and offshore their production in response to rising minimum wages.[1] Most research on minimum wages has focused on aggregate employment effects, and has produced mixed results.[2] However, the role of minimum wages as instruments of change to firms' input mix and production structure has received little attention.[3]

I fill this gap by building on the automation and offshoring literature to study how different firms adjust their capital investment and labor inputs following minimum wage increases in their respective industries and states. I use granular Indian firm-level data on machinery and computer investment, as well as employment data for workers and managers, and exploit frequent variation in local industry minimum wages to explore the following questions: (1) How do individual firms invest in different types of capital, and adjust their employment of workers and managers as the relative cost of frontline labor to capital increases? (2) How does this adjustment differ for firms in industries more intensive in routine and offshorable tasks?[4]

Using an array of Indian datasets and concordance tables between India and the U.S., I bring common measures of routineness and offshorability used in the literature to the Indian economy. In particular, I use the Routineness Intensity measure (RTI) introduced by Autor and Dorn (2013) and Autor et al. (2013) and the measure of offshorability proposed by Firpo et al. (2011) and Acemoglu and Autor (2011).[5] As a source of input cost shifter, I construct a comprehensive

[1]Offshoring occurs when firms move some operations to another country (e.g. when GM moves its car assembly lines to Mexico). This is different from outsourcing where firms contract another party for a specific function (e.g. when GM hires a firm to produce molds for certain car parts).

[2]For example see Neumark and Wascher (2007), Dube et al. (2010), Cengiz et al. (2019), and Neumark et al. (2014) for a review of research on developed countries, and Neumark et al. (2006), Bell (1997), as well as Betcherman (2015) and Menon and Rodgers (2017) for reviews of work on developing countries. Clemens (2021) provides an analytical framework to understand how firms may adjust non-wage compensation and hours to dampen the effect of the minimum wage. This may help explain small aggregate disemployment effects in the U.S. In support of this idea, Clemens et al. (2018) find a decline in employer-provided health insurance provisions, while Yu et al. (2021, 2023) find a decrease in hours per worker associated with a decrease in benefit eligibility, following minimum wage hikes in the U.S.

[3]A small body of research has investigated the role of minimum wages on productivity and profits. For example, Draca et al. (2011) and Bell and Machin (2018) find that minimum wage hikes in the UK lower firms' profits and the market value of low-wage firms, respectively. Ku (2022) and Hill (2018) find a conflicting effect on worker-level productivity, while Coviello et al. (2022) find that the effect on worker-level productivity depends on monitoring intensity.

[4]Routine tasks are usually repetitive, and are successfully accomplished by following a clear and known set of rules (Autor et al. (2003)). When this is the case, it is easier to design a machine or computer code to perform the task. Suppose that a task involves repetitively moving homogeneous pieces off of an assembly line and onto a conveyor belt. It is easy to design a machine to do this task since the pieces to be picked are homogeneous; they reach the end the assembly line at known intervals, and it is possible to define a clear set of motions that correctly move the pieces from point A to point B. Managers may be tasked with motivating workers to ensure that they remain productive. While this may be a repetitive task with a clear goal, there is no clear or unique way to perform this task. Thus, it is much harder to automate.

[5]A task is more offshorable if it is possible to do at least part of the task remotely while supplying the task's output at the place of production, at little or no cost. This measure captures the degree to which face-to-face interactions, and on-site presence, are necessary. For example, a firm

database of all formal industry-level minimum wages in the country from 2002 to 2008. India is particular in that the minimum wage changes at the state, year, and *industry* level, with the average industry experiencing a nominal increase in its minimum wage every year and a half.[6] This provides a wealth of plausibly exogenous variation in the cost of frontline employees. Moreover, the granularity of the variation allows me to control for industry- and district-specific shocks without soaking up much of the identifying variation.[7] By doing so, I account for other confounding policies and factors such as aggregate changes in labor or output demand, and changes in the cost of capital goods. The wealth of variation in the minimum wages, the fact that the minimum wage in an industry is binding for most firms in that industry (ILO (2018)), and that firms had not fully automated or offshored their production in the early 2000s (Mani (2019)), make India over this time period an ideal context to study how firms adjust to changes in relative input prices.[8] To quantify the effect of changes in the relative cost of labor inputs, I adopt a difference-in-difference approach and compare the adjustment in investment and employment of firms experiencing a minimum wage increase to that of firms that do not experience a hike, before and after the minimum wage increase.

I propose a task-based production model in order to get predictions on how firms adjust their inputs following changes in the cost of these inputs (in the spirit of Acemoglu and Zilibotti (2001), Acemoglu and Autor (2011), Goos et al. (2014), Acemoglu and Restrepo (2018)). In addition to capital, I include four types of frontline employees: regular workers, contractual workers, managers, and offshore workers.[9] In the model, firms combine tasks to produce an output, and tasks are produced by combining inputs using CES production functions. The elasticity of substitution between inputs within tasks depends on how routine and offshorable the tasks are. The model predicts the status quo or an increase in the demand for capital in India for firms intensive in neither routine nor offshorable tasks, and a clear increase in capital in routine-intensive firms following a minimum wage hike. The model predicts an increase in offshore labor and capital for firms intensive in offshorable tasks, and a fall in the demand in India for the group of workers affected the most by the minimum wage in all types of firms. These predictions are largely consistent with the results of the empirical analysis.

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producing bolts must ensure that the diameter of the bolts remain within a particular range. If too many bolts fall outside this range, the machines may need to be adjusted. One can imagine that analysts charged with determining whether too many bolts are faulty, can do their analysis remotely relatively easily. However, the workers placing the boxes of bolts onto a truck for shipping must be physically present to complete their task, making it harder to offshore.

[6] While not all industries have a statutory minimum wage, 40% of the entire non-agricultural workforce (100 million people) are entitled to receive minimum wages (India Briefing (2020), Majumdar (2008)). Using data from the National Sample Survey presented in the data section, I estimate that in 2008, 61 million people are working for wages in industries with a minimum wage and 42.1 million of them are paid $\leq$ 120% of the minimum wage in their industry. I.e., the minimum wage is likely to affect up to 42.1% of the workforce in formal firms or 17% of the entire non-agricultural workforce. Estimates from Cengiz et al. suggest that around 10% of the U.S. workforce is paid the statutory minimum wage prevailing in their respective state (15.7 million people in 2008).

[7] I include district-by-year and industry-by-year fixed effects in the regressions. Indian states are divided into districts. Districts are akin to counties in the U.S. Territories are not included in the analysis.

[8] India was not facing a recession during the study period.

[9] Regular or payroll workers are hired directly by the firm, appear on the muster roll, and receive employment benefits. Contractual workers also work in the same firms, but are hired externally, generally through contracting intermediaries. Most contract workers are lower skilled and less educated workers from socially disadvantaged groups. They are usually paid only for their days worked, and often work irregular schedules (ILO (2018)).

I find that firms invest in computers and machinery at the rates of 7.8% and 8.3% per year on average, respectively. Firms in the average industry, that is, firms in industries intensive in neither routine nor offshorable tasks, do not meaningfully change their investment patterns following a typical (real) minimum wage hike (approximately 2.5 rupees).[10] On the other hand, firms in routine-intensive industries boost their rate of investment in computers and machinery.[11] Firms in industries one standard deviation (SD) above the mean in terms of routineness intensity invest, on average, 6.1% more in machinery and 4% more in computers following a typical minimum wage increase. Firms in industries more intensive in offshorable tasks also continue to invest in machinery and computers, but the rate of investment in computers falls by 6.2%. When the minimum wage binds for regular workers, the number of regular workers working during a typical workday falls by 0.44-1.2 workers (0.5%-1.36%). Firms in the average industry and firms in more offshorable industries substitute some of these workers with contract workers and managers less likely to be bound by the minimum wage. Given that the latter group of firms also experiences a fall in computer investment following a minimum wage hike suggests that some tasks that combine workers and computers, like data analysis, may be offshored.[12] There is less evidence of substitution across labor inputs in routine-intensive industries, indicating that most of the substitution takes place between regular workers and capital. The adjustments made by firms allow them to maintain their profit margins without changing their level of production. This suggests, that minimum wages can have important impacts on the production landscape of developing countries, which can play a role in the speed and shape of the structural transformation of these nations.

The empirical strategy I use in this study exploits variation from all firms. An alternative is to focus on firms in districts along state borders only, since they may evolve in more similar environments (Card and Krueger (2000), Dube et al. (2010)). This concern is partially accounted for by including district-by-year fixed effects in the main specifications. Nevertheless, I show that the results are similar when using this contiguous design. The results are also robust to using only variation from real minimum wage increases that exceed inflation and when accounting for staggered minimum wage changes (Cengiz et al. (2019)). They are also robust to controlling for the average minimum wage in other industries of the same state, capturing the potential changes in the outside option of people employed in a given industry.

This study contributes to the literature establishing a link between relative input costs and automation and offshoring trends. Many authors have theorized that routine tasks and tasks that can be done remotely are more likely to be, respectively, automatized and offshored as the relative cost of labor inputs increases. These predictions are consistent

[10]Firms in the average industry are firms in industries with average routineness and offshorability intensity. The routineness and offshorability measures are normalized to be mean 0 and standard deviation 1 in 2000, across all industries. I refer to firms in routine-intensive industries when the routineness index is at least1 SD above the mean, and refer to firms in industries intensive in offshorable tasks when the offshorability index is at least 1 SD above the mean.

[11]Unless otherwise stated, all changes in wages are in real 2008 rupees.

[12]I do not have data on their employment of offshore labor, but I find no evidence of an increase in outsourcing for these firms. This suggests that offshoring is the more likely channel.

with the results of this paper (in addition to the authors mentioned previously, see Autor et al. (2003, 2006), Antràs et al. (2006), Blinder et al. (2009), Goos and Manning (2007), Goos et al. (2009), Blinder and Krueger (2013), Brynjolfsson and McAfee (2014, 2017), Autor et al. (2015)).[13] Most research in this literature uses aggregate employment data to document trends consistent with this theory by leveraging different sources of variation such as the falling cost of technology (Beaudry et al. (2010), Autor and Dorn (2013), Goos et al. (2014)), or the rise in the cost of labor through changes in the U.S. state-level minimum wage. In particular, Aaronson and Phelan (2019) as well as Lordan and Neumark (2018) have investigates the heterogeneous effects of increases in state minimum wages in the U.S. depending on the routineness and offshorability of different occupations. Using population survey data, Aaronson and Phelan find that an increase in the cost of labor in low-wage employment leads to a decrease in aggregate employment for people employed in routine occupations. Using the same data, Lordan and Neumark find that increases in the minimum wage lead to a fall in employment for low-skilled workers in routine-intensive occupations. Here, the objective is to better understand how firms adjust their inputs when they differ in their capabilities to offshore or automate tasks. However, in exploratory analyses, I find evidence that minimum wage hikes reduce employment at the national level for younger workers across all types of industries and for older workers in routine-intensive industries.

Little work has explored how rising minimum wages affect capital investment at the firm-level. A notable exception is Hau et al. (2020) who consider whether hikes in the county-level minimum wages in China affect manufacturing firms' input choices.[14] The authors investigate whether minimum wage hikes affect firms responses differently whether they are state-owned, privately owned by nationals, or privately owned by foreign parties. They find that an increase in the minimum wage leads to a shift from workers to capital especially in foreign-owned private firms. This pattern is less pronounced in Chinese-owned private firms and in state-owned firms. Suggestive evidence indicates that these three types of firms differ in managerial quality. Hence, the authors suggest that differences in management structures may drive the heterogeneous responses following the minimum wage hikes observed across the three firm types. Here, I propose another explanation, and provide evidence that the differences in responses across firms may, instead, be driven by differences in their capability to offshore and automate certain tasks.

In additional analyses, I investigate the role of layoff regulations, and find that the firm-level responses to minimum wage hikes differ depending on how easy it is to layoff workers in their state. Therefore, I contribute to the literature on the effect of different layoff regulations on firms (see for example Besley and Burgess (2004), Aghion et al. (2008), Adhvaryu et al. (2013) Adhvaryu et al. (2013) andAmirapu and Gechter (2020) for a recent review). Building on Aghion et al. (2008), I identify pro-employer, pro-worker, and neutral states that have, respectively, facilitated, hindered, or left unchanged, the difficulty of laying off frontline workers over the years. I find that adjustments in capital and labor

[13] An analogous literature explores variation in exposure to technology (Michaels et al. (2014), Graetz and Michaels (2018), Bessen et al. (2023), Acemoglu et al. (2020), Acemoglu and Restrepo (2020)).

[14] See also Haepp and Lin (2017) who study the same context and find a decrease in training expenditure per worker which they take as a measure of investment in human capital, and find no change in physical capital investment.

inputs are greater in pro-employer states. This indicates that other labor regulations play a key role in determining how firms adjust to changes in the costs of their inputs.

The remainder of this paper is organized as follows. In Section 2, I describe how minimum wages are set in the formal economy. I also present the datasets used, and provide summary statistics. The model and its predictions are introduced in Section 3. Section 4 presents the empirical strategies I employ, followed by the results in Section 5. Finally, I conclude the paper in Section 6.

2 Context, data and summary statistics

In this section, I first explain the institutional details surrounding minimum wages in India before moving on to the different sources of data used in the paper.

2.1 Minimum wages in the formal economy

Context

In the Minimum Wage Act of 1948, the federal government of India mandated that states establish minimum wages in a group of predetermined industries in the formal economy.[15] Although the initial group is common across the country, individual states have added different industries to this list since 1948. The Act states that the minimum wages listed apply to any employee working in these industries, regardless of their age, gender, or work arrangements, unless explicitly mentioned (Soundararajan (2019)).[16]

The Act recommends that states designate committees consisting of both employers and employees, as well as state officials, to make recommendations with regards to wage fixation and revision. However, the state governments ultimately determine the prevailing wages. The Act does not dictate which methodology states should follow in revising their wages, rendering the decision process opaque and the wage hikes hard to predict (Soundararajan (2019), Adhvaryu et al. (2022)). However, the Act stipulates that revised wages be posted in the states' official gazettes at most three months before they come into effect on the first of January of the coming year. Firms are required to pay the set wages,

[15] The industries in the original group are often referred to as the scheduled employments under the Minimum Wage Act (see Appendix A). Scheduled employments refers to those listed in the schedule appended to the Minimum Wages Act, or any process or branch of work constituting part of such employment (Minimum Wage Act (1948)). While they use the term "employment", it refers to industries (4-digit) and sometimes, subindustries (5-digit) rather than occupations or jobs. For example, we can find in the original list a minimum wage for individuals employed "in any tobacco (including bidi making) manufactory" or individuals employed in "in any rice mill, our mill, or dal mill."

[16] This includes regular workers, contract workers, and managers. However, as I mention in Subsection 2.3, enforcement of the minimum wages may not be as strong for contract workers as for other employees.

and compliance is verified through inspections by designated officials.[17] Moreover, states must revise the minimum wages at least every five years, and as I show below, nominal wages are increased every year and a half, on average.[18]

In 2005, India passed The National Rural Employment Guarantee Act (NREGA) which may confound the analysis in this study. This Act stipulates that rural households be guaranteed 100 days of public work at a minimum wage set by the respective states. The program was rolled out sequentially during the last few years of the study period (2006-2008). The most common work provided is short-term unskilled manual work.[19] However, NREGA does not cover formal firms in the private sector. Nevertheless, the program can drain workers away from the private sector and put upward pressure on low-skill manual workers' wages. As I explain in the empirical strategy section, the data I use is very granular. Therefore, I can account for the NREGA roll-out by controlling for district-specific shocks.

[17] In addition, workers can submit claims to Labor Commissioners whenever their employer pays less than the statutory wage in their industry.

[18] In 1991, the National Commission on Rural Labour recommended the implementation of a National Floor Level Minimum Wage (NFLMW) in response to variation in minimum wages across states. In 1996, this wage was introduced as a recommendation for the different states, rather than as a binding minimum wage, and it was left to the discretion of the states whether to follow the recommendation. The Indian government is now thinking of implementing a binding national minimum wage. Hence, the results of this research may prove valuable for Indian policy makers.

[19] Imbert and Papp (2015) have studied the program and determined that the average recipient is able to claim 38 days of guaranteed work, and the median household is only able to claim about a month of guaranteed public work across all members of the household. Moreover, they find that recipients are usually earning less than the state-set NREGA wage because there are large discrepancies across states as to whether they respect the guidelines set by the federal government. See also Sharma (2009), and Dreze and Khera (2009).

Data

The research done in this paper is made possible through the combination of five different databases. Table 1 briefly summarizes them and the key variables used to help situate the reader.

Table 1: Brief summary of the datasets used in the paper

Reports on the Working of the Minimum Wages Act

Description:	Lists the universe of the yearly minimum wages of the formal economy in India
Key variable:	Nominal minimum wages at the state and industry level for the years 2002-2008 inclusive

Prowess

Description:	Balanced panel of yearly income statements of the universe of publicly listed firms in India
Key variable:	Yearly investment in capital, machinery, and computers, and profit margin at the firm level for the years 2002-2008 inclusive

Annual Survey of Industries (ASI)

Description:	Representative survey of formal manufacturing firms in India. It is an unbalanced panel of firms in that firms are surveyed at most every 5 years
Key variable:	Number of employees, mandays, total compensation bill for different types of employees: regular workers, contract workers, and managers

O*Net

Description:	Provides the task content of U.S. occupations
Key variable:	Raw routineness (from Autor and Dorn (2013)) and offshorability measures (from Firpo et al. (2011)) of 500, 4-digit U.S. occupational codes for the year 2000

National Sample Survey (NSS)

Description:	Representative survey of Indian households
Key variable:	Main occupation and industry of a cross section of household heads in 2000. This allows me to bring the O*Net measures to the Indian context. I construct measures of routineness and and offshorability for the different Indian industries from crosswalks between the occupational codes of the U.S. and India. This allows me to merge these measures with the Prowess and ASI databases. The measures are mean 0 and SD 1 in 2000 across Indian industries.

I begin by constructing a comprehensive list of industry minimum wages for firms in the formal economy across India from 2002 to 2008. To do so, I digitized all formal minimum wages from annual federal government reports.[20] All minimum wages are in the form of a minimum wage per eight-hour workday.[21]

Then, I map the wages for the listed industries to their equivalents in the National Industry Code (NIC) in order to merge the minimum wages with firm-level datasets. In the vast majority of cases, the minimum wages listed correspond to 4-digit industries, which makes the mapping simple. However, in some cases, minimum wages correspond to 5-digit sub-industry codes. From the NIC, I can distinguish how many 5-digit sub-industries there are within any 4-digit industry. Therefore, I average the minimum wages within 4-digit industries in these cases.[22] Since there is no national wage floor, I assume that the minimum wage is 0 in industries and sub-industries that do not appear in the minimum wage reports like Menon and Rodgers (2017, 2018).

From the exercise above, I find over 6,300 industry-year observations with a set minimum wage, as summarized in Table C.1 in Appendix C. States have a set minimum wage for 45% of their 4-digit industries on average (ranging from 7-82% across states). Over the span of the data, I observe 2,600 nominal wage increases occurring every year and a half, on average. Among industries with a minimum wage, the average nominal minimum wage is approximately 80.5 rupees per workday (ranging from 28-163 rupees across industries and states). However, throughout the analysis, I use the minimum wage in constant rupees of 2008 by deflating the minimum wages by the consumer price index for that year.[23] I find that the real daily minimum wage is approximately 94.5 rupees (ranging from 30-179 rupees). When the nominal minimum wage increases, it does so by 8 rupees on average, or 2.5 rupees in real terms. This corresponds to a 9.9% and 3.1% increase, respectively.[24] Figure 1 shows that there is extensive variation in the distribution of real minimum wages, and in the distribution of annual growth rates in the real minimum wages across industries and states in Panels (a) and (b), respectively.

[20] The reports are titled "Report on the Working of the Minimum Wages Act, 1948 for the year t", with t being the year of the report, e.g., $t = 2001$. Each year, approximately 700-1,000 minimum wages are listed across all states and industries.

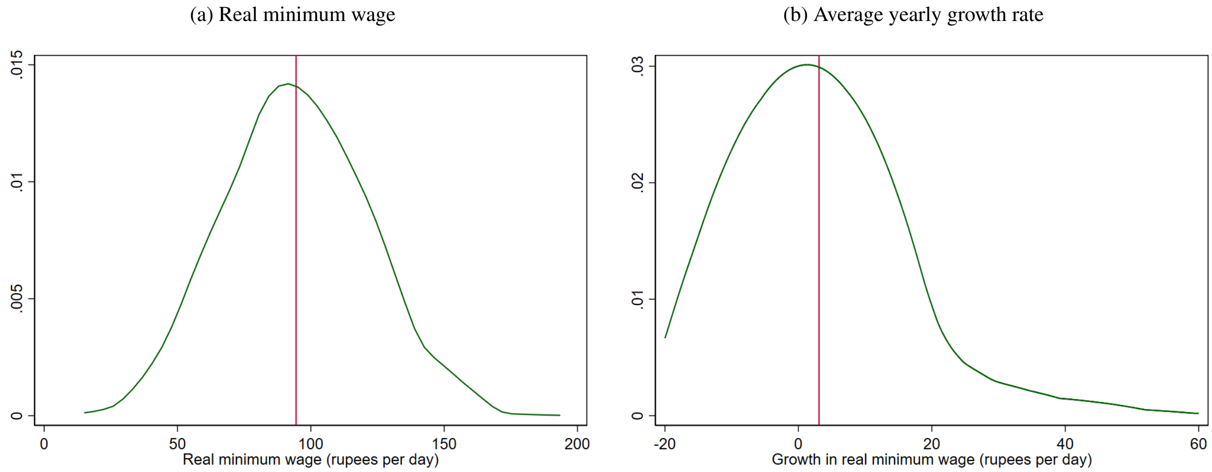
[21] Listed minimum wages in older reports often vary format across states, and even across reports for the same state.

[22] There are 102 four-digit industries in the NIC classification.

[23] I use the same deflator across all states in a given year. Although some states produce their own CPI, they are not harmonized across states, and not all states construct this metric (MOSPI (2021)).

[24] In terms of PPP, this represents an increase of $0.10 per hour in 2020 dollars every year and a half. Comparatively, U.S. states saw an increase in their nominal minimum wage every 3 years between 1990 and 2005, with an average increase of approximately $0.50 in real terms. I computed the U.S. statistics using replication data from Dube et al. (2010).

Figure 1: Distribution of the average real industry minimum wages and their grow rates across industries and states



Note: I compute the average real minimum wage across years for every industry and state, and plot the distribution across industries and states in Panel (a). I compute the average real minimum wage growth across years for every industry and state, and plot the distribution across industries and states in Panel (b). The vertical line represents the average: 94.5 rupees per day in Panel (a), and 3.1% in Panel (b). I trim the figure in Panel (b) at -20% and 60%. These bounds are smaller, and larger, than the first and 99th percentiles, respectively.

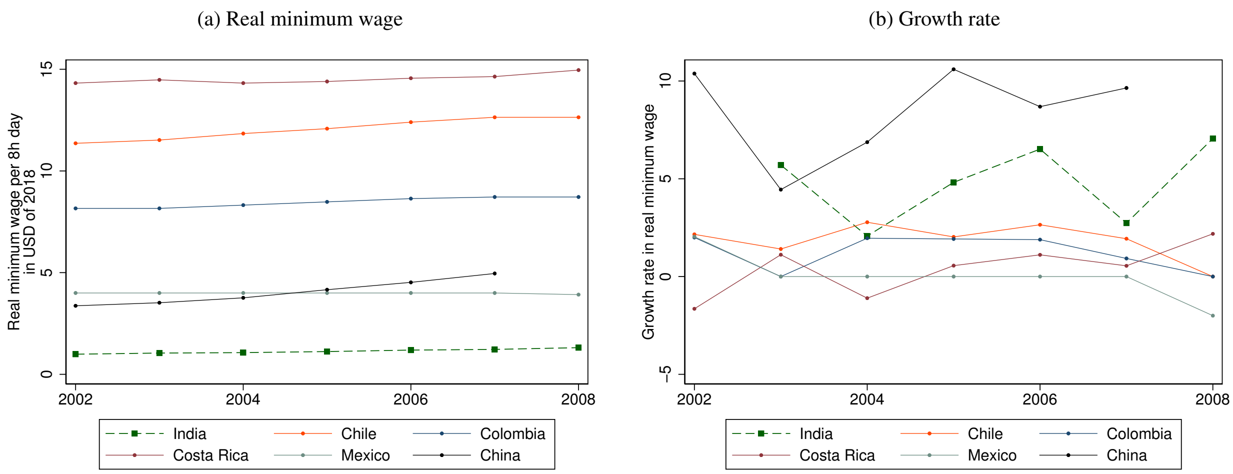
In Appendix D, I compile three waves of India's nationally representative household survey data that span over my study period. This data contains information on working individuals' wages and the industry in which they are employed. I regress the real daily wage of working individuals on the real minimum wage.[25] I find that every rupee increase in the real minimum wage of an industry is associated with a 0.28 rupees (SE 0.12) increase in the average real wage for people employed in that industry. This indicates that the minimum wage binds for a large percentage of workers.

For perspective on Indian minimum wages, and the pace at which they grow, I compare them to minimum wages in other developing countries. The OECD tallies minimum wage data for a subset of countries including a handful of South-American developing countries in real 2018 dollars.[26] I compute the average real minimum wage in dollars across all states and industries with a set minimum wage for every year. In Figure 2, I compare the average Indian minimum wage to the national minimum wages of Chile, Colombia, Costa Rica, and Mexico in real dollars per 8-hour workday. I add China's minimum wage to the list using numbers reported by Haepp and Lin (2017). As shown in the first panel, the Indian wage is lower than that of any other country on the list, ranging from $1 per day in 2002 to $1.30 per day in 2008, in real terms. However, India's average minimum wage grows faster than any other country listed, except for China.

[25]The firm-level datasets used in the main analysis do not contain wage data.

[26]The data can be found at: https://stats.oecd.org/Index.aspx?DataSetCode=RMW

Figure 2: Real minimum wage in U.S. dollars of 2018 and its growth rate across as sample of developing countries



Note: I convert the Indian minimum wages into 2018 USD per hour. I average the real minimum wages across states and industries for every year for industries and states with a statutory minimum wage. I plot the average real minimum wages in Panel (a) and the yearly growth rates in Panel (b).

2.2 Investment data

The Prowess dataset is a balanced panel of the quasiuniverse of publicly listed firms in India. The data is at the firm level, and is constructed from firms' annual and quarterly financial statement filings. This dataset is ideal for studying investment decisions of firms since they have to list the value of their capital inputs, the industry they are in, and their location, as part of their filings.[27]

I define the net value of capital as the sum of the net value of machinery and the net value of computers, software, and related IT equipment.[28] Machinery includes all forms of physical capital needed in the firm's productions other than computers, software, and IT equipment. This category includes hydraulic and electric tools, machines, conveyor belts, etc. (see Appendix B for details on the variables.) Then, I follow Yagan (2015) and construct a measure of aggregate capital investment by computing the change in net value of capital, as follows.[29]

$$I_{ft} = 100 * \frac{\text{Net Value of Capital}_t - \text{Net Value of Capital}_{t-1}}{0.5(\text{Net Value of Capital}_{t-1} + \text{Net Value of Capital}_{t-2})}.$$

[27] I assume that firms primarily produce in their districts of incorporation. The dataset also includes the district of firms' corporate offices and head offices. However, 90% of the firms have all offices in the same district.

[28] I add software expenditure to the computer category, as the two are intrinsically linked and it is unclear from the data whether all firms separate the two.

[29] I winsorize the top 2.5%, where outliers are more likely, and bottom 1% of values. When firms have no capital and invest for the first time, then the value investment is infinity for the first investment year. Winsorizing ensures that these cases do not drive the results. I show that the main results are robust to winsorizing the top and bottom 1% of values in Appendix H.

In the equation above, the numerator corresponds to the difference in the value of capital at the end of the year t, and at the beginning of the year $t-1$, net of depreciation. The denominator captures the net value over the previous year. It is constructed by averaging between the end-of-year and beginning-of-year net capital value of the previous year.[30] Therefore, I_{ft} captures the percentage change in physical capital over the course of year t for firm f.

I also separately compute the same measures of investment for machinery and computers.[31] I find that firms invest, on average, at a yearly rate of 12.3% in capital, 7.8% in machinery, and 8.3% in computers, as presented in Appendix Table C.2.

Since the data has a balanced-panel structure, I include firm fixed effects in the regressions below to account for firms' time-invariant characteristics. However, I also include time-varying controls that are often used in the corporate finance literature. In particular, I include fourth-degree polynomials in the age of the firms, lagged revenue, lagged profit margin, and lagged revenue growth (Yagan (2015)).[32] Note that age may be collinear with district-by-year fixed effects included in the analysis. However, I show in Appendix F, that excluding the age controls or all controls listed above has virtually no impact on the sign and size of the estimates.

2.3 Employment Data

While the balance sheet data from Prowess is very detailed, it suffers from one major flaw: firms do not have to report how many employees they have.[33] Therefore, I rely on India's Annual Survey of Industries (ASI) for employment information. The ASI is a survey of registered (formal) firms from over 40 four-digit manufacturing industries which represents a coverage of about 40% of all 4-digit industry categories. The data includes all establishments with 10 or more employees if they use electrical power, and 20 or more employees if not. Firms are surveyed at least every 5 years using an efficient sampling design (Indira et al. (2010), Chaurey (2015)). Employment is divided into three main categories: regular (payroll) workers, contract workers, and managerial staff involved in the production process. Regular or payroll workers are employed directly by the firm; they appear on the firm's muster roll, and their wages must be greater than or equal to the minimum wage, if there is one in their industry, and they receive job-security benefits. Non-permanent contract workers also work at the firm, but they are employed on short-term contracts through

[30] This normalization is common in the corporate finance literature. See also Luck and Zimmermann (2020).

[31] Given this definition, firms are included in the analysis only if the net value capital, as defined above, does not equal 0 for some years in the data. Firms without any capital over the study period are excluded. If a firm has some machinery (i.e., the net value of machinery is positive), but no computers for two consecutive years, then I assume that investment in computers is 0 in the second year, and vice versa for machinery, if a firm has computers, but no machinery for two consecutive years.

[32] For the controls, "lagged" indicates the average between the end-of-year and beginning-of-year variable values during the previous year.

[33] In fact, only an insignificant amount of firms does report it.

an intermediary such as a labor contractor or an agent. These workers usually receive no benefits, as they are employed through intermediaries. While enforcement is strict with respect to the minimum wage paid to regular workers, it is not as strict for non-permanent workers. As a result, contract workers are generally paid less than regular workers due to lack of enforcement for this subgroup, and because they are often employed through oral agreements (see Srivastava (2016) for a review). In the context of this study, this means that changes to the formal minimum wages likely have a lesser effect on contract workers' wages than on those of regular workers.

In the ASI, firms report how many mandays each type of employee worked (regular workers, contract workers, and managers). This variable represents the total number of full days worked across every employee of a particular type during the year.[34] Firms also report the average number of employees working on a typical workday during the reported year for every employee group.[35]

Firms in the sample employ, on average, 88 regular workers, 53 contract workers, and 13 managers in a typical eight-hour day, as summarized in Appendix Table C.3. As a result, firms report 26,000 full workdays paid to regular workers, 15,500 to contract workers, and 3,700 to managers.[36] Taking the ratio of the two variables indicates that regular workers and contract workers typically work 294 full days per year, or 24-25 days per month. Managers work on average 284 full days during the year, or 23-24 days per month. This means a typical employee works full-time given that in India, a full workday is eight hours and that a usual workweek is six days.[37]

2.4 Routineness and Offshorability of Industries

I map the measures of routineness and offshorability used by Acemoglu and Autor (2011) to Indian industries.[38] Doing so allows me to assess whether increases in minimum wages have heterogeneous effects across industries.[39]

[34]For example, I find that firms report 26,000 full workdays paid to regular workers on average. A full workday is eight hours. This means that if we were to sum the number of 8-hour workdays across all regular workers, we would arrive at 26,000 workdays for this group.

[35]I winsorize the top 5% of values. The minimum values are bounded by 0. Therefore, there is no need to winsorize the bottom of the distribution. The results are also robust to winsorizing the top 1% of values (see Appendix H).

[36]The averages are conditional on employing a positive number of the type of employee mentioned.

[37]Note that firms do not report the total number of employees they have paid in the year, but this total would not capture adjustments done during the year or changes in the intensity of work. On the other hand, the number of mandays and the average number of employees working does account for these adjustments and changes.

[38]These measures have been generously made available by Prof. David Autor and can be found on his website. The RTI measure used Acemoglu and Autor (2011) is based on the original work of Autor et al. (2003). The two papers follow the same methodology, but the former relies on task-content of occupations as of 1998, while the latter uses the mapping of 1991. The offshorability measure builds on the work of Firpo et al. (2011), but excludes scales that may overlap with the routineness measure. See Acemoglu and Autor (2011)'s data appendix for a precise exposition how they map task content to the routineness and offshorability measures.

[39]Routine tasks are usually repetitive, and are successfully accomplished by following a clear and known set of rules (Autor et al. (2003)). When this is the case, it is easier to design a machine or computer code to perform the task. Suppose that a task involves repetitively moving homogeneous pieces off of an assembly line and onto a conveyor belt. It is easy to design a machine to do this task since the pieces to be picked are homogeneous; they reach the end the assembly line at known intervals, and it is possible to define a clear set of motions that correctly move the pieces from point A to point B. Managers may be tasked with motivating workers to ensure that they remain productive. While this may be a repetitive task with a clear goal, there is no clear or unique way to perform this task. Thus, it is much harder to automate.

The authors use the task composition of occupations to measure occupational routineness and offshorability.[40] The task composition of occupations comes from the Occupational Information Network database (O*NET) of the U.S. Department of Labor. Therefore, the routineness and offshorability measures these authors propose are at the U.S. occupation level which follows the Standard Occupation Classification (SOC). India has its own National Classification of Occupations (NCO). Fortunately, both national classification systems have been harmonized in recent decades to be compatible with the International Standard Classification of Occupations (ISCO). Hence, it is possible to map the routineness and offshorability measures to India's occupations.[41] However, the firm-level data sets presented above are at the industry, rather than the occupation level. Below, I explain how I aggregate the measures at the industry level.

Before doing so, I provide anecdotal evidence that the task content of occupations in India is similar to that of the U.S. While the ideal approach would be to construct the routineness and offshorability measures from task-to-occupation mappings in India, such mapping has only been done in the U.S., as far as I am aware. However, in 2015, the Department of Labor of India launched the National Career Services website. This platform was created to provide career information and to connect employers with job seekers. Job seekers interested in determining whether their skillset matches certain occupations are referred to the O*NET interest profiler (see Bhatnagar (2018)). This suggests that the Indian government considers the skill requirements of occupations characterized in O*NET to be a good proxy for occupations in India.[42] If the skill requirements are similar, then it is unlikely that occupations are too dissimilar in terms of tasks.

Firms in Prowess and the ASI are classified using the National Industry Classification (NIC). Of course, occupations do not align one-to-one with the industry classifications. For example, cashiers can be found in multiple industries. Fortunately, India's main household survey, the National Sample Survey (NSS), records the 3-digit NCO occupation of employed people in the sample, and the 5-digit industry in which they work.[43] I average the measures from the authors above at the 4-digit industry level using the NSS sampling weights for the 2000 survey wave.[44] The measures are normalized to have a mean of 0 and a standard deviation of 1 across all 4-digit industries in 2000. This strategy allows me to construct measures capturing how routine and offshorable the tasks and occupations are in every Indian industry, just before the study period. The measures can then be merged with the firm-level datasets used in the

[40] A task is more offshorable if it is possible to do at least part of the task remotely while supplying the task's output at the place of production, at little or no cost. This measure captures the degree to which face-to-face interactions, and on-site presence, are necessary. For example, a firm producing bolts must ensure that the diameter of the bolts remain within a particular range. If too many bolts fall outside this range, the machines may need to be adjusted. One can imagine that analysts charged with determining whether too many bolts are faulty, can do their analysis remotely relatively easily. However, the workers placing the boxes of bolts onto a truck for shipping must be physically present to complete their task, making it harder to offshore.

[41] Goos et al. (2014) follow a similar strategy for Western European countries.

[42] Blinder and Krueger (2013) provide alternative metrics of offshorability. However, their measures come from a snapshot of the US economy at the end of my study period. Moreover, they do not rely on O*NET's task composition of occupations. Hence, the measures may not be applicable to the Indian context during the study period. They recruited professional coders to subjectively rate the offshorability of occupations from a 2008 survey of 2,500 U.S. labor force participants.

[43] The National Sample Survey (NSS) is a nationally representative cross-sectional survey of households.

[44] The survey is conducted at irregular intervals, and employment questions are not asked in all waves. The 2000 wave is the only usable wave that took place before the study period. The previous survey wave with employment data was conducted in 1993, before the country opened its economy.

paper.[45] The resulting ranking of the continuous routineness and offshoring indexes makes intuitive sense. Indeed, pasta manufacturing, the production and preserving of meat products, bakery products manufacturing, and man-made fiber manufacturing are among the most routine industries, while maintenance and repair of vehicles, manufacture of locomotives, manufacture of aircraft, salt extraction, and building and repairing of ships are among the least. Man-made fiber manufacturing, game and toy manufacturing, software development, and call centers are among the industries with the most offshorable occupations, and sewage and refuse disposal, maintenance of machinery, washing and cleaning of textile, and services such as hairdressing, hotels..., with the least. As we can also see, the routineness and offshorability are not mutually exclusive.[46] Hence, it is important to analyze them in tandem.

While the task requirements for a given Indian occupation may slightly differ than that of the U.S., what matters for the analysis is that when *averaging across all occupations* in a given industry, the *ranking* in the routineness and offshoring measures between Indian industries is correct.[47] In addition to the anecdotal evidence above, I show that the results are robust when comparing impact for industries in the 75th percentile (about 1SD above the mean) compared to those that are not in terms of routineness and offshorability instead of the continuous indexes (see Appendix G).

3 Model

In this section, I construct a simple task-based production model in the spirit of Acemoglu and Restrepo (2018) in order to derive predictions on the firms' adjustments. As I show below, the change in demand for the different inputs is not straightforward when there are more than two inputs. Hence, the model predictions are important to understand the dynamic observed in the data.

In the model, firms produce a single output, Y, by combining a continuum of tasks, $y(i)$ with $i \in (0,1)$, through a CES production function:

$$Y = \left(\int_0^1 y(i)^{\frac{\sigma-1}{\sigma}} di\right)^{\frac{\sigma}{\sigma-1}}, \tag{1}$$

[45] I calculated both the unweighted average and the weighted average using sampling weights. There is a strong correlation between unweighted measures and weighted measures ($\rho = 0.8$). Therefore, I use the weighted mean in the main analysis.

[46] In fact, at the industry level, the correlation between routineness and offshorability is 0.67.

[47] Among the most routine occupations in India, I find office and numerical clerks, cashiers, bank tellers, food processing workers, and textile machine operators. Among the most offshorable occupations, I find social science professionals, mathematicians and statisticians, numerical clerks, and computing professionals.

where $\sigma \in [0,\infty)$ is the elasticity of substitution between the tasks. Without loss of generality, I assume that the technology component equals 1. Next, I assume that tasks can potentially be done by different inputs, namely contract workers (c), regular workers (l), managers (m), and capital (k). Offshore inputs are discussed in the discussion section below. I assume that the production function for tasks also has a CES structure, as presented in Equation (2) below.

$$y(i) = (\sum_{j\in\{c,l,m,k\}} [\delta_j(i)]^{\frac{\varepsilon_i-1}{\varepsilon_i}} \times [j(i)]^{\frac{\varepsilon_i-1}{\varepsilon_i}})^{\frac{\varepsilon_i}{\varepsilon_i-1}}, \text{ or} \tag{2}$$

$$y(i) = (\sum_{j\in\{c,l,m,k\}} \gamma_j(i) \times j(i)^{\rho_i})^{\frac{1}{\rho_i}}. \tag{3}$$

In Equation (2), $\delta_j(i)$ is the productivity of input j at task i. The element $j(i)$ is the number of input j used in task i, and $\varepsilon_i \in [0,\infty)$ is the elasticity of substitution between inputs for that task. While certain tasks may use all inputs listed above, other tasks may use only regular workers and capital, for example. In such a case, only $\delta_l(i)$ and $\delta_k(i)$ would be different from 0, and positive. To ease the notation, I replace $[\delta_j(i)]^{\frac{\varepsilon_i-1}{\varepsilon_i}}$ with $\gamma_j(i)$ and $\frac{\varepsilon_i-1}{\varepsilon_i}$ with ρ_i to obtain Equation (3).

I chose this general class of functions for the task production since it imposes few restrictions on which inputs are used in a particular task. This can accommodate cases where a given input is used differently across tasks. For example, computers may be used as substitutes for some workers in quality-control tasks, while computers may complement managers in monitoring tasks.

In order to have a tractable solution, I assume that all inputs of the same type have the same wage, and that firms take wages as given, and follow a typical two-step cost minimization as in Acemoglu and Restrepo (2018) and Goos et al. (2014). In the first step, firms minimize each task's production costs by choosing inputs. In the second step, they minimize the final output's production costs by choosing how many iterations of each task is done. The ratio of the FOCs for the cost minimization of task i for any two inputs, j and j', can be expressed as:

$$\frac{w_j}{w_{j'}} = \frac{\gamma_j(i)}{\gamma_{j'}(i)}(\frac{j(i)}{j'(i)})^{\rho_i-1},$$

where w_j and $w_{j'}$ are the wages of these inputs to the firm after any adjustments. By plugging the last equation in (3) and solving for $j(i)$, we obtain the factor demand for input j in task i conditional on $y(i)$.

$$j(i) = y(i)(\frac{\gamma_j(i)}{w_j})^{\frac{1}{1+\rho_i}}(\sum_{j\in\{c,l,m,o,k\}}(\gamma_j(i))^{\frac{-1}{\rho_i-1}}w_j^{\frac{\rho_i}{\rho_i-1}})^{\frac{-1}{\rho_i}} \tag{4}$$

Similarly, the task demand conditional on output from the cost minimization of tasks can be written as:

$$y(i) = Y p(i)^{-\sigma}, \tag{5}$$

where $p(i)$ is the unit cost of task i which is defined as $p(i) = \frac{1}{y(i)}(\sum_{j\in\{c,l,m,k\}} w_j j(i))$. Then, plugging Equation (4) in $p(i)$, we have:

$$p(i) = (\sum_{j\in\{c,l,m,k\}}(\delta_j(i)w_j)^{1-\varepsilon_i})^{\frac{1}{1-\varepsilon_i}}. \tag{6}$$

We obtain the demand for factor j in task i conditional on output by plugging in Equations (5) and (6) in (3). By taking the log of the factor demand, we finally have:

$$\mathscr{L}_j(i) \equiv ln(j(i)) = ln(Y) + \varepsilon_i ln(\gamma_j(i)) - \varepsilon_i ln(w_j) + (\varepsilon_i - \sigma)ln(p(i)). \tag{7}$$

Next, I investigate how the demand for inputs changes when these inputs' wages change. Given that minimum wage hikes can affect the wage of different types of employees, it is useful to consider cases where the wage of multiple labor inputs changes. Consistent with the results, I assume that output is unchanged. Due to lack of data, I also assume that the productivity of the inputs at a particular task is constant. When this is the case, the total derivative of the last expression becomes:

$$d\mathscr{L}_j(i) = \underbrace{\varepsilon_i(\frac{dp}{p(i)} - \frac{dw_j}{w_j})}_{\text{Substitution within tasks}} \underbrace{-\sigma\frac{dp}{p(i)}}_{\text{Substitution between tasks}}, \tag{8}$$

with $dp = p(i)^{\varepsilon_i}(\sum_{j\in\{c,l,m,k\}}\delta_j(i)^{1-\varepsilon_i}w_j^{-\varepsilon_i}dw_j)$. The first term captures the change in demand for input j in task i due to a change in the relative price of the inputs used in the task. The second term captures the change in demand for input j in task i which stems from a change in demand for task i as the price of that tasks changes relative to other tasks.

Equation (8) demonstrates that the demand for inputs in a given task does not change if the tasks are perfect complements and the inputs used in that task are also perfect complements ($\sigma = 0$ and $\varepsilon_i = 0$). Proposition 1 below considers cases in which tasks are perfect complements, but inputs are not. In these cases, the relationship between inputs in a given task can range from imperfect complements to perfect substitutes. Proposition 2 considers cases in which tasks are more complementary than the inputs within the tasks.[48]

PROPOSITION 1: *Suppose that tasks are perfect complements, but inputs are not ($\sigma = 0$ and $\varepsilon_i > 0\ \forall i$). In any given task, the demand will increase for the input which experiences the smallest percentage increase in wages. On the other hand, the demand for the input with the largest percentage increase in wages will decrease. The change in demand is indeterminate for other inputs in that task.* PROOF: see Appendix Q.

PROPOSITION 2 : *Suppose that tasks are more complementary than inputs within tasks such that $\sigma \geq 0$, $\sigma < \varepsilon_i\ \forall i$, and $\varepsilon_i > 0\ \forall i$. In any task using inputs that all become cheaper, the demand will increase for the input that experiences the largest percentage decrease in wages. In tasks using inputs that all become more expensive, the demand for the input with the largest percentage increase in wages will decrease. In tasks using some inputs that become more expensive and some that become cheaper, the demand will increase for the input that experiences the largest percentage decrease in wages, and decrease for the input with the largest percentage increase in wages. The change in demand is indeterminate for other inputs in those tasks.* PROOF: see Appendix Q.

If any of the conditions laid out in Propositions 1 and 2 hold, it follows that the demand at the firm level will increase for whichever input experiences the smallest percentage increase in wages among all inputs. Conversely, the demand at the firm level will fall for whichever input experiences the largest percentage increase in wage among all inputs. What happens to inputs with an intermediate wage increase or an intermediate wage decrease is indeterminate. To provide intuition, suppose that the wage of regular workers increases by 2% following a minimum wage hike, and the wage of contract workers increases by 1%, while the wage of other inputs remains unchanged. Regular workers become relatively more expensive than any other input so there is an incentive to substitute away from them in every task. Contract workers become relatively less expensive than regular workers, but relatively more expensive than other inputs. Hence, there is an incentive to substitute towards contract workers in tasks where only regular and contract workers are used. However, in tasks that do not use regular workers, but use a combination of contract workers and some other inputs, there is an incentive to substitute away from contract workers. Therefore, it's not clear what happens to the demand for contract workers at the firm level in this case.

[48] In these cases tasks can be anything from perfect complements to imperfect substitutes and inputs within tasks can be anything from imperfect complements to perfect substitutes as long as the inputs within the tasks are more substitutable than the tasks themselves. I leave out cases where tasks are less complementary than the inputs within the tasks since this implies that the inputs are more substitutable across tasks than within tasks, which is less realistic.

3.1 Discussion and predictions

As the example above illustrates, in order to make predictions, it is necessary to postulate on how the wages of the different inputs evolve following a minimum wage hike. I consider a case in which the wages of both contract workers and regular workers increase following a minimum wage hike. Since the minimum wage is unlikely to be binding for managers, I will assume that their wages are either unchanged or increase relatively less (by a smaller percentage) than those of their subordinates.[49] Karabarbounis and Neiman (2014) study the price of physical capital since the 1980s and find that it has been falling worldwide by at least 0.1 log points annually. I assume that the price of capital falls at this rate and is unaffected by the Indian minimum wage. Finally, due to lack of data, I assume that the wage of offshore labor is constant.

Next, I consider different types of firms and formalize the model's predictions in the context at hand. The predictions are summarized in Table 2.

Firms not intensive in routine or offshorable tasks

The literature on automation suggests that capital cannot easily replace labor inputs in non-routine tasks. Nevertheless, capital may be used as a perfect (or imperfect) complement to other inputs in certain tasks, and used on its own in other tasks. Following a minimum wage hike, the cost of capital continues to fall at its usual rate, while the cost of other inputs either rises or remains unchanged. Therefore, after such a hike, we would expect no change in the firm-level demand for capital inputs for firms in the average industry if tasks and inputs within tasks are perfect complements, and an increase in the demand for that input otherwise. When regular workers' wages increase by a larger percentage than those of contract workers, there is an incentive to replace regular workers in any task where they are used in tandem with other inputs, as regular workers see the largest wage increase. Therefore, the propositions above imply a decrease in the demand for that input at the firm level. In such a case, the demand for contract workers and managers is indeterminate. If the wage of contract workers increases by a larger proportion, the firm-level demand for contract workers falls, but the change in demand for the other labor inputs is indeterminate.

Firms intensive in routine tasks

Capital is believed to be a better substitute for labor in routine manual tasks and routine analytic tasks. These tasks tend to be performed by low and intermediate skill workers, respectively (see Acemoglu and Autor (2011) and Autor

[49] At the firm level, this means that $\frac{dw_k}{w_k} < \frac{dw_m}{w_m} < \frac{dw_r}{w_r} \lesseqgtr \frac{dw_c}{w_c}$. Below, I consider cases where $\frac{dw_r}{w_r} < \frac{dw_c}{w_c}$ and $\frac{dw_r}{w_r} > \frac{dw_c}{w_c}$ in turn.

Table 2: Summary of predictions

Average Industries		Routine Industries		Offshorable Industries	
dw_{reg}/w_{reg} > dw_{cont}/w_{cont}	dw_{reg}/w_{reg} < dw_{cont}/w_{cont}	dw_{reg}/w_{reg} > dw_{cont}/w_{cont}	dw_{reg}/w_{reg} < dw_{cont}/w_{cont}	dw_{reg}/w_{reg} > dw_{cont}/w_{cont}	dw_{reg}/w_{reg} < dw_{cont}/w_{cont}
$dX_k \geq 0$	$dX_k \geq 0$	$dX_k > 0$	$dX_k > 0$	dX_k ?	dX_k ?
$dX_{reg} < 0$	dX_{reg} ?	$dX_{reg} < 0$	dX_{reg} ?	$dX_{reg} < 0$	dX_{reg} ?
dX_{cont} ?	$dX_{cont} < 0$	dX_{cont} ?	$dX_{cont} < 0$	dX_{cont} ?	$dX_{cont} < 0$
dX_{man} ?	dX_{man} ?	dX_{man} ?	dX_{man} ?	dX_{man} ?	dX_{man} ?
				$dX_{k_o} \geq 0$	$dX_{k_o} \geq 0$
				$dX_{l_o} > 0$	$dX_{l_o} > 0$

Note: dw_j/w_j represents the percentage change in wage for input j. The question marks indicate an indeterminate sign. dX_j represents the change in demand for input j at the firm level. The inputs are abreviated as follows: regular workers → reg, contract workers → cont, managers → man, capital → k, offshore capital → k_o, and offshore labor → l_0.

and Dorn (2013)). As mentioned, contract workers are generally less skilled than regular workers, who are in turn presumably less skilled than managers. Hence, capital is more likely to be a substitute in certain tasks done by contract and/or regular workers. As a result, when firms are intensive in routine tasks, we would expect a clear increase in capital at the firm level following a minimum wage hike. When the wage of regular workers increases by a larger percentage than the wage of contract workers following a minimum wage hike, the former group will be in lower demand for routine tasks and the demand for contract workers may either fall, or remain the same, in other tasks, depending on input complementarity in these tasks. As a result, demand for regular workers is expected to fall at the firm level. The effect for managers remains undetermined. When the wage of contract workers increases by the largest percentage, it is the demand for these workers that is expected to fall, while the effect on demand for other labor inputs in unclear.

Firms intensive in offshorable tasks

Tasks that require fewer face-to-face interactions and that do not need to be performed in a specific location, like data analysis, call-based or online customer support, and programming are easier to offshore. These tasks are usually analytic rather than manual, and are more likely to be performed by a combination of regular workers and information technology. Therefore, a more appropriate functional form for these tasks could be:

$$y(i) = (min[\delta_l l(i),\ \delta_k k(i)]^{\frac{\varepsilon_i - 1}{\varepsilon_i}} + min[\delta_{l_o} l_o(i),\ \delta_{k_o} k_o(i)]^{\frac{\varepsilon_i - 1}{\varepsilon_i}})^{\frac{\varepsilon_i}{\varepsilon_i - 1}},$$

where l_o and k_o are labor and capital offshore, respectively. $\delta_l > 0$ and $\delta_k > 0$ if capital is used in these tasks, and ε_i increases when it is easier to offshore the task. In this case, the input demand at the task level is driven by the relative cost of the labor-capital bundle in India to the cost of the bundle offshore. Otherwise, the analysis and its conclusion remain the same. That is, the more offshorable the tasks are, the more likely it is that Indian inputs for these tasks will be replaced by inputs offshore following a minimum wage hike in India. As a result, we would expect to see an aggregate increase in the usage of inputs offshore by Indian firms more intensive in offshorable tasks. The demand for Indian inputs in these tasks would fall as a result. As explained before, the demand for capital inputs in other tasks is predicted to increase or remain unchanged. Therefore, the net change in capital used in India is unclear at the firm level. Like before, when regular workers become more expensive than contract workers, the demand for regular workers in offshorable tasks and other tasks falls. Hence, we would expect a drop in the demand for regular workers in India at the firm level in this case. When contract workers become more expensive than regular workers following a minimum wage change, the demand for contract workers in India decreases. However, it is unclear how the demand for regular workers will change in India. On the one hand, there is less demand for them in offshorable tasks. On the other hand, firms have an incentive to substitute contract workers with regular workers in tasks where both of these inputs are used.

4 Empirical strategy

Unfortunately, it is not possible to estimate the task-level model directly with the data at hand. To test whether increases in minimum wages have an effect on capital investment and employment, I adopt a difference-in-difference approach, instead, where I compare the adjustment in investment and employment of firms experiencing a minimum wage increase to that of firms that do not experience a hike, before and after the minimum wage increase. This "panel approach" uses variation from all firms in the data, and is prevalent in the minimum wage literature (see Neumark and Wascher (1992, 2007), and Neumark (2019) for a summary). An alternative "contiguous design" approach consists of comparing firms exposed to a minimum wage increase located in districts along state lines to firms in contiguous districts of the neighboring states.[50] Both approaches have advantages and potential pitfalls. The contiguous design rests on the idea that firms along state lines are more likely to evolve in similar economic environments. However, it is more susceptible to bias if there is movement of firms or workers across state lines due to the changing minimum wage. Moreover, this approach can introduce artificial variation. Since contiguous districts are paired, observations

[50] See Card and Krueger (2000), Dube et al. (2010), Allegretto et al. (2011), Soundararajan (2019), Coviello et al. (2022)

are duplicated for districts that share a border with more than one other district across state lines. However, the panel approach is more robust to migration as it does not rely only on observations along state lines, but can compare firms that may evolve in dissimilar environments.

Given the benefits and pitfalls of both strategies, I show results of the panel regression approach in the main body of the paper, and show that the results are robust to using the contiguous design in Appendix I. The reason for focusing on the panel approach is two-fold. The first reason is that I include district-by-year fixed effects that account for district-specific shocks. Hence, the critique that firms in border districts may evolve in more similar environments is less relevant in this context. The second reason comes from data constraints. To identify contiguous districts, I used shape files that use administrative codes for the districts. The ASI data also uses the administrative district codes, but the Prowess dataset uses its own code to classify districts. To identify neighboring districts in that dataset, I map the district names from the shape files to the district names in Prowess. However, this mapping is imperfect, which forces me to drop many firm-year observations.

For the main analysis, I estimate the following regression for the investment outcomes:

$$y_{fsdit} = \alpha + \eta M_{sit} + X_{fsit}\beta + \Phi + \varepsilon_{fsdit}, \tag{9}$$

where y is the dependent variable for firm f, in state s, district d, and 4-digit industry i in year t. M is the real minimum wage in that state and industry that year. The matrix X contains the firm level time varying predictors of capital investment mentioned in Subsection 2.2 and Φ is a matrix of fixed effects.[51] I include firm, district-by-year, and 4-digit-industry-by-year fixed effects. The first absorbs time-invariant firm-level characteristics. Firm fixed effects imply that I make use of within-firm variation, essentially comparing the same firm exposed to different levels of minimum wage. The final two sets of fixed effects account for idiosyncratic time trends within districts and within industries. This unusual level of granularity for time trends in a minimum wage regression alleviates some concerns with the panel approach since it accounts for differences in the evolution of economic environments across districts and industries. It also helps with concerns that are usually present when the minimum wage changes only at a higher administrative level such, as at the state level in the U.S. When this is the case, it is hard to distinguish the effect of minimum wage hikes from other confounding statewide policies.

To capture heterogeneity in the effect of minimum wage hikes, I interact the real industry minimum wage with the routineness (R_i) and offshorability intensity (O_i) of industries as follows:

[51] Note that age may be collinear with district-by-year fixed effects included in the analysis. However, I show in Appendix F, that excluding the age controls or all controls listed above has virtually no impact on the sign and size of the estimates.

$$y_{fsdit} = \alpha + \eta_0 M_{sit} + \eta_1 M_{sit} R_i + \eta_2 M_{sit} O_i + \beta X_{fsdit} + \Phi + \varepsilon_{fsdit} \tag{10}$$

Note that the time-invariant terms are absorbed by the fixed effects. I estimate the same regressions for the employment variables from the ASI data, where each term, other than the fixed effects, is further interacted with the type of worker (regular workers, contract workers, and managerial workers).[52] For the investment regressions, all firms with a positive amount of capital for some years of the study period are included. This way, the same firms are included in all investment regressions. Similarly for the employment regressions, firms with any number of paid adult employees for some years are included.[53]

In all regressions, standard errors are clustered at the 4-digit-industry-by-state level.[54] The identification of the coefficients in the regressions requires that conditional on the controls and fixed effects, there are no differences in pretrends, and that no other policy or event at the same level of variation occur simultaneously. Controlling for industry-by-year and district-by-year fixed effects accounts for differences in the dependent variable due to observed and unobserved differences between districts and industries. The fixed effects also account for policies occurring at the level of observation such as the NREGA roll- out explained in Subsection 2.1. I further use a distributed lag specification and produce event-study graphs to show that there is little evidence of pretrends in the present context. Another threat to identification can occur if firms or workers move due to minimum wage hikes. While this is a possibility, wage-induced worker migration, both in absolute and relative terms, is known to be very low in India (Klasen and Pieters (2015), Munshi and Rosenzweig (2016), Menon and Rodgers (2017)). Moreover, since I am leveraging within-firm variation, movements of firms should not affect the estimates (Coviello et al. (2022)).

I also show event studies in the paper as additional support to the difference-in-difference approach above. Following Freyaldenhoven et al. (2019), the distributed lag analogue of Equation (9) with two pre-event and four post-event periods can be written as:

$$y_{fsdit} = \alpha + \eta_{-2} M_{sit+2} + \sum_{s=-1}^{3} \eta_s \Delta M_{sit-s+1} + \eta_4 M_{sit-4} + X_{fsdit}\beta + \Phi + \varepsilon_{fsdit}, \tag{11}$$

where M_{sit+2} is the second minimum wage lead, M_{sit-4} is the fourth lag, and $\Delta M_{sit-s+1}$ is the difference in the real minimum wage between two consecutive years. For example, if $s = -1$, then ΔM_{sit+2} is the difference between the

[52] All employment regressions use sampling weights. Given the unbalanced nature of the ASI data, I include the same fixed effects as in the investment regressions, but no controls in the main analysis of the employment outcomes.

[53] For example, if a firm does not have contract workers for some years, then the number of contract workers for that firm is coded as 0 for those years. The ASI is cross-sectional by design, but since I am interested in within-firm adjustment, I restrict my attention to firms that are surveyed at least twice during the study period allowing for the inclusion of firm fixed effects.

[54] The significance levels change little if I use one cluster for states and one cluster for industries. The same is true if I cluster at the 4-digit-industry-by-district level, but the number of observations per cluster can be small. Therefore, the preferred clustering strategy is more sensible.

second and first lead of the minimum wage. The analogue to Equation (10) is obtained by interacting each minimum wage term with the RTI and offshorability indexes. They should really be thought of as robustness checks given that the span of the data is relatively short. Indeed, to ensure that no firm is dropped for this exercise, I set the minimum wage leads and lags equal to the last available data point.

Before moving on to the results, it is important to assess whether the granular fixed effects soak up all the variation in minimum wages. To do so, I regress those wages on the fixed effects, and plot the distribution of residuals in Figure 3. Blue indicates the distribution of the residuals when state, year, and industry fixed effects are included. Orange indicates the distribution of residuals when industry-by-year and district-by-year fixed effects are included instead. As shown, plenty of variation in the residual wages remains after including the more stringent and preferred fixed effects. This is true both for the nominal wages in Panel (a), and the real wages in Panel (b).

Figure 3: Variation in residuals

Note: I use the ASI dataset and regress the nominal and real minimum wages on industry, district, and year fixed effects in Panel (a). I regress the wages on industry-by-year and district-by-year fixed effects in Panel (b).

5 Results

5.1 Capital Investment

In this subsection, I investigate firms' capital investment responses following changes in minimum wages. I first present evidence of adjustment in overall capital in Table 3. The first column corresponds to Equation (9) and captures the average effect of a minimum wage hike across all firms. Column (2) presents the heterogeneous effects of the minimum wage across firms differing in their routineness intensity unconditional on offshorability. Column (3), does the same for offshorability unconditional on routineness intensity. The preferred specification can be found in Column (4) corresponding to Equation (10) where the heterogeneous effects due to differences in routineness and offshorability intensity are analyzed in tandem. The routineness and offshorability indexes are measured in standard deviations from the mean. Hence, the first coefficient in Columns (2) to (4) captures the effect for firms in the average industry. Each coefficient can be interpreted as a 1 percentage point change in the dependent variable.

The first thing to notice from Table 3 is that ignoring heterogeneity across industries would lead us to conclude that minimum wages have little effect on capital investment, as shown by the small and insignificant coefficient in Column (1). Comparing Columns (2) and (3) to Column (4) indicates that routineness intensity is the more important driver of heterogeneity in capital investment across firms, following a minimum wage hike. All else equal, the results from the preferred specification indicate that firms in industries more routine-intensive by 1 standard deviation above the mean increase their capital investment by 0.8 percentage points following a typical increase in the real minimum wage (2.5 rupees).[55] This represents an increase of 6.5% given that firms invest at a rate of 12.3% on average. Instead, firms in the average industry continue to invest in capital expenditures at their usual rate. The point estimate suggests that firms in industries more intensive in offshorable tasks reduce overall capital investment by about 4.9% (0.6 percentage point) following a typical minimum wage increase.

Table 3: Effect of a minimum wage increase on overall capital investment

	Capital			
	(1)	(2)	(3)	(4)
Minimum wage	-0.00742	-0.0797	-0.000153	-0.0773
	(0.0484)	(0.0514)	(0.0514)	(0.0501)
Minimum wage X RTI		0.320**		0.392***
		(0.126)		(0.142)
Minimum wage X Offshore			-0.0651	-0.167
			(0.115)	(0.121)
Observations	54997	54997	54997	54997
Mean of Y	12.29	12.29	12.29	12.29
SD	68.30	68.30	68.30	68.30

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

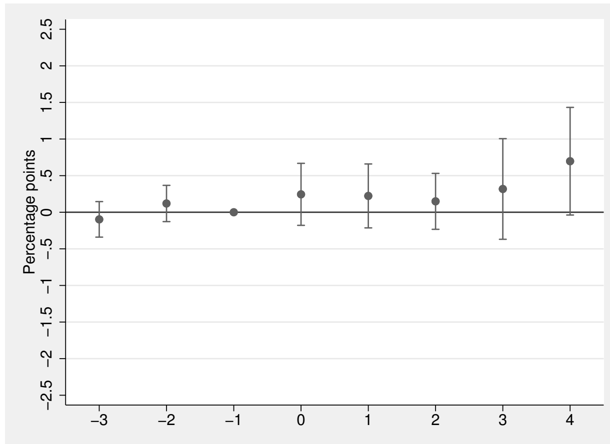
[55] $(\beta_1 + \beta_2) \times 2.5 = 0.64$ where 2.5 rupees is a typical increase in the real minimum wage.

Figure 4 presents the event study results for overall capital investment. The effect of an increase in the real minimum wage on the rate of investment for firms in the average industry are presented in Panel (a), for firms in more routine-intensive industries in Panel (b), and for firms in industries intensive in offshorable tasks in Panel (c).[56] The graphs present 90% confidence bands. As shown in this figure, there is little evidence of pretrend differences, and the graphs reflect the findings above, but with some nuance. Panels (a) and (c) indicate that firms in the average industry and firms in industries more intensive in offshorable tasks see no meaningful changes in their rate of investment following a wage hike. As I present below, this latter group of firms tends to see a reduction in computer investment, but not so much in machinery. Panel (b) shows that firms in routine industries increase their investment in capital shortly after the increase in the minimum wage, and continue to increase investment for multiple periods after the wage change. This indicates that minimum wage hikes do not lead to a one-time lump increase in capital, but to repeated increases over time.

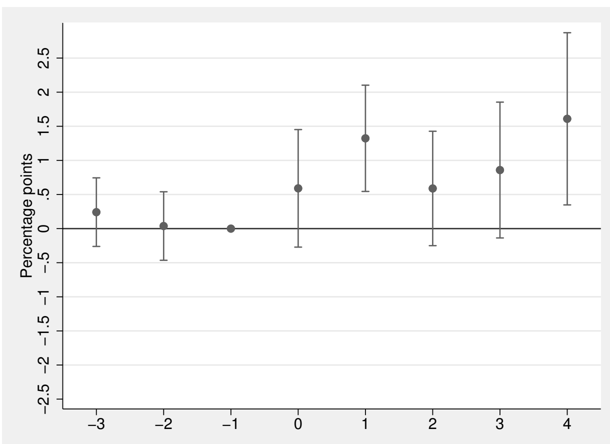
[56] Firms in more routine-intensive industries refer to firms in industries more routine intensive by 1 SD, holding offshorability at the mean (RTI=1 and Offshorability=0). Similarly, firms in industries intensive in offshorable tasks are firms in industries where the offshorability index is 1 SD above the mean, all else equal (RTI=0 and Offshorability=1).

Figure 4: Event study of a minimum wage increase on overall capital investment

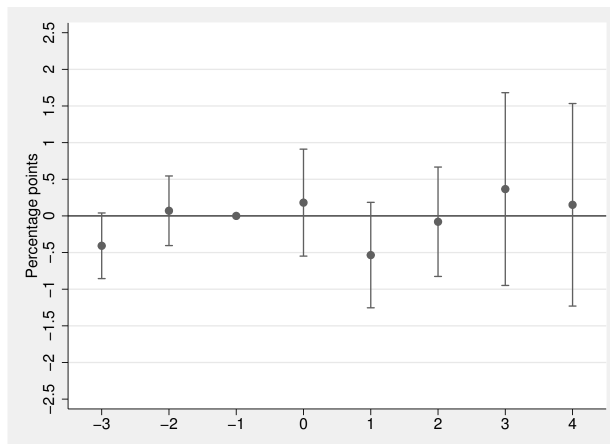
(a) Firms in the average industry



(b) Firms in routine-intensive industries



(c) Firms in industries intensive in offshorable tasks



Note: 90% confidence bands are displayed. I regress investment on 2 leads and 4 lags of the real minimum wages (see Equation 11). I also include an interaction of each of the minimum wage coefficient with the routineness and offshorability indexes, separately. I report the coefficients of the regression for a typical minimum wage hike (2.5 rupees). In Panel (a), I show the results when the routineness and offshorability indexes are at the mean (when they are equal to 0). In Panel (b), I report the results when the routineness intensity index is one SD above the mean (the offshorability index is kept at the mean). In Panel (c), I report the results when the offshorability intensity index is one SD above the mean (the routineness index is kept at the mean). All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Next, I investigate the effect of a hike on the two components of capital investment. In Table 4 and Figure 5, I examine how firms adjust their investment in machinery. Firms in the average industry, or in more offshorable industries, see little change in machinery investment, as shown in Figure 4. However, firms in more routine industries see a 6.1% (0.5 percentage points) increase in machinery investment for a usual increase in the minimum wage in their industry (2.5 rupees).

Table 4: Effect of a minimum wage increase on investment in machinery

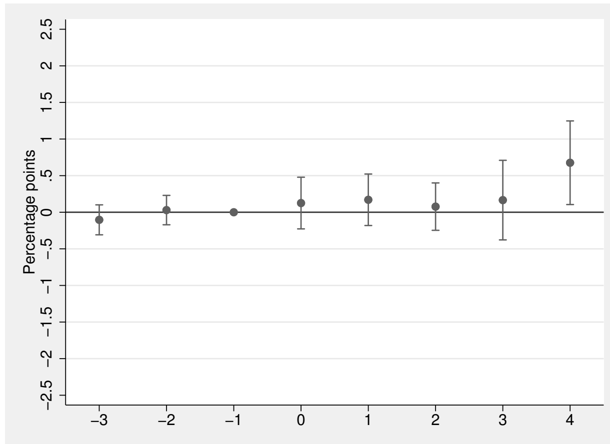
	Machinery			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0154	-0.0635	-0.0123	-0.0621
	(0.0417)	(0.0446)	(0.0440)	(0.0436)
Minimum wage X RTI		0.213*		0.253**
		(0.110)		(0.124)
Minimum wage X Offshore			-0.0283	-0.0943
			(0.0965)	(0.104)
Observations	54997	54997	54997	54997
Mean of Y	7.761	7.761	7.761	7.761
SD	49.27	49.27	49.27	49.27

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

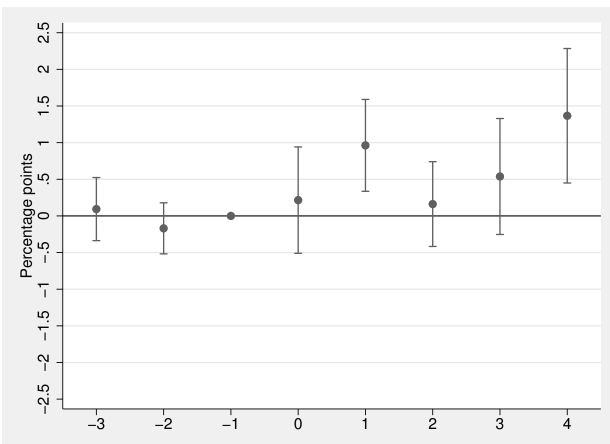
Figure 5 is also similar to Figure 4 in both magnitude and the periods at which the rate of investment changes. Just like before, there is little evidence of preexisting trends. Firms in routine-intensive industries see an increase in machinery investment shortly after the wage hike, and the rate of investment is sustained for multiple periods.

Figure 5: Event study of a minimum wage increase on investment in machinery

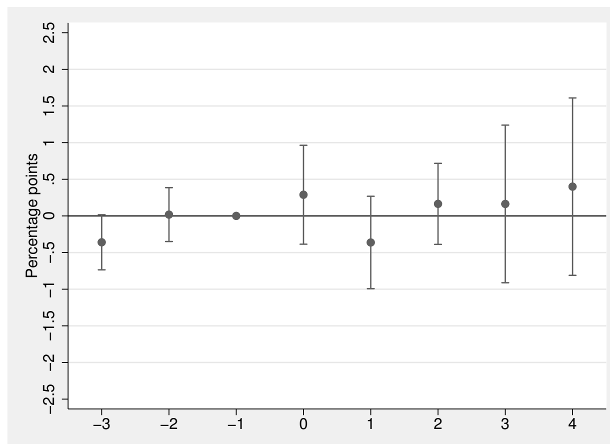
(a) Firms in the average industry



(b) Firms in routine-intensive industries



(c) Firms in industries intensive in offshorable tasks



Note: 90% confidence bands are displayed. I regress machinery investment on 2 leads and 4 lags of the real minimum wages (see Equation 11). I also include an interaction of each of the minimum wage coefficient with the routineness and offshorability indexes, separately. I report the coefficients of the regression for a typical minimum wage hike (2.5 rupees). In Panel (a), I show the results when the routineness and offshorability indexes are at the mean (when they are equal to 0). In Panel (b), I report the results when the routineness intensity index is one SD above the mean (the offshorability index is kept at the mean). In Panel (c), I report the results when the offshorability intensity index is one SD above the mean (the routineness index is kept at the mean). All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table 5 and Figure 6 present the investment responses for computers. The table indicates that firms in more routine-intensive industries see a 0.35 percentage point (or a 4% increase) in computer investment following a typical minimum wage hike. While the point estimate is not statistically significant, the figure below also points towards an increase in computer investment for these firms. Instead, firms more intensive in offshorable tasks see a 6.2% decline (0.5 percentage points) in computer investment following a typical hike.

Table 5: Effect of a minimum wage increase on investment in computers

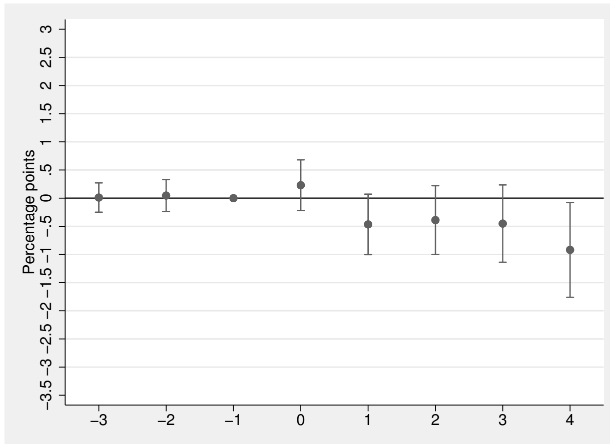
	Computers			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0341	-0.0671	-0.0244	-0.0651
	(0.0359)	(0.0476)	(0.0380)	(0.0464)
Minimum wage X RTI		0.146		0.207
		(0.138)		(0.145)
Minimum wage X Offshore			-0.0870	-0.141
			(0.0857)	(0.0872)
Observations	54997	54997	54997	54997
Mean of Y	8.332	8.332	8.332	8.332
SD	66.00	66.00	66.00	66.00

Note: 90% confidence bands are displayed. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

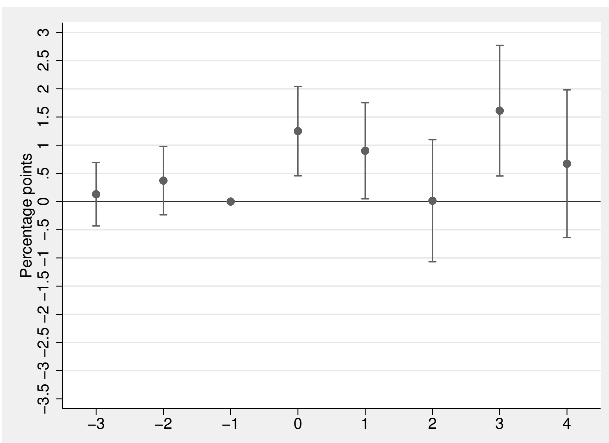
Panel (a) of Figure 6 suggests that firms in the average industry may increase their investment during the year that the minimum wage increases, and reduce their investment afterwards. This indicates that investment may fall relative to similar firms that are not exposed to a minimum wage hike. Panel (b) indicates that firms intensive in routine tasks see an increase in computer investment soon after a minimum wage hike, and the increase continues for ensuing periods. On the other hand, firms in more offshorable industries see a decrease in computer investment soon after the hike, and also continue to do so for multiple years.

Figure 6: Event study of a minimum wage increase on investment in computers

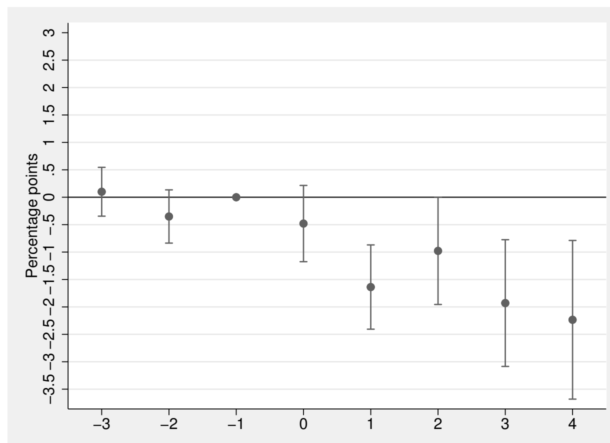
(a) Firms in the average industry



(b) Firms in routine-intensive industries



(c) Firms in industries intensive in offshorable tasks



Note: 90% confidence bands are displayed. I regress computer investment on 2 leads and 4 lags of the real minimum wages (see Equation 11). I also include an interaction of each of the minimum wage coefficient with the routineness and offshorability indexes, separately. I report the coefficients of the regression for a typical minimum wage hike (2.5 rupees). In Panel (a), I show the results when the routineness and offshorability indexes are at the mean (when they are equal to 0). In Panel (b), I report the results when the routineness intensity index is one SD above the mean (the offshorability index is kept at the mean). In Panel (c), I report the results when the offshorability intensity index is one SD above the mean (the routineness index is kept at the mean). All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

The results presented above indicate that changes in minimum wages lead firms in industries intensive in routine occupations to increase their investment in machinery and computers. If labor falls or remains unchanged, such an uptake in investment would suggest that firms more intensive in routine tasks set themselves on a mechanization/automation path following increases in labor costs. Firms intensive in offshorable occupations instead see a fall in their rate of investment in computers and related IT equipment. On the other hand, firms in industries that are intensive in neither routine nor offshorable tasks see little adjustment in capital.

Table 6: Effect of a minimum wage increase on profit margin

	Profit Margin	
	(1)	(2)
Minimum wage	0.0150	0.0183
	(0.00922)	(0.0130)
Minimum wage X RTI		-0.0351
		(0.0356)
Minimum wage X Offshore		0.0414
		(0.0305)
Observations	54997	54997
Mean of Y	2.093	2.093
SD	18.79	18.79

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the profit margin on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index and the interaction between the real minimum wages and the index of offshorability in Column (2). All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest and smallest 7.5% of values of the dependent variable are winsorized due high variation in this variable. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

In order to get a more complete picture of firm adjustments, it is important to investigate what happens to labor at the firm level.[57] Labor employment comes from the ASI data and will be tackled in the next section. Before moving on to employment responses, I make one final use of the Prowess data to study what happens to firms' profit margins and output growth following a minimum wage hike. Table 6 reports the results for firms' profit margins and indicates that profits are mostly unaffected by rising minimum wages.[58] In Table 7, I investigate whether changes to the minimum wages impact output growth, as measured by the growth in the sales of the goods produced and services offered by the firms.[59] Similar to the profit margin results, all coefficients are small in magnitude and statistically insignificant. This suggests that the firms' adjustments ensure that their bottom line is not altered by minimum wage regulations. Consistent with this, I find no evidence of change in price or output level in the ASI data either.

[57] As mentioned earlier, I obtained employment information from the ASI which only includes firms from manufacturing industries, while the investment results above include firms from all industries. The results above are similar in sign and magnitude when focusing on the manufacturing industries.

[58] The profit margin is defined as the percentage of profit that a firm generates from the total income it made in a year, after expenses, but before paying direct taxes (see Appendix B for additional details).

[59] This variable is computed in a fashion similar to the investment variables. I take the difference in gross sales of the output over the year and divide it by the average value of the gross sales at the beginning and end of the previous year.

Table 7: Effect of a minimum wage increase on the output growth

	Output Growth	
	(1)	(2)
Minimum wage	-0.00932	-0.00901
	(0.0113)	(0.0162)
Minimum wage X RTI		-0.0178
		(0.0446)
Minimum wage X Offshore		0.0332
		(0.0335)
Observations	54997	54997
Mean of Y	7.798	7.798
SD	18.09	18.09

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the growth in the sales of the goods produced and services offered by the firms on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index and the interaction between the real minimum wages and the index of offshorability in Column (2). All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest and smallest 5% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

5.2 Employment

Next, using data from ASI, I investigate how firms adjust their labor inputs when the minimum wages evolve. Table E.1 in Appendix E shows the results for the average number of employees working during a typical 8-hour workday for different categories of employees, namely regular workers, contract workers, and managers. Table E.2 does the same for the total number of mandays worked during the year for every type of employee. In the tables, the main coefficients are interacted with the type of employee, with regular workers being the excluded type. This facilitates comparisons between these groups, and suggests that minimum wage hikes have stronger employment effects for non-routine firms. However, the number of interaction terms in the tables make it harder to distinguish the total effects of the minimum wage increases. In the Tables L.5 and L.7, I compute the total effects for a typical hike in minimum wages (2.5 rupees) for each category of employee for firms in the average industry, and for firms in industries more routine intensive, by one standard deviation, and for firms in industries more offshorable by one SD.[60] The results in Tables L.5 and L.7 are similar in magnitude and significance.

Similar to capital investment, ignoring heterogeneity across firms would lead to a conclusion that minimum wages have no discernible effects on how firms adjust their labor inputs. Column (1) of Tables L.5 and L.7 captures the effect

[60] For example, holding offshorability at it's mean value of 0, the total effect of an increase for contract workers in industries more routine by 1 SD is $2.5*(\beta_1+\beta_2+\beta_4+\beta_5)$ where β_j represents the j^{th} coefficient of a given column in Table E.1.

of an increase in the minimum wage for firms across all manufacturing industries, while allowing for heterogeneous effects based on the routineness and offshorability of the different industries.

Table 8: Total effect of a minimum wage increase on the number of employees working in a typical workday

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
		Median firm compensation $< 105\%$ of minwage	Median firm compensation $[105\%, 130\%)$ of minwage	Median firm compensation $[130\%, 180\%)$ of minwage	Median firm compensation $> 180\%$ of minwage
Minimum wage	-.03	-.82***	-.15*	-.13	.29***
	(.052)	(.251)	(.088)	(.091)	(.081)
MinXContract	.06	.52***	.09	.11	-.01
	(.04)	(.157)	(.063)	(.071)	(.048)
MinXManager	-.04*	.41***	.01	-.08*	-.15***
	(.025)	(.12)	(.043)	(.043)	(.043)
MinXRTI	.45***	-.44*	.29*	.63***	.5***
	(.135)	(.258)	(.17)	(.271)	(.164)
MinXRTIXContract	-.27***	.31*	-.09	-.34**	-.32***
	(.082)	(.181)	(.125)	(.153)	(.105)
MinXRTIXManager	-.25***	.26**	-.12	-.39***	-.34***
	(.062)	(.13)	(.084)	(.106)	(.083)
MinXOff	-.45***	-1.2***	-.76***	-.46***	-.23
	(.124)	(.258)	(.214)	(.164)	(.183)
MinXOffXContract	.4***	.68***	.35**	.27**	.38***
	(.081)	(.177)	(.153)	(.12)	(.116)
MinXOffXManager	.24***	.53***	.21**	.01	.21***
	(.059)	(.148)	(.102)	(.085)	(.086)
Observations	420051	42270	45483	84618	244998
Mean of Y	39.59	36.44	30.74	44.88	40.17
SD	76.50	76.34	67.74	85.37	74.97

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

The first 3 coefficients in Column (1) of both tables are small and mostly insignificant suggesting that firms in the average industry do little or no adjustment to labor inputs following a change in the wages. Instead, firms in industries intensive in offshorable tasks substitute away from regular workers in favor of managers and contract workers. On the other hand, the results suggest that firms in more routine-intensive industries by one SD above the mean employ 0.45 additional regular workers, while employing about 0.3 fewer contract workers and managers following a hike. These latter results and the lack of adjustment for firms in the average industry are somewhat puzzling at first glance and warrants further investigation.

The ASI contains data on the total compensation bill paid to different groups of employees. This includes wages, salaries, overtime pay, paid leave including holidays, allowances, and bonuses, among other expenses, before taxes and insurance contributions. I divide this variable by the number of mandays worked by each employee group to derive an estimate of the compensation bill for a typical employee, expressed in rupees per day. For every district, industry, and year, I compute the median daily compensation across firms for regular workers, and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample.

In Columns (2) to (5), I look at firms in different compensation groups. I examine firms in districts and industries where the median firm-level compensation paid to regular workers is less than 105%, between 105% and 130%, between 130% and 180%, and above 180% of the average minimum wage in their district and industry over the study period.[61] The idea behind this exercise is that the closer regular workers' compensation is to the minimum wage, the more likely their wages will increase with a minimum wage hike.

[61] I chose the cutoffs such that approximately 25% of all industry-districts with some non-zero minimum wages fall into each compensation group. Then, I winsorize the top 5% of values of the ratio. I use only non-zero minimum wages when computing the average minimum wage. Firms in industry-states without minimum wages receive the highest ratios after winsorizing. Therefore, these firms fall into the last compensation group. Including a dummy for whether firms are in an industry, and state where the minimum wage increases from 0 to a positive value during the study period, and a dummy for whether firms are in industries and states without a minimum wage throughout the study period, has a negligible effects on the regressions. The regressions are also robust to excluding firms in industries and states lacking a minimum wage throughout the study period.

Table 9: Total effect of a minimum wage increase on the number of mandays

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
		Median firm compensation $< 105\%$ of minwage	Median firm compensation $[105\%, 130\%)$ of minwage	Median firm compensation $[130\%, 180\%)$ of minwage	Median firm compensation $> 180\%$ of minwage
Minimum wage	-9.11	-210.18***	-33.2	-40.1	79.31***
	(13.983)	(58.748)	(26.146)	(26.865)	(20.06)
MinXContract	11.96	124.49***	21.17	25.61	.5
	(9.993)	(39.311)	(16.856)	(18.997)	(12.263)
MinXManager	-8.73	96.19***	7.87	-23.71*	-39.74***
	(6.887)	(30.265)	(12.971)	(13.103)	(11.182)
MinXRTI	132.02***	-118.63*	111.29**	188.44***	141.6***
	(40.294)	(68.629)	(53.424)	(81.025)	(47.957)
MinXRTIXContract	-78.67***	55.9	-27.61	-105.97**	-90.59***
	(23.894)	(51.376)	(37.065)	(45.794)	(30.983)
MinXRTIXManager	-73.75***	39.88	-33.34	-120.12***	-99.01***
	(18.283)	(37.055)	(26.817)	(32.862)	(24.246)
MinXOff	-147.83***	-338.89***	-248.29***	-138.99***	-89.93*
	(38.79)	(67.991)	(72.602)	(51.815)	(52.527)
MinXOffXContract	119.93***	177.07***	93.37*	82.54***	127.98***
	(24.711)	(49.318)	(48.974)	(34.952)	(33.775)
MinXOffXManager	84.69***	135.04***	64.57*	14.99	79.98***
	(18.142)	(41.63)	(35.225)	(26.128)	(23.851)
Observations	420051	42270	45483	84618	244998
Mean of Y	11690.0	9926.0	8950.9	13563.5	11929.5
SD	23067.7	21719.8	20604.9	26111.5	22634.2

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of 8-hour workdays paid to each group of employee over the year on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Looking at firms in different compensation groups sheds light on the effect of a minimum wage increase on how firms switch between types of employees.[62] I find that firms in the first compensation group which are intensive in neither routine nor offshorable tasks have 0.82 fewer regular workers on a typical workday (equivalent to a reduction of 210 mandays for this group over the year), but 0.52 and 0.41 additional contract workers and managers following a

[62]As mentioned before, Prowess uses its own district codes, while other datasets use the district administrative codes. This introduces imperfections into the mapping. Moreover, many firms in the Prowess dataset are located in districts that are not in the ASI. As a result, I do not replicate the compensation heterogeneity analysis for the investment outcomes, since bringing the compensation measures to the Prowess dataset significantly cuts the sample of firms.

minimum wage hike (124 and 96 additional mandays). Firms in routine-intensive industries in this compensation group employ 0.44 fewer regular workers after a minimum wage increase (118 fewer mandays). For this group of firms, the evidence of substitution towards other workers is not as strong. Table L.5 suggests that routine intensive firms employ approximately 0.3 additional contract workers and managers following a typical minimum wage hike, corresponding to 56 and 40 additional mandays throughout the year for contract workers and managers, respectively. However, the estimates for the number of workdays paid to these two types of employees are far from significant. Taken together with the investment results, this suggests that routine intensive firms substitute regular workers in a large part for capital inputs. Firms intensive in offshorable tasks employ 1.2 fewer regular workers (339 fewer mandays), while the number of contract workers and managers increases by 0.68 and 0.53 (177 and 135 additional mandays), respectively.

Moving to the latter compensation groups, substitution away from regular workers weakens for all types of firms. For both firms in the average industry and firms in more routine-intensive industries, the substitution patterns eventually reverse. In the highest compensation group, firms in the average industry experience a small increase in regular workers employed on a typical 8-hour workday. This pattern also appears in more routine-intensive firms. For example, the number of regular workers employed per workday increases by 0.5-0.63 workers, and this time, the number of contract workers and managers falls by approximately 0.3-0.4 employees in compensation groups 3 and 4.

To understand the sign reversal in the latter compensation groups, it is helpful to investigate the relationship between regular workers' compensation and that of contract workers. Using all firms that employ both types of workers, I compute the average within-firm ratio of the compensation for regular workers to the compensation for contract workers. I find that, on average, the compensation for regular workers is 17% greater than that of contract workers in the first compensation group, while it is 24%, 45%, and 98% greater in the second, third, and final groups, respectively. This means that as regular workers' compensation increases relative to the prevailing minimum wage when moving from group 1 to group 4, contract workers' compensation remains close to the minimum wage in all groups. As mentioned in the data section, minimum wage enforcement is stricter for regular workers than it is for contract workers. Therefore, when regular workers are paid the minimum wage, their wages are likely to increase by a greater increment than contract workers' wages following a minimum wage hike. That is, regular workers will likely become more expensive, compared to contract workers, after the hike than they were before it. However, when the minimum wage increases and regular workers are paid well above it, but contract workers are paid close to the wage floor, there is more pressure on contract workers' wages. In other words, firms are more likely to substitute away from regular workers in the first compensation groups, but more likely to substitute contract workers for other inputs as we move in the latter compensation groups. These results, indeed, suggest a gradual change in which group of workers the firms replace. However, this pattern appears to take place at varying rates across firm types with routine intensive firms being the first to see a reversal, followed by firms in the average industry. This suggests that the minimum wage continues to bind for regular workers, even as non-wage compensation rises in non-routine firms. I find suggestive evidence that the minimum wage does affect a larger fraction of employees in non-routine industries. In Appendix D, I use NSS household survey data and regress the real daily wage data for employed individuals on the real minimum wage. I find that every rupee increase in the real minimum wage is associated with a real wage increase of 0.31 rupees for people employed in the average industry, and of 0.58 rupees for those employed in industries intensive in offshorable tasks. In comparison, the wage increases by 0.13 rupees for individuals employed in routine-intensive industries. This is also consistent with the stronger substitution patterns observed in non-routine firms within any compensation groups.

I present the event study results associated with the total effect of a typical minimum wage hike on the number of employees working on a typical workday in Figures M.1 to M.12 in Appendix M. The figures reveal several additional patterns. Firstly, they show little evidence of pre-event trend differentials, especially for firms in the first compensation group. Secondly, the substitution patterns described above happen gradually, and do persist in time for firms in this compensation group. In other words, a minimum wage hike appears to have a permanent effect on the employee mixes firms use. Gradual and persistent effects also seem to be present in firms of other compensation groups, but the results are estimated with less precision.

Together with the investment results, the substitution patterns between employee types are largely consistent with the model's predictions. Following a minimum wage increase, firms intensive in routine tasks substitute away from employees more likely to be bound by the minimum wage and towards all form of capital. Firms in the average industry see little change in capital investment, but substitute minimum wage workers for employees less likely to be affected by a minimum wage hike.[63] This labor-to-labor substitution is also observed in firms intensive in offshorable tasks who also see a decrease in capital investment. This is consistent with these firms offshoring certain tasks where labor and capital are used in tandem, and which are conducive to being done remotely. If these firms were asking workers to do offshorable tasks remotely from other Indian states where the minimum wage is lower, capital expenditure for the remote positions would still appear on firms' balance sheets. Therefore, we would be unlikely to see a fall in capital if this were the case. If firms were moving jobs to other parts of the country, we would also expect employment to increase in offshorable industries of a given state if wages rise in the same industries elsewhere in the country. I show in the aggregate section below that there is no evidence of that. I also show that minimum wages don't seem to have an impact on outsourcing for any groups of firms in Appendix P. The point estimate for the minimum wage is even negative (but remains insignificant) for firms in industries intensive in offshorable tasks, adding support to the idea that offshorable tasks are offshored rather than outsourced. However, to derive a more definitive answer on offshoring patterns would require additional data on offshore inputs, which is not available, as far as I am aware.

[63] If we are willing to make a series of simplifying assumptions about the model, it is possible to get estimates on certain elasticities. I find that the elasticity of substitution between Indian labor inputs is at least 1.24 and the elasticity of substitution between capital and workers is at least 2.4 in routine-intensive industries see Appendix R.

5.3 Robustness

As mentioned in Sections 2 and 4, the results presented above are similar in sign and magnitude when: (1) excluding controls from the investment regression, (2) using a dummy for high routineness and offshorability intensity rather than the continuous measures, (3) using more conservative winsorizing cutoffs, and (4)when using an alternative border design identification strategy (see Appendixes F, G , H and I). Recent literatute on difference-in-difference highlight the challenges of interpreting regression coefficients when different units are treated at different time (see Callaway and Sant'Anna (2021), De Chaisemartin and d'Haultfoeuille (2020), Sun and Abraham (2021) for example). I account for this in Appendix J using the stacked approach of Cengiz et al. (2019) as it is currently the only approach that can accomodate continuous heterogeneity and continuous treatment designs. Once more, the results are similar in size, magnitude, and significance. The opaque decision process that states use in deciding minimum wages makes it hard to predict minimum wage hikes (Adhvaryu et al. (2022)). Nevertheless, I show in Appendix K that the results are also similar when focusing on real minimum wage increases that exceed the national inflation level which may be harder to anticipate than lesser changes.[64] Given that minimum wages vary at the state, year, and industry level, it is possible that a worker in a given industry with a rising minimum wage also sees her outside option increase if the minimum wage also rises in other industries. In Appendix L, include the average real minimum wage in other industries of the same state that have a statutory minimum wage and its interactions with the routineness and offshorability indexes and show that the estimates are virtually unchanged.

Before concluding, I explore whether layoff regulations affect how firms adjust to minimum wage hikes, and whether the hikes affect aggregate employment.

5.4 Impact of layoff regulation intensity

In 1947, India adopted its Industrial Disputes Act which established layoff regulations for firms' regular and contract workers. The regulation established conditions under which workers could be laid off without consequences. In general, managers are not covered by layoff regulations and contract workers are employed on short-term contracts. Hence, firms can easily reduce the number of contract workers by not renewing their contracts. Therefore, the regulation applies primarily to regular workers. I follow Aghion et al. (2008) who builds on the work of Besley and Burgess (2004) to identify pro-employer, pro-worker, and neutral states that, respectively, facilitated, hindered, and did not change the difficulty of laying off regular workers, as dictated by the Act of 1947.[65] I run the same regressions for

[64] For this exercise, I set the real minimum wage to its previous value, unless the change exceeds, or is equal to, the inflation.

[65] Aghion et al. Identify 6 neutral states (Assam, Bihar, Haryana, Jammu and Kashmir, Punjab, and Uttar Pradesh), 6 pro-employer states (Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Rajasthan and Tamil Nadu), and 4 pro-worker states (Gujurat, Maharashtra, Orissa, and West Bengal). The remaining unclassified states are excluded from this section.

capital and employment separately comparing firms in pro-employer, neutral, and pro-worker states, and present the results in Appendix O.[66] I find that firms respond differently following a hike in the minimum wages depending on the layoff regulations' intensity. The exploratory results indicate that both the capital and the labor adjustments are stronger in pro-employer, and to some extent, in neutral states. This suggests that limiting the firms' ability to lay off workers also limits the speed at which they automate and offshore parts of their production following minimum wage hikes.

5.5 Aggregate employment and welfare

While the employment variables in the ASI data are useful in determining how firms switch between types of employees, it is important to note that they capture both intensive and extensive margin adjustments. Indeed, when the number of regular workers working during a usual workday falls for example, it is unclear whether some of these workers have been laid off, or whether some have experienced a reduction in work hours, or both.[67]

From a policy standpoint, it is also important to know whether firms' adjustments affect aggregate employment. However, the minimum wages vary at the state and industry level, complicating any analysis of their effects on aggregate unemployment time series. Fortunately, the National Sample Survey presented in the data section includes data on the working individuals' employment status every five years or so. Therefore, I aggregate the number of workers employed by industry, district, and age quartiles for three waves of the NSS that overlap with my study period. In Table N.1 of Appendix N, I regress the log of the aggregate employment on the real minimum wages, and their interaction with the routineness and offshorability indexes. The point estimates are negative, but tiny in magnitude and insignificant when looking at all age groups together. This is consistent with the findings Menon and Rodgers (2017) and Soundararajan (2019). However, the results suggest a negative effect on employment for the younger group of workers (14-24 years old). For a typical minimum wage hike, employment tends to fall by 0.3% in the first age quartile across all firm types. If all industries were to experience a typical increase in their minimum wages, employment would fall by 140,000 for this age group at the national level. The results also indicate a fall in employment of 0.3% for individuals between 44-65 years old in routine-intensive industries following a typical minimum wage hike which is about 11,300 workers per industry at the national level. While firms are able to keep their profit margins stable, the results above suggest that some workers may suffer a welfare loss. This suggests that welfare may be increasing for all groups at the aggregate level, given that a typical increase in the real minimum wage is associated with a 0.5% increase in real wage. However, it is important to note that work hours and non-wage compensations may also evolve with changes in the minimum wages.

[66] Fewer firms in Prowess are located in neutral states. For the capital investment regressions, I group pro-employer and neutral states together.

[67] Note that until rencently, it was very complicated to force a payroll worker to become a contract worker (see Business Insider (2020)).

In Table N.2, I also control for the average minimum wage in the same industry and year, but in other states, and interact it with the routineness and offshorability indexes. All coefficients related to the average wage in other states are small and insignificant, suggesting that employment in an industry and state is not significantly affected by the minimum wages in the same industry elsewhere in the country. Hence, there is little evidence that firms in any type of industry move jobs in cheaper part of the country.

6 Conclusion

Minimum wage policies have been focal points in labor studies and policy debates alike for decades. The attention has been on the effect of these policies on aggregate employment. However, the conclusions reached have been mixed in both developed and emerging economies. Yet, little is known about the adjustment process for firms following minimum wage hikes. This may shed light on the mixed conclusions observed at the aggregate level. The structural transformation literature suggests that an increase in wages can push firms to upgrade their production to the best available technology and innovate, and therefore change, the production structure at the aggregate level. The automation and offshoring literature provides additional nuance and predicts that firms intensive in routine tasks are more likely to mechanize and automate their production, while firms relying on offshorable tasks are likely to relocate part, or all, of their operations to other countries.

In this paper, I explore how Indian firms that differ in their routine and offshorable task intensity adjust a wide array of capital and labor inputs following minimum wage hikes. I find that firms intensive in routine tasks invest more in machinery and computers, to the detriment of workers paid the minimum wage. This indicates that they automate certain tasks. Firms intensive in offshorable tasks rely less on Indian workers paid the minimum wage and computers, but more on other Indian employees. This suggests that some tasks combining workers and computers may be moved offshore, while other tasks are relegated to different employees in India. Firms that are not intensive in these two task types see little change in capital investment, but also replace workers paid the minimum wage with other employees. The adjustment done by firms allow them to keep their profit margin, prices, and output stable as the minimum wage rise in their industry.

Overall, these results indicate that firms' ability to automate and offshore certain tasks is a key driver of their heterogeneous responses to minimum wage hikes. The results indicate that while some tasks may be offshored and automated, there is also a substitution between different groups of employees. This may help us better understand why rising minimum wages may yield mixed results at the aggregate level. For example, some firms where the minimum wage binds stronger for regular workers substitute some of these workers with contractual workers. The opposite is observed in firms where the minimum wage is more likely to bind for contract workers. In addition, when workers' wages rise, some firms rely more on managers, while other firms rely less on them. At the national level, employees from all of these firms are clumped together. Hence, it is perhaps unsurprising that the literature has reported contradictory results, even within the same country. In the context at hand, I find evidence that employment at the national level falls for younger workers in all industry types, and for older workers in industries more intensive in routine tasks. Meanwhile, employment in the middle age group is unaffected.

One thing is clear, however: minimum wages can have an important impact on the production landscape of developing countries, which can play a role in the speed and shape of the structural transformation of these nations.

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A Original schedule of the minimum wages act, 1948

Part I-Non-agricultural occupations

1. Employment in any woolen carpet making or shawl weaving establishment.
2. Employment in any rice mill flour mill or dal mill.
3. Employment in any tobacco (including bidi making) manufactory.
4. Employment in any plantation that is to say any estate which is maintained for the purpose of growing cinchona rubber tea or coffee.
5. Employment in any oil mill.
6. Employment under any local authority.
7. Employment on the construction or maintenance of roads or in building operations.
8. Employment in stone breaking or stone crushing.
9. Employment in any lac manufactory.
10. Employment in any mica works.
11. Employment in public mo tor transport.
12. Employment in tanneries and leather manufactory.
13. Employment in gypsum mines.
14. Employment in barytes mines.
15. Employment in bauxite mines.
16. Employment in manganese mines.
17. Employment in the maintenance of buildings and employment in the construction and maintenance of runways.
18. Employment in china clay mines.
19. Employment in kyantite mines.
20. Employment in copper mines.

21. Employment in clay mines covered under the Mines Act 1952 (35 of 195 2).

22. Employment in magnesite mines covered under the Mines Act 1952 (35 of 195 2).

23. Employment in white clay mines.

24. Employment in stone mines.

Part II-Non-agricultural occupations

(1) Employment in agriculture that is to say in any form of farming including the cultivation and tillage of the soil, dairy farming, the production, cultivation, growing and harvesting of any agricultural or horticultural commodity, the raising of live-stock, bees or poultry and any practice performed by a farmer or on a farm as incidental to or in conjunction with farm operation (including any forestry or timbering operations and the preparation for market and delivery to storage or to market or to carriage for transportation to market farm produce).

B Definition of key variables

The Prowess data dictionary defines the plant and machinery as follow:

> Plant and machinery are essentially production facilities, typically for manufacturing goods. Examples for plant & machinery are air conditioner plant, furnace, boiler, water pumps, effluent treatment plant (ETP), water treatment plant, moulds, tools, weighing scale, hydraulic works, construction equipment, medical equipment and surgical instrument, studio equipment, testing equipment, windmill, workshop equipment, factory equipment, etc.

Importantly, electrical installations are defined as follows:

> Electrical installations includes electrical machinery, energy saving devices, UPS, generator/ diesel generator set, transformers, etc. Electrical machinery includes switchgear, transformers and other stationary plant and wiring, fitting of electric light and fan installations.
>
> Electrical installations are often reported along with plant and machinery by companies in their Annual Report. If the electrical installation assets can be segregated then it is reported separately in Prowess. Else, it is reported along with plant and machinery in Prowess.

Since, most firms do not distinguish between electrical machinery and non-electrical machinery, I sum the two categories above for the firms that do segregate between the two. Note that buildings are not included, hence the resulting plant and machinery category includes only physical equipment required for the production.

The computer category includes computers and peripheral IT systems. Since software and computers are intrinsically linked, I add software to this category. Just like before, this choice is also driven by the fact that it's not clear if all firms report software separately from the computer category.

The profit margin variable used in the paper is defined as follows:

> The percentage of profit that a company generated from the total income it earned during a period, after meeting all the expenses but before paying direct taxes.

The documentation states that this variable provides a comparable profit metric to compare firms within and across industries.

From the ASI documentation, total employee compensations are defined to include all remuneration in monetary terms and also payable more or less regularly in each pay period to workers as compensation for work done during the accounting year. It includes (a) direct wages and salary (i.e., basic wages/salaries, payment of overtime, dearness, compensatory, house rent and other allowances) (b) remuneration for the period not worked (i.e., basic wages, salaries and allowances payable for leave period, paid holiday, lay- off payments and compensation for unemployment, if not paid from sources other than employers) (c) bonus and ex-gratia payment paid both at regular and less frequent intervals (i.e., incentive bonuses, productive bonuses, profit sharing bonuses, festival or year-end bonuses etc.) It excludes lay off payments which are made from trust or other special funds set up exclusively for this purpose i.e., payments not made by the employer. It also excludes imputed value of benefits in kind, employer's contribution to old age benefits and other social security charges, direct expenditure on maternity benefits creches and other group benefits Traveling and other expenditure incurred for business purposes and reimbursed by the employer are excluded. The wages are expressed in terms of gross value i.e., before deduction for fines, damages, taxes, provident fund, employee's state insurance contribution etc.

C Summary statistics

Table C.1: Minimum wages summary statistics

Variables	Mean/(S.D.)
Percentage of industries with a minimum wage across states	45.5 % (19.8 %)
Nominal minimum wage across states and industries	₹ 80.5 (₹ 21)
Real minimum wage across states and industries	₹ 94.5 (₹ 23.1)
Size of real minimum wage increases across states and industries	₹ 2.5 (₹ 8.2)
Number of years between changes in a given industry and state	1.5 Years (.60 Years)
Number of nominal minimum wage changes between 2002 and 2008	2587
Number of 4-digit industries with a minimum wage between 2002 and 2008	6325

Notes: The real minimum wage is in rupees of 2008.

Table C.2: Investment summary statistics

Variables	Mean/(S.D.)
Capital investment	12.3 % (68.3 %)
Machinery investment	7.8 % (49.3 %)
Computer investment	8.3 % (49.3) %
Profit margin	2.1 % (18.8) %
Number of firms	18438

Notes: Only firms with nonzero net value of capital for some years over the sample are included. The investment variables are wisorized at the top 5% and bottom 1%. Capital is the combination of machinery and computers. The mean capital investment is larger than the mean of its individual components because a firm can invest in machinery, but not in computer or vice versa for certain years. The profit margin can be negative as firms can make losses and large outliers exist most likely because the net revenue (revenue after expenses) can be close to 0. Hence, I winsorize the top and bottom 10% of values for this variable.

Table C.3: Employment summary statistics

Variables	Mean/(S.D.)	Mean increase/(S.D.)
A-Number of employees per 8h shift		
Regular workers	88	.9
	(111.3)	(39.6)
Contract workers	53	2.1
	(56.5)	(39)
Managers	13	.3
	(16.8)	(6.9)
B-Yearly number of mandays paid to		
Regular workers	25886	393.3
	(33741.4)	(12439.5)
Contract workers	15491	707.9
	(17295.9)	(11725.4)
Managers	3720	108.5
	(5115.6)	(2128.3)
Number of firms	44759	

Notes: Panel A presents summary statistics for the number of employees on a typical 8-hour shift, and panel B does the same for the number of yearly mandays paid to the 3 different groups of employees. Column 2 presents the employment averages that are conditional on having a positive number of the type of employee listed at any point during the study period. The variables are bounded at 0 so I wisorize the top 5% of values. The growth statistics in Column 3 represent the average yearly within-firm growth in the number of employeeand mandays for the different type of employee conditional on having a positive number of employee of this type at any point during the study period.

D Binding minimum wage

Table D.1: Effect of a minimum wage increase on wages using household survey data

	(1) Daily wage	(2) Daily wage
Minimum wage	0.281**	0.312**
	(0.118)	(0.131)
Minimum wage X RTI		-0.185
		(0.132)
Minimum wage X Offshore		0.272***
		(0.0868)
Observations	10527	10527
Mean of Y	134.7	134.7
SD	169.4	169.4

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. India's National Sample Survey collects data on employment for individuals in the 14-65 age range every five years or so. The 2000, 2005, and 2008 waves contain employment data. I compile the wage of all individuals in these waves. I regress the wage of employed individuals on the real minimum wages in Column (1). In Column (2), I also include the interactions between the minimum wages and the routineness and offshorability indexes. All specifications include district, year, four-digit-industry fixed effects, and three-digit-occupation fixed effects. All specifications use the sample weights provided in the surveys. I report White standard errors in parenthesis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. I exclude observations in states and industries where no statutory minimum wages exist. The minimum wage data spans from 2002-2008. When merging in the wage data to the survey data, I attribute the 2002 wages to the 2000 employment wave. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

E Marginal effects for the employment regressions

Table E.1: Effect of a minimum wage increase on the number of employees working in a typical workday

	(1)	(2)	(3)	(4)	(5)
	Pooled	Group 1	Group 2	Group 3	Group 4
Minimum wage	-0.0137	-0.328***	-0.0619*	-0.0534	0.114***
	(0.0208)	(0.100)	(0.0354)	(0.0363)	(0.0325)
MinXContract	0.0368	0.536***	0.0975*	0.0988	-0.118**
	(0.0356)	(0.159)	(0.0568)	(0.0620)	(0.0492)
MinXManager	-0.00273	0.492***	0.0657	0.0228	-0.172***
	(0.0279)	(0.143)	(0.0455)	(0.0478)	(0.0466)
MinXRTI	0.193***	0.152**	0.178***	0.307**	0.0852
	(0.0508)	(0.0615)	(0.0609)	(0.119)	(0.0593)
MinXRTIXContract	-0.325***	-0.236**	-0.251***	-0.488***	-0.210**
	(0.0830)	(0.0978)	(0.0968)	(0.188)	(0.0936)
MinXRTIXManager	-0.278***	-0.213***	-0.231***	-0.432***	-0.163*
	(0.0701)	(0.0695)	(0.0727)	(0.158)	(0.0853)
MinXOff	-0.166***	-0.153***	-0.241***	-0.131**	-0.205***
	(0.0472)	(0.0568)	(0.0836)	(0.0597)	(0.0711)
MinXOffXContract	0.302***	0.218***	0.345**	0.193**	0.362***
	(0.0762)	(0.0766)	(0.136)	(0.0974)	(0.117)
MinXOffXManager	0.279***	0.201***	0.322***	0.165*	0.349***
	(0.0675)	(0.0702)	(0.116)	(0.0868)	(0.0991)
Observations	420051	42270	45483	84618	244998
Mean of Y	39.59	36.44	30.74	44.88	40.17
SD	76.50	76.34	67.74	85.37	74.97

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table E.2: Effect of a minimum wage increase on the number of mandays

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-3.642	-84.07***	-13.28	-16.04	31.73***
	(5.593)	(23.50)	(10.46)	(10.75)	(8.024)
MinXContract	8.427	133.9***	21.75	26.29	-31.52***
	(9.215)	(37.49)	(16.11)	(17.46)	(11.96)
MinXManager	0.152	122.5***	16.43	6.558	-47.62***
	(7.655)	(33.72)	(13.65)	(14.58)	(11.49)
MinXRTI	56.45***	36.62**	57.80***	91.42**	24.91
	(14.99)	(16.51)	(19.53)	(35.51)	(17.33)
MinXRTIXContract	-92.70***	-64.06**	-77.31***	-144.1***	-61.35**
	(24.02)	(26.16)	(29.92)	(55.70)	(27.11)
MinXRTIXManager	-82.46***	-59.14***	-74.28***	-130.0***	-48.62*
	(20.83)	(17.22)	(24.64)	(47.86)	(25.10)
MinXOff	-55.49***	-51.48***	-86.04***	-39.55**	-67.70***
	(15.55)	(18.00)	(28.51)	(18.90)	(21.96)
MinXOffXContract	98.68***	72.52***	114.9**	62.33**	118.7***
	(24.94)	(23.59)	(46.02)	(30.43)	(35.69)
MinXOffXManager	92.85***	67.02***	108.7***	55.03**	115.6***
	(22.14)	(21.66)	(40.26)	(27.31)	(30.09)
Observations	420051	42270	45483	84618	244998
Mean of Y	11690.0	9926.0	8950.9	13563.5	11929.5
SD	23067.7	21719.8	20604.9	26111.5	22634.2

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of 8-hour workdays paid to each group of employee over the year on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

F Robustness with fewer controls for investment regressions

F.1 Without controlling for age

Table F.1: Effect of a minimum wage increase on overall capital investment without controlling for age

	Capital			
	(1)	(2)	(3)	(4)
Minimum wage	-0.00758	-0.0796	-0.000145	-0.0771
	(0.0482)	(0.0513)	(0.0512)	(0.0500)
Minimum wage X RTI		0.319**		0.391***
		(0.126)		(0.141)
Minimum wage X Offshore			-0.0665	-0.168
			(0.115)	(0.121)
Observations	54997	54997	54997	54997
Mean of Y	12.29	12.29	12.29	12.29
SD	68.30	68.30	68.30	68.30

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table F.2: Effect of a minimum wage increase on investment in machinery without controlling for age

	Machinery			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0161	-0.0635	-0.0126	-0.0621
	(0.0417)	(0.0446)	(0.0439)	(0.0436)
Minimum wage X RTI		0.210*		0.252**
		(0.110)		(0.124)
Minimum wage X Offshore			-0.0311	-0.0967
			(0.0967)	(0.104)
Observations	54997	54997	54997	54997
Mean of Y	7.761	7.761	7.761	7.761
SD	49.27	49.27	49.27	49.27

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress machinery investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table F.3: Effect of a minimum wage increase on investment in computers without controlling for age

	Computers			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0316	-0.0654	-0.0228	-0.0635
	(0.0364)	(0.0490)	(0.0387)	(0.0479)
Minimum wage X RTI		0.150		0.207
		(0.140)		(0.147)
Minimum wage X Offshore			-0.0794	-0.133
			(0.0858)	(0.0870)
Observations	54997	54997	54997	54997
Mean of Y	8.332	8.332	8.332	8.332
SD	66.00	66.00	66.00	66.00

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress computer investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

F.2 Without controls

Table F.4: Effect of a minimum wage increase on overall capital investment without controls

	Capital			
	(1)	(2)	(3)	(4)
Minimum wage	-0.00586	-0.0768	0.00165	-0.0743
	(0.0481)	(0.0512)	(0.0510)	(0.0499)
Minimum wage X RTI		0.314**		0.386***
		(0.125)		(0.141)
Minimum wage X Offshore			-0.0672	-0.168
			(0.115)	(0.121)
Observations	54997	54997	54997	54997
Mean of Y	12.29	12.29	12.29	12.29
SD	68.30	68.30	68.30	68.30

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table F.5: Effect of a minimum wage increase on investment in machinery without controls

	Machinery			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0150	-0.0613	-0.0114	-0.0599
	(0.0415)	(0.0445)	(0.0437)	(0.0434)
Minimum wage X RTI		0.205*		0.247**
		(0.109)		(0.124)
Minimum wage X Offshore			-0.0324	-0.0966
			(0.0965)	(0.104)
Observations	54997	54997	54997	54997
Mean of Y	7.761	7.761	7.761	7.761
SD	49.27	49.27	49.27	49.27

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress machinery investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table F.6: Effect of a minimum wage increase on investment in computers without controls

	Computers			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0312	-0.0651	-0.0223	-0.0632
	(0.0364)	(0.0489)	(0.0387)	(0.0477)
Minimum wage X RTI		0.150		0.208
		(0.140)		(0.147)
Minimum wage X Offshore			-0.0794	-0.134
			(0.0859)	(0.0871)
Observations	54997	54997	54997	54997
Mean of Y	8.332	8.332	8.332	8.332
SD	66.00	66.00	66.00	66.00

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress computer investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

G Discrete ranking

G.1 Capital

Table G.1: Effect of a minimum wage increase on overall capital investment where the RTI and Offshorability variables equal one for industries in the 75th percentile

	Capital			
	(1)	(2)	(3)	(4)
Minimum wage	-0.00742	-0.0264	-0.000153	-0.0144
	(0.0484)	(0.0528)	(0.0514)	(0.0522)
Minimum wage X RTI		0.286*		0.377**
		(0.146)		(0.171)
Minimum wage X Offshore			-0.0651	-0.162
			(0.115)	(0.130)
Observations	54997	54997	54997	54997
Mean of Y	12.29	12.29	12.29	12.29
SD	68.30	68.30	68.30	68.30

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. Here, the index are equal to one for industries in the 75th percentile and zero otherwise. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table G.2: Effect of a minimum wage increase on overall capital investment where the RTI and Offshorability variables equal one for industries in the 75th percentile

	Machinery			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0154	-0.0307	-0.0123	-0.0231
	(0.0417)	(0.0455)	(0.0440)	(0.0450)
Minimum wage X RTI		0.229*		0.286*
		(0.126)		(0.149)
Minimum wage X Offshore			-0.0283	-0.102
			(0.0965)	(0.112)
Observations	54997	54997	54997	54997
Mean of Y	7.761	7.761	7.761	7.761
SD	49.27	49.27	49.27	49.27

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. Here, the index are equal to one for industries in the 75th percentile and zero otherwise. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table G.3: Effect of a minimum wage increase on overall capital investment where the RTI and Offshorability variables equal one for industries in the 75th percentile

	Computers			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0341	-0.0338	-0.0244	-0.0264
	(0.0359)	(0.0371)	(0.0380)	(0.0379)
Minimum wage X RTI		-0.00421		0.0521
		(0.135)		(0.153)
Minimum wage X Offshore			-0.0870	-0.100
			(0.0857)	(0.0952)
Observations	54997	54997	54997	54997
Mean of Y	8.332	8.332	8.332	8.332
SD	66.00	66.00	66.00	66.00

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. Here, the index are equal to one for industries in the 75th percentile and zero otherwise. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

G.2 Number of employees working in a typical workday

Table G.4: Total effect of a minimum wage increase on the number of employees working in a typical workdaywhere the RTI and Offshorability variables equal one for industries in the 75th percentile

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	.13	-.75***	-.17*	-.01	.58***
	(.093)	(.277)	(.092)	(.135)	(.136)
MinXContract	-.04	.54***	.09	.05	-.17**
	(.06)	(.168)	(.066)	(.098)	(.079)
MinXManager	-.12***	.43***	.01	-.1*	-.28***
	(.042)	(.133)	(.047)	(.062)	(.067)
MinXRTI	.28***	-.52**	.08	.39***	.3**
	(.108)	(.262)	(.14)	(.161)	(.136)
MinXRTIXContract	-.14**	.54***	.32***	-.22***	-.08
	(.068)	(.184)	(.11)	(.088)	(.104)
MinXRTIXManager	-.25***	.35**	.09	-.34***	-.29***
	(.062)	(.157)	(.09)	(.087)	(.066)
MinXOff	-.07	-.99***	-.47***	-.01	.13
	(.093)	(.267)	(.127)	(.228)	(.115)
MinXOffXContract	.1*	.44***	-.06	.05	.01
	(.057)	(.179)	(.108)	(.134)	(.081)
MinXOffXManager	.1*	.42***	-.03	-.1	.03
	(.05)	(.144)	(.09)	(.098)	(.058)
Observations	433770	42309	45804	85929	257019
Mean of Y	39.591	36.439	30.74	44.882	40.169
SD	76.502	76.337	67.741	85.369	74.971

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Here, the index are equal to one for industries in the 75th percentile and zero otherwise. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table G.5: Total effect of a minimum wage increase on the number of employees working in a typical workday where the RTI and Offshorability variables equal one for industries in the 75th percentile

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	38.87	-179.16***	-39.96	-2.72	163.87***
	(27.627)	(60.751)	(27.303)	(40.546)	(38.471)
MinXContract	-17.13	131.57***	23.44	3.21	-43.51*
	(17.033)	(39.282)	(17.688)	(27.566)	(22.917)
MinXManager	-33.25***	103.9***	9.79	-36.9*	-77.22***
	(12.406)	(31.202)	(14.127)	(19.399)	(18.664)
MinXRTI	78.24***	-133.92**	34.69	121.79***	81.19**
	(32.006)	(68.211)	(42.986)	(48.967)	(39.779)
MinXRTIXContract	-44.34**	128.18***	92.17***	-66.85***	-22
	(19.63)	(52.335)	(30.657)	(26.15)	(31.498)
MinXRTIXManager	-73.27***	75.45*	39.93	-97.98***	-86.13***
	(18.916)	(45.288)	(27.627)	(27.272)	(19.679)
MinXOff	-20.78	-267.8***	-137.82***	-5.49	35.71
	(27.284)	(68.83)	(39.238)	(68.944)	(33.351)
MinXOffXContract	30.42*	100.92**	-24.09	4.32	7.41
	(16.519)	(49.024)	(32.355)	(39.483)	(24.274)
MinXOffXManager	34.63***	97.36***	-12.13	-34.34	14.44
	(14.757)	(40.306)	(27.839)	(29.858)	(17.393)
Observations	433770	42309	45804	85929	257019
Mean of Y	11690.02	9926.014000000001	8950.928	13563.478	11929.491
SD	23067.657	21719.842	20604.881	26111.457	22634.247

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of yearly mandays on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Here, the index are equal to one for industries in the 75th percentile and zero otherwise. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

H Robustness to winsorizing highest 1% of values

Table H.1: Effect of a minimum wage increase on overall capital investment- winsorizing top and bottom 1% of values

	Capital			
	(1)	(2)	(3)	(4)
Minimum wage	-0.00951	-0.151	0.0160	-0.145
	(0.106)	(0.154)	(0.115)	(0.153)
Minimum wage X RTI		0.626*		0.816**
		(0.359)		(0.391)
Minimum wage X Offshore			-0.228	-0.441*
			(0.227)	(0.239)
Observations	54997	54997	54997	54997
Mean of Y	23.57	23.57	23.57	23.57
SD	160.0	160.0	160.0	160.0

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table H.2: Effect of a minimum wage increase on investment in machinery- winsorizing top and bottom 1% of values

	Machinery			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0145	-0.0815	0.00900	-0.0768
	(0.0783)	(0.105)	(0.0825)	(0.104)
Minimum wage X RTI		0.296		0.436
		(0.247)		(0.270)
Minimum wage X Offshore			-0.211	-0.324*
			(0.156)	(0.168)
Observations	54997	54997	54997	54997
Mean of Y	13.52	13.52	13.52	13.52
SD	96.08	96.08	96.08	96.08

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress machinery investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table H.3: Effect of a minimum wage increase on investment in computers- winsorizing top and bottom 1% of values

	Computers			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0462	-0.0704	-0.0311	-0.0678
	(0.0513)	(0.0664)	(0.0546)	(0.0645)
Minimum wage X RTI		0.107		0.186
		(0.180)		(0.193)
Minimum wage X Offshore			-0.135	-0.184
			(0.128)	(0.137)
Observations	54997	54997	54997	54997
Mean of Y	11.97	11.97	11.97	11.97
SD	100.0	100.0	100.0	100.0

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress computer investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table H.4: Effect of a minimum wage increase on the number of employees working in a typical workday- winsorizing top 1% of values

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-0.00193	-0.421***	-0.0989**	-0.0656	0.161***
	(0.0255)	(0.141)	(0.0491)	(0.0489)	(0.0463)
MinXContract	0.0171	0.612***	0.109	0.134*	-0.175**
	(0.0418)	(0.215)	(0.0753)	(0.0797)	(0.0698)
MinXManager	-0.0230	0.578***	0.0849	0.0291	-0.245***
	(0.0346)	(0.202)	(0.0644)	(0.0682)	(0.0663)
MinXRTI	0.287***	0.218**	0.210***	0.458**	0.219**
	(0.0756)	(0.0971)	(0.0731)	(0.199)	(0.104)
MinXRTIXContract	-0.459***	-0.281**	-0.308***	-0.700**	-0.379**
	(0.121)	(0.143)	(0.114)	(0.299)	(0.164)
MinXRTIXManager	-0.428***	-0.301***	-0.304***	-0.653**	-0.333**
	(0.107)	(0.106)	(0.0883)	(0.263)	(0.155)
MinXOff	-0.261***	-0.186**	-0.279***	-0.183**	-0.411**
	(0.0750)	(0.0791)	(0.106)	(0.0827)	(0.175)
MinXOffXContract	0.467***	0.272**	0.443***	0.261*	0.695**
	(0.116)	(0.113)	(0.165)	(0.145)	(0.279)
MinXOffXManager	0.439***	0.267**	0.425***	0.223*	0.666***
	(0.106)	(0.107)	(0.140)	(0.131)	(0.254)
Observations	420051	42270	45483	84618	244998
Mean of Y	52.04	45.91	38.80	60.15	53.05
SD	128.1	123.6	108.2	146.5	125.8

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table H.5: Total effect of a minimum wage increase on the number of employees working in a typical workday-winsorizing top 1% of values

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	0	-1.05***	-.25**	-.16	.4***
	(.064)	(.352)	(.123)	(.122)	(.116)
MinXContract	.04	.48**	.03	.17*	-.04
	(.047)	(.211)	(.082)	(.091)	(.07)
MinXManager	-.06*	.39**	-.04	-.09	-.21***
	(.032)	(.181)	(.065)	(.069)	(.062)
MinXRTI	.71***	-.51	.28	.98**	.95***
	(.202)	(.32)	(.21)	(.468)	(.311)
MinXRTIXContract	-.39***	.32	-.22	-.44*	-.44**
	(.123)	(.241)	(.168)	(.23)	(.2)
MinXRTIXManager	-.41***	.19	-.27**	-.58***	-.49***
	(.101)	(.182)	(.127)	(.173)	(.169)
MinXOff	-.66***	-1.52***	-.95***	-.62***	-.63
	(.18)	(.351)	(.273)	(.22)	(.393)
MinXOffXContract	.55***	.69***	.43***	.36*	.67***
	(.111)	(.248)	(.178)	(.193)	(.242)
MinXOffXManager	.38***	.6***	.33***	.01	.43**
	(.088)	(.223)	(.125)	(.165)	(.191)
Observations	420051	42270	45483	84618	244998
Mean of Y	52.04	45.91	38.80	60.15	53.05
SD	128.1	123.6	108.2	146.5	125.8

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table H.6: Effect of a minimum wage increase on the number of mandays- winsorizing top 1% of values

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	0.593	-105.4***	-26.57*	-20.86	48.15***
	(7.206)	(29.21)	(15.00)	(14.82)	(12.32)
MinXContract	1.885	146.9***	24.81	36.36	-48.60***
	(11.31)	(44.61)	(22.09)	(23.47)	(18.44)
MinXManager	-6.708	138.9***	22.31	7.547	-70.32***
	(9.826)	(41.63)	(19.64)	(20.97)	(17.54)
MinXRTI	85.97***	58.52**	65.52***	139.6**	65.66**
	(22.40)	(26.85)	(24.64)	(59.88)	(30.67)
MinXRTIXContract	-136.0***	-77.86**	-100.5***	-211.0**	-116.6**
	(35.41)	(38.54)	(37.06)	(89.64)	(47.91)
MinXRTIXManager	-130.3***	-86.05***	-102.5***	-199.5**	-103.7**
	(31.69)	(26.48)	(31.00)	(79.54)	(45.60)
MinXOff	-91.39***	-67.17***	-101.6***	-62.15**	-139.1***
	(24.45)	(25.34)	(38.59)	(26.72)	(51.94)
MinXOffXContract	158.5***	95.93***	154.3***	91.92**	231.6***
	(37.19)	(36.08)	(58.45)	(45.73)	(82.28)
MinXOffXManager	151.4***	94.27***	151.2***	81.35*	223.9***
	(33.71)	(33.98)	(50.85)	(41.48)	(74.39)
Observations	420051	42270	45483	84618	244998
Mean of Y	15739.0	12507.3	11638.3	18578.4	16174.7
SD	39984.8	35213.2	34329.1	46094.1	39532.9

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of 8-hour workdays paid to each group of employee over the year on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table H.7: Total effect of a minimum wage increase on the number of mandays- winsorizing top 1% of values

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	1.48	-263.52***	-66.42*	-52.15	120.38***
	(18.014)	(73.036)	(37.499)	(37.043)	(30.797)
MinXContract	6.19	103.71**	-4.39	38.74	-1.11
	(12.31)	(50.543)	(23.234)	(26.089)	(20.029)
MinXManager	-15.29	83.68*	-10.63	-33.28	-55.41***
	(9.341)	(44.419)	(20.325)	(21.301)	(17.661)
MinXRTI	216.41***	-117.21	97.38	296.8**	284.52***
	(60.581)	(81.298)	(69.922)	(140.83)	(91.326)
MinXRTIXContract	-118.99***	55.37	-91.81	-139.91**	-128.55**
	(36.465)	(69.794)	(56.051)	(69.546)	(59.345)
MinXRTIXManager	-126.07***	14.87	-103.03**	-183.08***	-150.54***
	(29.837)	(50.851)	(46.012)	(53.417)	(49.235)
MinXOff	-227***	-431.44***	-320.48***	-207.51***	-227.37**
	(57.243)	(89.633)	(98.41)	(70.611)	(115.319)
MinXOffXContract	174.06***	175.61***	127.4**	113.19*	230.15***
	(33.257)	(69.437)	(61.671)	(58.686)	(70.5)
MinXOffXManager	134.85***	151.42***	113.42***	14.72	156.66***
	(26.076)	(61.419)	(47.934)	(51.015)	(54.147)
Observations	420051	42270	45483	84618	244998
Mean of Y	15739.0	12507.3	11638.3	18578.4	16174.7
SD	39984.8	35213.2	34329.1	46094.1	39532.9

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of 8-hour workdays paid to each group of employee over the year on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 1% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

I Robustness using variation from firms in districts along state borders

Table I.1: Effect of a minimum wage increase on overall capital investment- contiguous district design

	Capital			
	(1)	(2)	(3)	(4)
Minimum wage	-0.00954	-0.0581	-0.00450	-0.0585
	(0.0539)	(0.0650)	(0.0563)	(0.0643)
Minimum wage X RTI		0.219		0.276*
		(0.148)		(0.164)
Minimum wage X Offshore			-0.0583	-0.141
			(0.114)	(0.126)
Observations	191715	191715	191715	191715
Mean of Y	12.01	12.01	12.01	12.01
SD	67.87	67.87	67.87	67.87

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. In this exercise, districts along state lines are paired to contiguous districts in other states. If a district shares a border with $n \geq 1$ disttricts in other states, the observations of that district are repeated n times. Fixed effects are included for every district pair. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms in contiguous districts with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table I.2: Effect of a minimum wage increase on investment in machinery- contiguous district design

	Machinery			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0172	-0.0409	-0.0130	-0.0411
	(0.0439)	(0.0545)	(0.0456)	(0.0539)
Minimum wage X RTI		0.107		0.143
		(0.127)		(0.141)
Minimum wage X Offshore			-0.0485	-0.0916
			(0.0944)	(0.106)
Observations	191715	191715	191715	191715
Mean of Y	7.552	7.552	7.552	7.552
SD	48.94	48.94	48.94	48.94

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress machinery investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. In this exercise, districts along state lines are paired to contiguous districts in other states. If a district shares a border with $n \geq 1$ disttricts in other states, the observations of that district are repeated n times. Fixed effects are included for every district pair. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms in contiguous districts with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table I.3: Effect of a minimum wage increase on investment in computers- contiguous district design

	Computers			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0325	-0.0407	-0.0180	-0.0412
	(0.0382)	(0.0495)	(0.0380)	(0.0474)
Minimum wage X RTI		0.0370		0.118
		(0.155)		(0.165)
Minimum wage X Offshore			-0.167*	-0.202**
			(0.0927)	(0.0989)
Observations	191715	191715	191715	191715
Mean of Y	8.193	8.193	8.193	8.193
SD	65.72	65.72	65.72	65.72

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress computer investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. In this exercise, districts along state lines are paired to contiguous districts in other states. If a district shares a border with $n \geq 1$ disttricts in other states, the observations of that district are repeated n times. Fixed effects are included for every district pair. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms in contiguous districts with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table I.4: Effect of a minimum wage increase on the number of employees working in a typical workday- contiguous district design

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-0.0251	-0.287***	-0.0321	-0.0694***	0.0979***
	(0.0182)	(0.0771)	(0.0323)	(0.0259)	(0.0316)
MinXContract	0.0455	0.425***	0.0918*	0.0836**	-0.0939**
	(0.0307)	(0.125)	(0.0515)	(0.0410)	(0.0453)
MinXManager	0.0186	0.386***	0.0561	0.0475	-0.146***
	(0.0245)	(0.111)	(0.0372)	(0.0336)	(0.0463)
MinXRTI	0.107***	0.0440	0.177***	0.155***	0.0432
	(0.0312)	(0.0433)	(0.0500)	(0.0415)	(0.0542)
MinXRTIXContract	-0.176***	-0.106*	-0.212***	-0.235***	-0.105
	(0.0514)	(0.0601)	(0.0815)	(0.0702)	(0.0815)
MinXRTIXManager	-0.153***	-0.103**	-0.194***	-0.211***	-0.0805
	(0.0426)	(0.0432)	(0.0535)	(0.0517)	(0.0796)
MinXOff	-0.0721**	0.0126	-0.210***	-0.0817*	-0.0573
	(0.0356)	(0.0463)	(0.0557)	(0.0452)	(0.0592)
MinXOffXContract	0.169***	0.110**	0.272***	0.134**	0.121
	(0.0548)	(0.0535)	(0.0870)	(0.0628)	(0.0899)
MinXOffXManager	0.145***	0.105**	0.243***	0.0902	0.129
	(0.0541)	(0.0477)	(0.0751)	(0.0587)	(0.0848)
Observations	738633	103494	89505	154611	387960
Mean of Y	31.71	27.13	27.09	33.96	33.19
SD	67.54	62.76	64.41	71.46	67.92

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. In this exercise, districts along state lines are paired to contiguous districts in other states. If a district shares a border with $n \geq 1$ disttricts in other states, the observations of that district are repeated n times. Fixed effects are included for every district pair. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms in contiguous districts with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table I.5: Total effect of a minimum wage increase on the number of employees working in a typical workday-contiguous district design

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-.06	-.72***	-.08	-.17***	.24***
	(.046)	(.193)	(.081)	(.065)	(.079)
MinXContract	.05	.34***	.15**	.04	.01
	(.036)	(.125)	(.066)	(.052)	(.047)
MinXManager	-.02	.25***	.06	-.05	-.12***
	(.023)	(.097)	(.046)	(.04)	(.048)
MinXRTI	.21**	-.61***	.36***	.22*	.35***
	(.089)	(.225)	(.135)	(.115)	(.151)
MinXRTIXContract	-.12**	.19	.06	-.16*	-.15
	(.056)	(.148)	(.121)	(.098)	(.096)
MinXRTIXManager	-.13***	.1	.02	-.19**	-.21***
	(.051)	(.112)	(.083)	(.084)	(.09)
MinXOff	-.24***	-.69***	-.61***	-.38***	.1
	(.096)	(.201)	(.16)	(.12)	(.167)
MinXOffXContract	.29***	.65***	.3***	.17*	.17
	(.065)	(.151)	(.126)	(.091)	(.104)
MinXOffXManager	.17***	.54***	.14	-.03	.06
	(.055)	(.131)	(.092)	(.079)	(.096)
Observations	738633	103494	89505	154611	387960
Mean of Y	31.71	27.13	27.09	33.96	33.19
SD	67.54	62.76	64.41	71.46	67.92

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. In this exercise, districts along state lines are paired to contiguous districts in other states. If a district shares a border with $n \geq 1$ disttricts in other states, the observations of that district are repeated n times. Fixed effects are included for every district pair. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms in contiguous districts with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table I.6: Effect of a minimum wage increase on the number of mandays- contiguous district design

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-6.515	-78.70***	-8.837	-20.93***	27.59***
	(5.017)	(21.11)	(9.286)	(7.715)	(8.577)
MinXContract	10.47	110.1***	19.83	22.66*	-24.17**
	(8.012)	(34.07)	(13.45)	(11.58)	(11.98)
MinXManager	5.976	100.8***	13.67	14.54	-39.81***
	(6.858)	(30.55)	(10.61)	(10.08)	(12.33)
MinXRTI	29.97***	6.086	53.80***	45.39***	11.77
	(9.044)	(13.08)	(15.76)	(11.79)	(15.83)
MinXRTIXContract	-48.66***	-26.50	-65.31***	-66.38***	-32.59
	(14.24)	(16.32)	(23.55)	(18.57)	(23.56)
MinXRTIXManager	-44.50***	-27.47**	-61.15***	-62.05***	-24.77
	(12.59)	(12.02)	(18.25)	(15.69)	(23.27)
MinXOff	-24.62**	0.775	-74.10***	-20.00	-21.95
	(11.33)	(15.03)	(19.23)	(13.25)	(18.84)
MinXOffXContract	54.83***	35.65**	91.32***	40.85**	43.41
	(17.46)	(15.64)	(30.08)	(18.75)	(27.92)
MinXOffXManager	49.14***	33.51**	84.24***	29.03	47.00*
	(17.26)	(14.11)	(26.90)	(17.82)	(26.42)
Observations	738633	103494	89505	154611	387960
Mean of Y	9295.1	7471.0	7737.7	10168.3	9819.0
SD	20269.3	17920.3	19441.3	21774.5	20421.5

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of 8-hour workdays paid to each group of employee over the year on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. In this exercise, districts along state lines are paired to contiguous districts in other states. If a district shares a border with $n \geq 1$ disttricts in other states, the observations of that district are repeated n times. Fixed effects are included for every district pair. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms in contiguous districts with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table I.7: Total effect of a minimum wage increase on the number of mandays- contiguous district design

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-16.29	-196.75***	-22.09	-52.32***	68.97***
	(12.543)	(52.78)	(23.214)	(19.289)	(21.442)
MinXContract	9.89	78.56**	27.48*	4.33	8.55
	(8.932)	(34.992)	(16.613)	(14.456)	(13.207)
MinXManager	-1.35	55.29**	12.07	-15.96	-30.54**
	(6.392)	(27.98)	(13.282)	(11.963)	(13.668)
MinXRTI	58.65**	-181.53***	112.4***	61.16*	98.41**
	(26.541)	(64.439)	(41.137)	(33.497)	(44.916)
MinXRTIXContract	-36.83**	27.53	-1.32	-48.15*	-43.5
	(16.386)	(43.079)	(32.448)	(26.421)	(29.257)
MinXRTIXManager	-37.66***	1.83	-6.3	-57.6**	-63.04**
	(15.209)	(33.735)	(24.7)	(25.586)	(27.274)
MinXOff	-77.85***	-194.81***	-207.34***	-102.33***	14.1
	(29.205)	(57.084)	(53.95)	(35.706)	(49.831)
MinXOffXContract	85.39***	169.62***	70.54*	56.44**	62.2**
	(19.307)	(46.405)	(37.658)	(25.835)	(31.365)
MinXOffXManager	59.94***	141.01***	37.44	6.61	32.1
	(17.336)	(41.556)	(29.684)	(23.531)	(29.046)
Observations	738633	103494	89505	154611	387960
Mean of Y	9295.1	7471.0	7737.7	10168.3	9819.0
SD	20269.3	17920.3	19441.3	21774.5	20421.5

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of 8-hour workdays paid to each group of employee over the year on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. In this exercise, districts along state lines are paired to contiguous districts in other states. If a district shares a border with $n \geq 1$ disttricts in other states, the observations of that district are repeated n times. Fixed effects are included for every district pair. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms in contiguous districts with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

J Robustness using clean controls

I define clean controls as state-by-industries not seing any nominal minimum wage change over the span of the data and observations for cohorts treated later, before they get treated.

Table J.1: Effect of a minimum wage increase on overall capital investment- stacked design

	Capital			
	(1)	(2)	(3)	(4)
Minimum wage	-0.00922	-0.0608	0.0117	-0.0589
	(0.0523)	(0.0595)	(0.0534)	(0.0572)
Minimum wage X RTI		0.214		0.330**
		(0.139)		(0.151)
Minimum wage X Offshore			-0.182	-0.260*
			(0.127)	(0.135)
Observations	196854	196854	196854	196854
Mean of Y	12.04	12.04	12.04	12.04
SD	68.67	68.67	68.67	68.67

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I define cohorts of treatment as industry-by-states seing a nominal increase in their minimum wage at a given year t. I define clean controls as state-by-industries not seing any nominal minimum wage change over the span of the data and observations for cohorts treated later, before they get treated. Each cohort and their clean controls are stacked, cohort-by-state-by-year and cohort-by-industry-by-year fixed effects are included in all specifications so that a given treatment cohort is only compared to their clean controls. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table J.2: Effect of a minimum wage increase on investment in machinery- stacked design

	Machinery			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0285	-0.0662	-0.0181	-0.0652
	(0.0460)	(0.0501)	(0.0470)	(0.0483)
Minimum wage X RTI		0.156		0.220*
		(0.117)		(0.130)
Minimum wage X Offshore			-0.0908	-0.143
			(0.0942)	(0.102)
Observations	196854	196854	196854	196854
Mean of Y	7.298	7.298	7.298	7.298
SD	48.75	48.75	48.75	48.75

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I define cohorts of treatment as industry-by-states seing a nominal increase in their minimum wage at a given year t. I define clean controls as state-by-industries not seing any nominal minimum wage change over the span of the data and observations for cohorts treated later, before they get treated. Each cohort and their clean controls are stacked, cohort-by-state-by-year and cohort-by-industry-by-year fixed effects are included in all specifications so that a given treatment cohort is only compared to their clean controls. I regress machinery investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table J.3: Effect of a minimum wage increase on investment in computers- stacked design

	Computers			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0558	-0.0912	-0.0376	-0.0897
	(0.0428)	(0.0582)	(0.0457)	(0.0562)
Minimum wage X RTI		0.147		0.243
		(0.162)		(0.164)
Minimum wage X Offshore			-0.158	-0.216
			(0.135)	(0.137)
Observations	196854	196854	196854	196854
Mean of Y	8.537	8.537	8.537	8.537
SD	66.94	66.94	66.94	66.94

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I define cohorts of treatment as industry-by-states seing a nominal increase in their minimum wage at a given year t. I define clean controls as state-by-industries not seing any nominal minimum wage change over the span of the data and observations for cohorts treated later, before they get treated. Each cohort and their clean controls are stacked, cohort-by-state-by-year and cohort-by-industry-by-year fixed effects are included in all specifications so that a given treatment cohort is only compared to their clean controls. I regress computer investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table J.4: Effect of a minimum wage increase on the number of employees working in a typical workday- stacked design

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	0.00858	-0.334***	-0.0384	-0.0154	0.0863***
	(0.0206)	(0.125)	(0.0251)	(0.0242)	(0.0323)
MinXContract	0.00660	0.532***	0.0531	0.0268	-0.0725
	(0.0332)	(0.200)	(0.0394)	(0.0381)	(0.0491)
MinXManager	-0.0269	0.490***	0.0215	-0.0234	-0.116**
	(0.0289)	(0.179)	(0.0327)	(0.0309)	(0.0456)
MinXRTI	0.172***	0.148***	0.178***	0.264**	0.0898
	(0.0461)	(0.0521)	(0.0546)	(0.111)	(0.0597)
MinXRTIXContract	-0.292***	-0.238***	-0.219***	-0.396**	-0.211**
	(0.0743)	(0.0892)	(0.0827)	(0.175)	(0.0939)
MinXRTIXManager	-0.256***	-0.190***	-0.209***	-0.372**	-0.172**
	(0.0640)	(0.0613)	(0.0638)	(0.150)	(0.0857)
MinXOff	-0.169***	-0.128***	-0.205***	-0.152**	-0.199***
	(0.0453)	(0.0470)	(0.0663)	(0.0615)	(0.0613)
MinXOffXContract	0.298***	0.193***	0.280***	0.230**	0.336***
	(0.0712)	(0.0611)	(0.108)	(0.0941)	(0.102)
MinXOffXManager	0.283***	0.173***	0.261***	0.207**	0.331***
	(0.0628)	(0.0545)	(0.0945)	(0.0848)	(0.0842)
Observations	1546845	79170	112386	219705	1128018
Mean of Y	38.13	37.89	30.99	41.29	38.40
SD	73.56	76.57	67.44	80.49	72.65

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I define cohorts of treatment as industry-by-states seing a nominal increase in their minimum wage at a given year t. I define clean controls as state-by-industries not seing any nominal minimum wage change over the span of the data and observations for cohorts treated later, before they get treated. Each cohort and their clean controls are stacked, cohort-by-state-by-year and cohort-by-industry-by-year fixed effects are included in all specifications so that a given treatment cohort is only compared to their clean controls. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table J.5: Total effect of a minimum wage increase on the number of employees working in a typical workday- stacked design

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	.02	-.84***	-.1	-.04	.22***
	(.051)	(.312)	(.063)	(.06)	(.081)
MinXContract	.04	.49***	.04	.03	.03
	(.035)	(.193)	(.052)	(.044)	(.048)
MinXManager	-.05*	.39***	-.04	-.1***	-.07*
	(.026)	(.142)	(.042)	(.031)	(.041)
MinXRTI	.45***	-.47	.35**	.62**	.44***
	(.128)	(.294)	(.159)	(.281)	(.158)
MinXRTIXContract	-.26***	.27	-.07	-.3*	-.27***
	(.077)	(.209)	(.126)	(.165)	(.103)
MinXRTIXManager	-.26***	.28**	-.12	-.37***	-.28***
	(.058)	(.141)	(.094)	(.114)	(.081)
MinXOff	-.4***	-1.16***	-.61***	-.42***	-.28*
	(.115)	(.303)	(.16)	(.154)	(.164)
MinXOffXContract	.36***	.66***	.22*	.22**	.38***
	(.071)	(.201)	(.122)	(.104)	(.109)
MinXOffXManager	.24***	.5***	.1	.04	.26***
	(.053)	(.159)	(.094)	(.08)	(.078)
Observations	1615440	79365	113991	226260	1188123
Mean of Y	38.135	37.888	30.988	41.294	38.395
SD	73.559	76.574	67.442	80.486	72.652

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I define cohorts of treatment as industry-by-states seing a nominal increase in their minimum wage at a given year t. I define clean controls as state-by-industries not seing any nominal minimum wage change over the span of the data and observations for cohorts treated later, before they get treated. Each cohort and their clean controls are stacked, cohort-by-state-by-year and cohort-by-industry-by-year fixed effects are included in all specifications so that a given treatment cohort is only compared to their clean controls. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table J.6: Effect of a minimum wage increase on the number of mandays- stacked design

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	2.285	-85.27***	-7.509	-6.777	24.20***
	(5.325)	(28.81)	(7.259)	(7.225)	(7.902)
MinXContract	0.956	125.6***	11.41	6.238	-19.56*
	(8.424)	(45.48)	(11.07)	(10.78)	(11.86)
MinXManager	-6.353	116.8***	5.738	-6.783	-32.27***
	(7.505)	(40.45)	(9.619)	(9.180)	(11.25)
MinXRTI	51.28***	37.83***	55.13***	78.96**	27.84
	(13.84)	(13.70)	(17.11)	(33.38)	(17.52)
MinXRTIXContract	-84.85***	-65.72***	-68.84***	-117.9**	-62.25**
	(21.94)	(23.53)	(25.23)	(52.08)	(27.47)
MinXRTIXManager	-77.32***	-55.00***	-67.68***	-111.9**	-52.05**
	(19.34)	(15.17)	(21.00)	(45.17)	(25.42)
MinXOff	-55.89***	-34.03**	-77.77***	-45.15**	-66.96***
	(14.80)	(16.15)	(22.35)	(18.55)	(19.74)
MinXOffXContract	97.19***	64.10***	91.48**	73.59**	110.7***
	(23.11)	(18.43)	(35.72)	(28.88)	(32.58)
MinXOffXManager	93.63***	57.50***	86.37***	67.51***	109.8***
	(20.41)	(16.52)	(31.75)	(26.07)	(26.87)
Observations	1546845	79170	112386	219705	1128018
Mean of Y	11295.0	9954.5	8983.8	12385.4	11451.6
SD	22200.8	21171.9	20309.7	24442.6	22025.9

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I define cohorts of treatment as industry-by-states seing a nominal increase in their minimum wage at a given year t. I define clean controls as state-by-industries not seing any nominal minimum wage change over the span of the data and observations for cohorts treated later, before they get treated. Each cohort and their clean controls are stacked, cohort-by-state-by-year and cohort-by-industry-by-year fixed effects are included in all specifications so that a given treatment cohort is only compared to their clean controls. I regress the number of 8-hour workdays paid to each group of employee over the year on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table J.7: Total effect of a minimum wage increase on the number of mandays- stacked design

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	5.71	-213.18***	-18.77	-16.94	60.51***
	(13.313)	(72.027)	(18.149)	(18.063)	(19.754)
MinXContract	8.1	100.9**	9.75	-1.35	11.6
	(8.742)	(45.615)	(13.957)	(12.818)	(12.238)
MinXManager	-10.17	78.71**	-4.43	-33.9***	-20.17*
	(6.765)	(33.978)	(11.885)	(10.153)	(10.84)
MinXRTI	133.91***	-118.6	119.05***	180.45**	130.11***
	(38.488)	(73.563)	(49.344)	(84.108)	(47.097)
MinXRTIXContract	-75.83***	31.19	-24.53	-98.7**	-74.43***
	(22.858)	(56.917)	(37.348)	(49.524)	(31.304)
MinXRTIXManager	-75.26***	35.81	-35.82	-116.25***	-80.69***
	(17.49)	(39.682)	(28.826)	(35.519)	(24.066)
MinXOff	-134.01***	-298.25***	-213.19***	-129.82***	-106.9**
	(35.328)	(76.9)	(52.928)	(46.124)	(47.886)
MinXOffXContract	111.34***	176.08***	44.04	69.75**	121.03***
	(21.135)	(50.839)	(38.092)	(31.344)	(32.746)
MinXOffXManager	84.17***	137.38***	17.08	22	87.01***
	(15.887)	(41.397)	(30.396)	(24.834)	(22.572)
Observations	1615440	79365	113991	226260	1188123
Mean of Y	11294.985	9954.496	8983.807	12385.449	11451.6
SD	22200.761	21171.929	20309.688	24442.632	22025.865

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I define cohorts of treatment as industry-by-states seing a nominal increase in their minimum wage at a given year t. I define clean controls as state-by-industries not seing any nominal minimum wage change over the span of the data and observations for cohorts treated later, before they get treated. Each cohort and their clean controls are stacked, cohort-by-state-by-year and cohort-by-industry-by-year fixed effects are included in all specifications so that a given treatment cohort is only compared to their clean controls. I regress the number of 8-hour workdays paid to each group of employee over the year on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

K Robustness using variation from real wage changes that exceed the inflation level

Table K.1: Effect of a minimum wage increase on overall capital investment- variation from changes larger than the inflation

	Capital			
	(1)	(2)	(3)	(4)
Minimum wage	-0.00989	-0.0821	-0.00720	-0.0808
	(0.0530)	(0.0548)	(0.0572)	(0.0533)
Minimum wage X RTI		0.328**		0.391**
		(0.144)		(0.153)
Minimum wage X Offshore			-0.0283	-0.159
			(0.141)	(0.133)
Observations	54997	54997	54997	54997
Mean of Y	12.29	12.29	12.29	12.29
SD	68.30	68.30	68.30	68.30

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. In this exercise, the real minimum wage is set to its previous value unless the real minimum wage increase between two years exceeds the national inflation rate between these years. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms in manufacturing industries with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table K.2: Effect of a minimum wage increase on investment in machinery- variation from changes larger than the inflation

	Machinery			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0177	-0.0680	-0.0165	-0.0672
	(0.0462)	(0.0477)	(0.0493)	(0.0465)
Minimum wage X RTI		0.229*		0.270*
		(0.126)		(0.138)
Minimum wage X Offshore			-0.0132	-0.103
			(0.130)	(0.132)
Observations	54997	54997	54997	54997
Mean of Y	7.761	7.761	7.761	7.761
SD	49.27	49.27	49.27	49.27

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. In this exercise, the real minimum wage is set to its previous value unless the real minimum wage increase between two years exceeds the national inflation rate between these years. I regress machinery investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms in manufacturing industries with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table K.3: Effect of a minimum wage increase on investment in computers- variation from changes larger than the inflation

	Computers			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0157	-0.0396	-0.0127	-0.0390
	(0.0292)	(0.0352)	(0.0316)	(0.0344)
Minimum wage X RTI		0.109		0.140
		(0.144)		(0.154)
Minimum wage X Offshore			-0.0315	-0.0780
			(0.0876)	(0.0876)
Observations	54997	54997	54997	54997
Mean of Y	8.332	8.332	8.332	8.332
SD	66.00	66.00	66.00	66.00

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. In this exercise, the real minimum wage is set to its previous value unless the real minimum wage increase between two years exceeds the national inflation rate between these years. I regress computer investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms in manufacturing industries with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table K.4: Effect of a minimum wage increase on the number of employees working in a typical workday- variation from changes larger than the inflation

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-0.00346	-0.241**	-0.0203	-0.0413	0.101***
	(0.0202)	(0.112)	(0.0407)	(0.0369)	(0.0308)
MinXContract	0.0219	0.446**	0.0172	0.0920	-0.106**
	(0.0343)	(0.176)	(0.0632)	(0.0601)	(0.0464)
MinXManager	-0.0171	0.428***	-0.0187	0.0199	-0.163***
	(0.0274)	(0.156)	(0.0533)	(0.0472)	(0.0438)
MinXRTI	0.203***	0.163**	0.161**	0.321***	0.104*
	(0.0482)	(0.0733)	(0.0653)	(0.106)	(0.0573)
MinXRTIXContract	-0.323***	-0.249**	-0.264***	-0.468***	-0.221**
	(0.0794)	(0.108)	(0.0955)	(0.174)	(0.0895)
MinXRTIXManager	-0.275***	-0.226***	-0.241***	-0.412***	-0.170**
	(0.0674)	(0.0821)	(0.0740)	(0.147)	(0.0805)
MinXOff	-0.158***	-0.101*	-0.176**	-0.169**	-0.171**
	(0.0455)	(0.0588)	(0.0856)	(0.0664)	(0.0720)
MinXOffXContract	0.263***	0.200**	0.309**	0.175**	0.294**
	(0.0740)	(0.0795)	(0.134)	(0.0888)	(0.118)
MinXOffXManager	0.245***	0.185**	0.289**	0.151*	0.290***
	(0.0652)	(0.0719)	(0.115)	(0.0793)	(0.0988)
Observations	419844	42222	45450	84588	244893
Mean of Y	39.59	36.44	30.74	44.88	40.17
SD	76.50	76.34	67.74	85.37	74.97

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. In this exercise, the real minimum wage is set to its previous value unless the real minimum wage increase between two years exceeds the national inflation rate between these years. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table K.5: Total effect of a minimum wage increase on the number of employees working in a typical workday-variation from changes larger than the inflation

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-.01	-.6**	-.05	-.1	.25***
	(.051)	(.281)	(.102)	(.092)	(.077)
MinXContract	.05	.51***	-.01	.13*	-.01
	(.038)	(.168)	(.071)	(.067)	(.046)
MinXManager	-.05**	.47***	-.1*	-.05	-.15***
	(.025)	(.126)	(.053)	(.041)	(.042)
MinXRTI	.5***	-.2	.35*	.7***	.51***
	(.133)	(.368)	(.205)	(.235)	(.164)
MinXRTIXContract	-.26***	.29	-.26*	-.24	-.31***
	(.084)	(.242)	(.143)	(.168)	(.109)
MinXRTIXManager	-.23***	.31*	-.3***	-.28**	-.32***
	(.063)	(.17)	(.111)	(.125)	(.084)
MinXOff	-.4***	-.86***	-.49*	-.53***	-.17
	(.123)	(.313)	(.254)	(.166)	(.178)
MinXOffXContract	.31***	.76***	.33*	.14	.3***
	(.082)	(.196)	(.176)	(.112)	(.118)
MinXOffXManager	.17***	.68***	.18	-.1	.14
	(.059)	(.161)	(.127)	(.089)	(.087)
Observations	419844	42222	45450	84588	244893
Mean of Y	39.59	36.44	30.74	44.88	40.17
SD	76.50	76.34	67.74	85.37	74.97

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. In this exercise, the real minimum wage is set to its previous value unless the real minimum wage increase between two years exceeds the national inflation rate between these years. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table K.6: Effect of a minimum wage increase on the number of mandays- variation from changes larger than the inflation

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-1.286	-65.32**	-5.631	-13.23	28.42***
	(5.475)	(29.07)	(12.20)	(10.89)	(7.811)
MinXContract	4.981	116.0**	-0.878	24.83	-27.86**
	(8.958)	(45.58)	(18.57)	(17.18)	(11.48)
MinXManager	-3.577	111.4***	-8.482	5.707	-44.83***
	(7.546)	(40.59)	(16.27)	(14.44)	(10.88)
MinXRTI	57.99***	38.48**	45.96**	94.54***	29.91*
	(13.90)	(19.21)	(20.31)	(31.94)	(16.82)
MinXRTIXContract	-91.49***	-66.34**	-80.79***	-138.1***	-64.54**
	(22.63)	(27.57)	(29.53)	(51.75)	(26.10)
MinXRTIXManager	-80.59***	-61.33***	-76.88***	-123.6***	-50.27**
	(19.65)	(19.23)	(24.78)	(44.55)	(23.72)
MinXOff	-52.99***	-34.15*	-59.01**	-51.50***	-57.79***
	(14.81)	(18.02)	(28.48)	(19.44)	(22.33)
MinXOffXContract	86.66***	67.65***	103.2**	56.70**	97.50***
	(24.01)	(23.67)	(44.91)	(27.74)	(36.16)
MinXOffXManager	82.14***	62.76***	97.84**	50.22**	96.93***
	(21.21)	(21.45)	(39.58)	(24.94)	(30.14)
Observations	419844	42222	45450	84588	244893
Mean of Y	11690.0	9926.0	8950.9	13563.5	11929.5
SD	23067.7	21719.8	20604.9	26111.5	22634.2

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. In this exercise, the real minimum wage is set to its previous value unless the real minimum wage increase between two years exceeds the national inflation rate between these years. I regress the number of 8-hour workdays paid to each group of employee over the year on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table K.7: Total effect of a minimum wage increase on the number of mandays- variation from changes larger than the inflation

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-3.21	-163.3**	-14.08	-33.07	71.05***
	(13.688)	(72.676)	(30.497)	(27.235)	(19.526)
MinXContract	9.24	126.74***	-16.27	29.01	1.41
	(9.724)	(45.114)	(20.078)	(18.56)	(12.163)
MinXManager	-12.16*	115.31***	-35.28**	-18.8	-41.02***
	(6.875)	(34.63)	(15.746)	(12.822)	(11.234)
MinXRTI	141.77***	-67.1	100.82	203.28***	145.83***
	(38.25)	(95.841)	(62.87)	(70.085)	(48.404)
MinXRTIXContract	-74.5***	57.09	-103.36***	-79.99	-85.16***
	(24.462)	(67.639)	(43.876)	(49.231)	(32.769)
MinXRTIXManager	-68.65***	58.18	-112.59***	-91.54***	-91.92***
	(18.539)	(48.372)	(35.364)	(37.06)	(25.062)
MinXOff	-135.68***	-248.69***	-161.61*	-161.82***	-73.42
	(38.058)	(82.852)	(83.2)	(50.557)	(52.151)
MinXOffXContract	93.43***	210.48***	94.2*	42	100.69***
	(25.046)	(52.933)	(55.908)	(32.302)	(35.082)
MinXOffXManager	60.73***	186.82***	61.78	-22	56.84**
	(18.446)	(44.362)	(42.137)	(26.38)	(25.046)
Observations	419844	42222	45450	84588	244893
Mean of Y	11690.0	9926.0	8950.9	13563.5	11929.5
SD	23067.7	21719.8	20604.9	26111.5	22634.2

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. In this exercise, the real minimum wage is set to its previous value unless the real minimum wage increase between two years exceeds the national inflation rate between these years. I regress the number of 8-hour workdays paid to each group of employee over the year on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

L Robustness controlling for the outside option wage

Table L.1: Effect of a minimum wage increase on overall capital investment controlling for the outside option

	Capital			
	(1)	(2)	(3)	(4)
Minimum wage	-0.00807	-0.0722	-0.00224	-0.0697
	(0.0485)	(0.0524)	(0.0526)	(0.0512)
Minimum wage X RTI		0.284**		0.352**
		(0.130)		(0.147)
Minimum wage X Offshore			-0.0509	-0.155
			(0.122)	(0.128)
Observations	54997	54997	54997	54997
Mean of Y	12.29	12.29	12.29	12.29
SD	68.30	68.30	68.30	68.30

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress investment on real minimum wages in column (1). I also include the interaction between the real minimum wages and the routineness index in column (2). In column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the prefered specification and includes both interactions. In all specifications, I control for the average real minimum wage in other industries with a statutory minimum wage and its interactions with the routineness and offshorability indexes. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table L.2: Effect of a minimum wage increase on investment in machinery controlling for the outside option

	Machinery			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0155	-0.0603	-0.0108	-0.0585
	(0.0418)	(0.0451)	(0.0443)	(0.0440)
Minimum wage X RTI		0.198*		0.249**
		(0.112)		(0.126)
Minimum wage X Offshore			-0.0412	-0.115
			(0.101)	(0.108)
Observations	54997	54997	54997	54997
Mean of Y	7.761	7.761	7.761	7.761
SD	49.27	49.27	49.27	49.27

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress machinery investment on real minimum wages in column (1). I also include the interaction between the real minimum wages and the routineness index in column (2). In column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the prefered specification and includes both interactions. In all specifications, I control for the average real minimum wage in other industries with a statutory minimum wage and its interactions with the routineness and offshorability indexes. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table L.3: Effect of a minimum wage increase on investment in computers controlling for the outside option

	Computers			
	(1)	(2)	(3)	(4)
Minimum wage	-0.0310	-0.0598	-0.0117	-0.0560
	(0.0359)	(0.0480)	(0.0370)	(0.0463)
Minimum wage X RTI		0.127		0.231
		(0.140)		(0.147)
Minimum wage X Offshore			-0.169*	-0.237***
			(0.0903)	(0.0901)
Observations	54997	54997	54997	54997
Mean of Y	8.332	8.332	8.332	8.332
SD	66.00	66.00	66.00	66.00

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress computer investment on real minimum wages in column (1). I also include the interaction between the real minimum wages and the routineness index in column (2). In column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the prefered specification and includes both interactions. In all specifications, I control for the average real minimum wage in other industries with a statutory minimum wage and its interactions with the routineness and offshorability indexes. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 2.5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table L.4: Effect of a minimum wage increase on the number of employees working in a typical workday controlling for the outside option

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-0.0138	-0.318***	-0.0617*	-0.0526	0.114***
	(0.0208)	(0.101)	(0.0355)	(0.0362)	(0.0325)
MinXContract	0.0368	0.536***	0.0975*	0.0988	-0.118**
	(0.0356)	(0.159)	(0.0568)	(0.0620)	(0.0492)
MinXManager	-0.00273	0.492***	0.0657	0.0228	-0.172***
	(0.0279)	(0.143)	(0.0455)	(0.0478)	(0.0466)
MinXRTI	0.193***	0.132**	0.184***	0.307**	0.0878
	(0.0508)	(0.0636)	(0.0611)	(0.119)	(0.0592)
MinXRTIXContract	-0.325***	-0.236**	-0.251***	-0.488***	-0.210**
	(0.0830)	(0.0978)	(0.0968)	(0.188)	(0.0936)
MinXRTIXManager	-0.278***	-0.213***	-0.231***	-0.432***	-0.163*
	(0.0701)	(0.0695)	(0.0727)	(0.158)	(0.0853)
MinXOff	-0.164***	-0.159***	-0.253***	-0.123**	-0.209***
	(0.0474)	(0.0611)	(0.0838)	(0.0592)	(0.0705)
MinXOffXContract	0.302***	0.218***	0.345**	0.193**	0.362***
	(0.0762)	(0.0767)	(0.136)	(0.0974)	(0.117)
MinXOffXManager	0.279***	0.201***	0.322***	0.165*	0.349***
	(0.0675)	(0.0702)	(0.116)	(0.0868)	(0.0991)
Observations	420051	42270	45483	84618	244998
Mean of Y	39.27	36.44	30.73	44.80	39.69
SD	76.33	76.33	67.79	85.46	74.59

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. In all specifications, I control for the average real minimum wage in other industries with a statutory minimum wage and its interactions with the routineness and offshorability indexes. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table L.5: Total effect of a minimum wage increase on the number of employees working in a typical workday controlling for the outside option

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-.03	-.8***	-.15*	-.13	.29***
	(.052)	(.252)	(.089)	(.09)	(.081)
MinXContract	.06	.54***	.09	.12	-.01
	(.04)	(.155)	(.063)	(.071)	(.048)
MinXManager	-.04*	.44***	.01	-.07*	-.14***
	(.025)	(.118)	(.043)	(.043)	(.043)
MinXRTI	.45***	-.46*	.31*	.63***	.51***
	(.135)	(.258)	(.17)	(.271)	(.164)
MinXRTIXContract	-.27***	.29	-.08	-.34**	-.31***
	(.082)	(.185)	(.129)	(.153)	(.106)
MinXRTIXManager	-.25***	.23*	-.11	-.39***	-.33***
	(.063)	(.138)	(.087)	(.107)	(.084)
MinXOff	-.44***	-1.19***	-.79***	-.44***	-.24
	(.124)	(.265)	(.214)	(.163)	(.181)
MinXOffXContract	.4***	.69***	.32**	.29***	.37***
	(.081)	(.186)	(.154)	(.122)	(.118)
MinXOffXManager	.25***	.54***	.18*	.03	.2***
	(.059)	(.164)	(.104)	(.086)	(.087)
Observations	420051	42270	45483	84618	244998
Mean of Y	39.27	36.44	30.73	44.80	39.69
SD	76.33	76.33	67.79	85.46	74.59

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. In all specifications, I control for the average real minimum wage in other industries with a statutory minimum wage and its interactions with the routineness and offshorability indexes. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table L.6: Effect of a minimum wage increase on the number of mandays controlling for the outside option

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-3.665	-78.85***	-13.01	-15.65	31.84***
	(5.592)	(23.57)	(10.48)	(10.71)	(8.028)
MinXContract	8.427	133.9***	21.75	26.29	-31.52***
	(9.215)	(37.49)	(16.11)	(17.46)	(11.96)
MinXManager	0.152	122.5***	16.43	6.558	-47.62***
	(7.655)	(33.72)	(13.65)	(14.58)	(11.49)
MinXRTI	56.35***	26.30	59.37***	91.32**	25.69
	(14.98)	(17.22)	(19.63)	(35.52)	(17.36)
MinXRTIXContract	-92.70***	-64.06**	-77.31***	-144.1***	-61.35**
	(24.02)	(26.16)	(29.92)	(55.70)	(27.11)
MinXRTIXManager	-82.46***	-59.14***	-74.28***	-130.0***	-48.62*
	(20.83)	(17.22)	(24.64)	(47.86)	(25.10)
MinXOff	-54.51***	-51.49***	-90.14***	-36.51*	-69.14***
	(15.61)	(19.51)	(28.57)	(18.71)	(21.93)
MinXOffXContract	98.68***	72.52***	114.9**	62.33**	118.7***
	(24.94)	(23.59)	(46.02)	(30.44)	(35.69)
MinXOffXManager	92.85***	67.02***	108.7***	55.03**	115.6***
	(22.14)	(21.66)	(40.27)	(27.31)	(30.09)
Observations	420051	42270	45483	84618	244998
Mean of Y	11602.8	9922.0	8951.1	13548.3	11802.5
SD	23016.8	21712.3	20619.7	26144.8	22524.9

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of 8-hour workdays paid to each group of employee over the year on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. In all specifications, I control for the average real minimum wage in other industries with a statutory minimum wage and its interactions with the routineness and offshorability indexes. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table L.7: Total effect of a minimum wage increase on the number of mandays controlling for the outside option

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-9.16	-197.12***	-32.52	-39.13	79.61***
	(13.98)	(58.93)	(26.212)	(26.783)	(20.07)
MinXContract	11.9	137.55***	21.85	26.59	.8
	(9.998)	(38.775)	(16.753)	(19.049)	(12.318)
MinXManager	-8.78	109.25***	8.55	-22.73*	-39.44***
	(6.894)	(29.851)	(12.903)	(13.126)	(11.209)
MinXRTI	131.73***	-131.37*	115.91**	189.16***	143.83***
	(40.279)	(68.705)	(53.562)	(80.945)	(48.04)
MinXRTIXContract	-78.96***	43.16	-22.99	-105.25**	-88.37***
	(23.938)	(52.639)	(37.939)	(45.584)	(31.314)
MinXRTIXManager	-74.05***	27.14	-28.72	-119.4***	-96.78***
	(18.37)	(39.535)	(27.552)	(32.937)	(24.432)
MinXOff	-145.45***	-325.84***	-257.88***	-130.39***	-93.24*
	(38.919)	(70.514)	(72.724)	(51.144)	(52.412)
MinXOffXContract	122.31***	190.12***	83.79*	91.14***	124.66***
	(24.502)	(52.926)	(49.078)	(35.545)	(34.167)
MinXOffXManager	87.07***	148.09***	54.99	23.59	76.66***
	(18.12)	(47.516)	(35.398)	(26.618)	(24.198)
Observations	420051	42270	45483	84618	244998
Mean of Y	11602.8	9922.0	8951.1	13548.3	11802.5
SD	23016.8	21712.3	20619.7	26144.8	22524.9

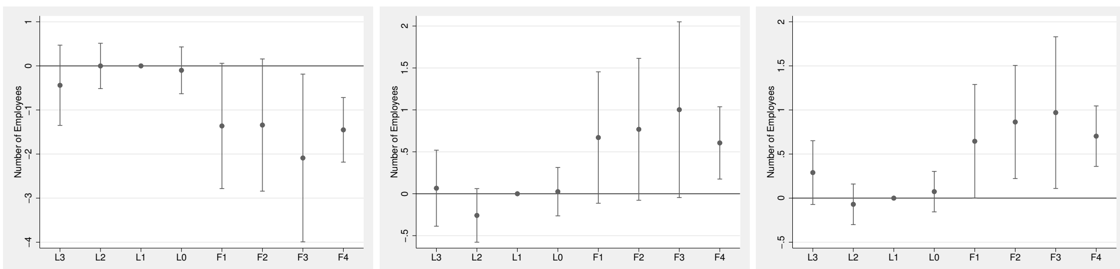
Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the number of 8-hour workdays paid to each group of employee over the year on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. In all specifications, I control for the average real minimum wage in other industries with a statutory minimum wage and its interactions with the routineness and offshorability indexes. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

M Distributed lag regression for the number of employees working in a typical workday

Group 1: $\leq$105% of minimum wage

Figure M.1: Firms in the average industry

(a) Regular workers (b) Contract workers (c) Managers



Note: 90% confidence bands are displayed. I report the coefficients of the event-study regression for a typical minimum wage hike (2.5 rupees). In the first figure of this subsection, I show the results when the routineness and offshorability indexes are at the mean (when they are equal to 0). In the second figure, I report the results when the routineness intensity index is one SD above the mean (the offshorability index is kept at the mean). In the last, I report the results when the offshorability intensity index is one SD above the mean (the routineness index is kept at the mean). In each figure, I report the results for regular workers in Panel (a), for contract worekers in Panel (b), and for managers in Panel (c). This subsection reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Figure M.2: Firms in routine industries

(a) Regular workers (b) Contract workers (c) Managers

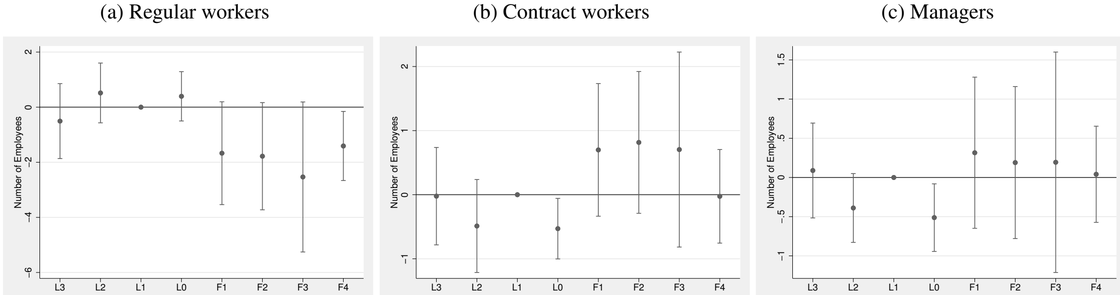
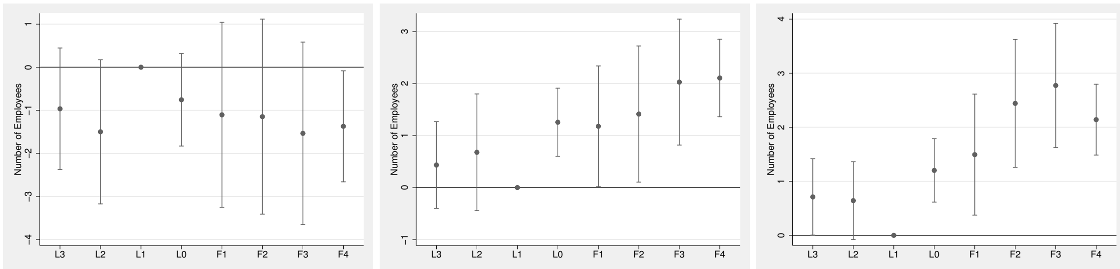


Figure M.3: Firms in offshorable industries

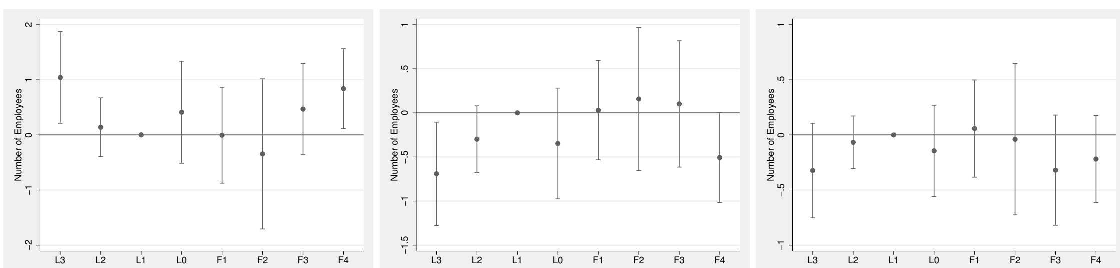
(a) Regular workers (b) Contract workers (c) Managers



Group 2: 105-130% of minimum wage

Figure M.4: Firms in the average industry

(a) Regular workers (b) Contract workers (c) Managers



Note: 90% confidence bands are displayed. I report the coefficients of the event-study regression for a typical minimum wage hike (2.5 rupees). In the first figure of this subsection, I show the results when the routineness and offshorability indexes are at the mean (when they are equal to 0). In the second figure, I report the results when the routineness intensity index is one SD above the mean (the offshorability index is kept at the mean). In the last, I report the results when the offshorability intensity index is one SD above the mean (the routineness index is kept at the mean). In each figure, I report the results for regular workers in Panel (a), for contract worekers in Panel (b), and for managers in Panel (c). This subsection reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is between 105% and 130%. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Figure M.5: Firms in routine industries

(a) Regular workers (b) Contract workers (c) Managers

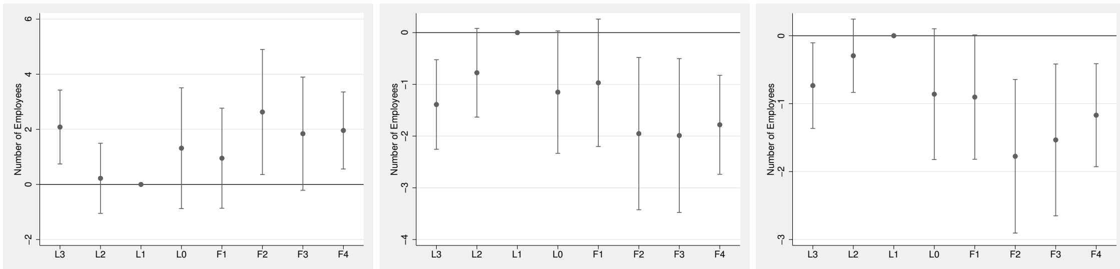
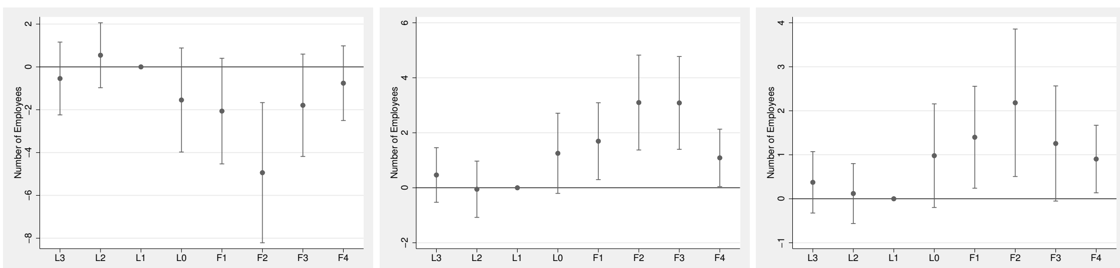


Figure M.6: Firms in offshorable industries

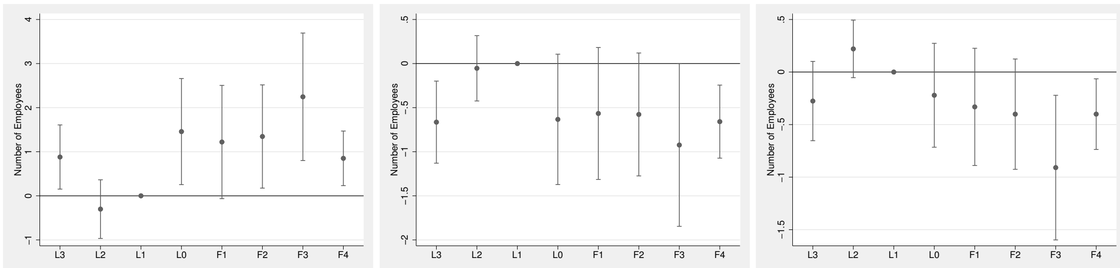
(a) Regular workers (b) Contract workers (c) Managers



Group 3: 130-180% of minimum wage

Figure M.7: Firms in the average industry

(a) Regular workers (b) Contract workers (c) Managers



Note: 90% confidence bands are displayed. I report the coefficients of the event-study regression for a typical minimum wage hike (2.5 rupees). In the first figure of this subsection, I show the results when the routineness and offshorability indexes are at the mean (when they are equal to 0). In the second figure, I report the results when the routineness intensity index is one SD above the mean (the offshorability index is kept at the mean). In the last, I report the results when the offshorability intensity index is one SD above the mean (the routineness index is kept at the mean). In each figure, I report the results for regular workers in Panel (a), for contract worekers in Panel (b), and for managers in Panel (c). This subsection reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is between 130% and 180%. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Figure M.8: Firms in routine industries

(a) Regular workers (b) Contract workers (c) Managers

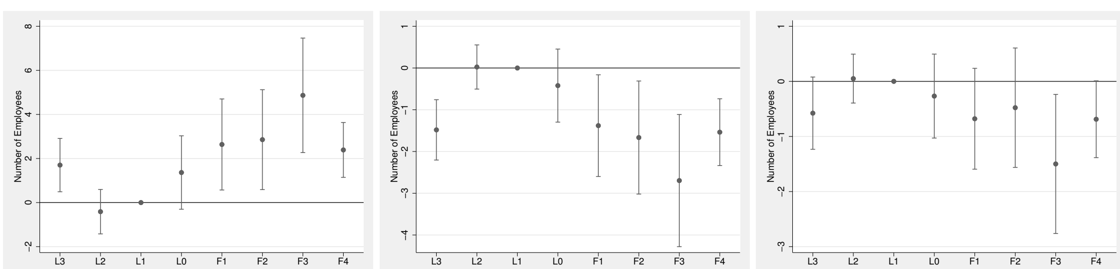
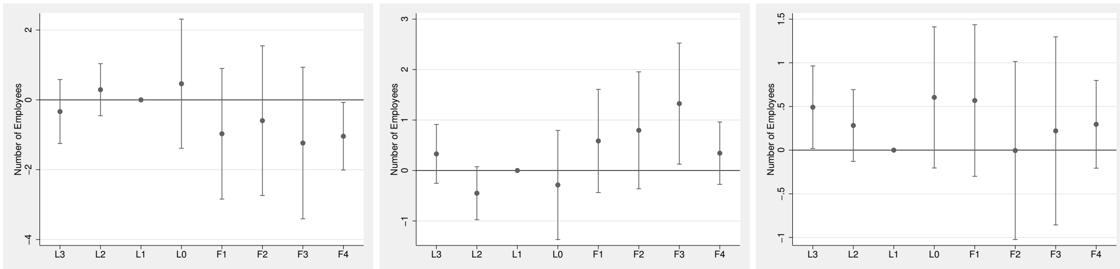


Figure M.9: Firms in offshorable industries

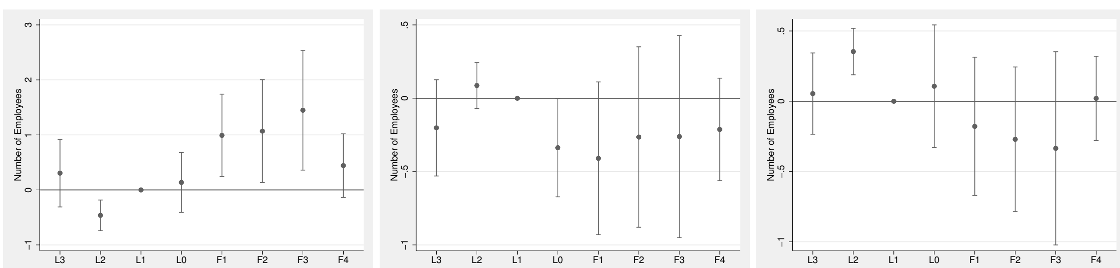
(a) Regular workers (b) Contract workers (c) Managers



Group 4: >180% of minimum wage

Figure M.10: Firms in the average industry

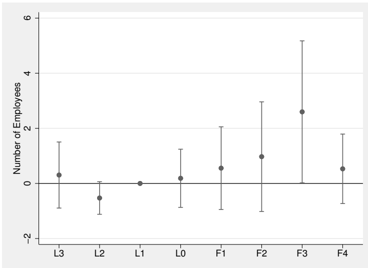
(a) Regular workers (b) Contract workers (c) Managers



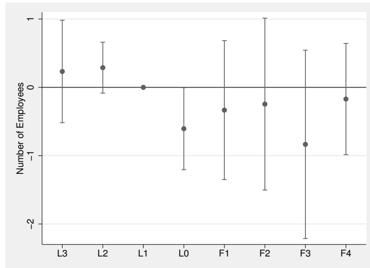
Note: 90% confidence bands are displayed. I report the coefficients of the event-study regression for a typical minimum wage hike (2.5 rupees). In the first figure of this subsection, I show the results when the routineness and offshorability indexes are at the mean (when they are equal to 0). In the second figure, I report the results when the routineness intensity index is one SD above the mean (the offshorability index is kept at the mean). In the last, I report the results when the offshorability intensity index is one SD above the mean (the routineness index is kept at the mean). In each figure, I report the results for regular workers in Panel (a), for contract worekers in Panel (b), and for managers in Panel (c). This subsection reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is greater than 180%. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Figure M.11: Firms in routine industries

(a) Regular workers



(b) Contract workers



(c) Managers

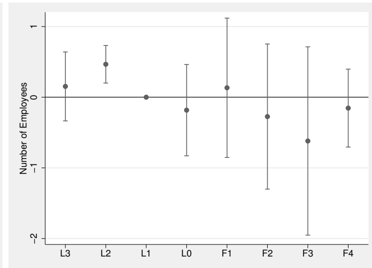
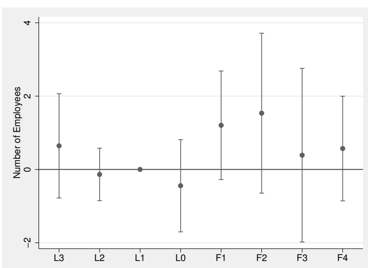
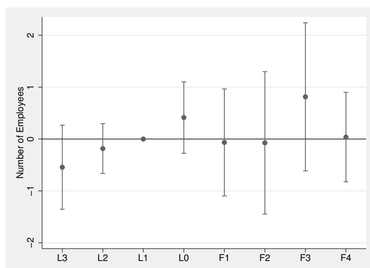


Figure M.12: Firms in offshorable industries

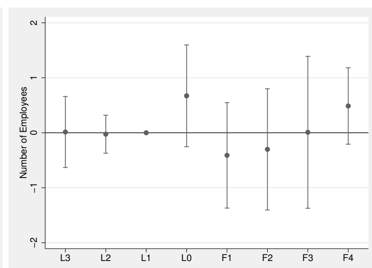
(a) Regular workers



(b) Contract workers



(c) Managers



N Aggregate employment

Table N.1: Effect of a minimum wage increase on aggregate employment (in logs) using household survey data

	(1) Pooled	(2) 14-24 years old	(3) 25-32 years old	(4) 33-43 years old	(5) 44-65 years old
Minimum wage	-0.000282	-0.00115**	-0.000157	-0.000217	0.000345
	(0.000245)	(0.000498)	(0.000479)	(0.000486)	(0.000531)
Minimum wage X RTI	-0.000285	0.0000226	0.000723	-0.000667	-0.00146*
	(0.000392)	(0.000781)	(0.000772)	(0.000795)	(0.000836)
Minimum wage X Offshore	-0.000437	-0.000101	-0.000740	0.000168	-0.000803
	(0.000376)	(0.000791)	(0.000749)	(0.000736)	(0.000769)
Observations	92872	19915	24207	25171	23498
Mean of Y	7.664	7.736	7.624	7.682	7.626
SD	1.732	1.737	1.750	1.715	1.725

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. India's National Sample Survey collects data on employment for individuals in the 14-65 age range every five years or so. The 2000, 2005, and 2008 waves contain employment data. I aggregate employment at the state, district, four-digit industry, and age quartile level. In doing so, I use the sample weights provided in the survey waves. I regress the log aggregate employment on the real minimum wages as well as the interactions between the minimum wages and the routineness and offshorability indexes in Column (1). I include fixed effects for the age quartile in that column only. In Column (2) to (5), I run the same regression for each age quartile separately. All specifications include district, year, and four-digit-industry fixed effects. I report White standard errors in parenthesis. The largest 5% of values of aggregate employment are winsorized. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The minimum wage data spans from 2002-2008. When merging in the wage data, I attribute the 2002 wages to the 2000 employment wave. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table N.2: Effect of a minimum wage increase on aggregate employment (in logs) controlling for the average minimum wage across other states

	(1) Pooled	(2) 14-24 years old	(3) 25-32 years old	(4) 33-43 years old	(5) 44-65 years old
Minimum wage	-0.000358	-0.00125**	-0.000384	-0.000362	0.000152
	(0.000263)	(0.000535)	(0.000511)	(0.000644)	(0.000582)
Minimum wage X RTI	-0.000221	-0.000150	0.000994	0.000120	-0.00134
	(0.000436)	(0.000868)	(0.000848)	(0.00100)	(0.000959)
Minimum wage X Offshore	-0.000538	-0.000323	-0.000469	0.000396	-0.00144
	(0.000429)	(0.000892)	(0.000851)	(0.000877)	(0.000899)
Minwage other	-0.000225	-0.000503	-0.00106	0.0000931	-0.00149
	(0.000678)	(0.00136)	(0.00123)	(0.00307)	(0.00164)
Minwage other X RTI	0.000629	-0.00139	0.000369	0.00610	0.00191
	(0.00157)	(0.00313)	(0.00283)	(0.00538)	(0.00391)
Minwage other X Offshore	-0.00158	-0.00236	0.00324	0.00227	-0.00842
	(0.00264)	(0.00519)	(0.00496)	(0.00630)	(0.00607)
Observations	90511	19362	23602	24558	22906
Mean of Y	7.664	7.736	7.624	7.682	7.626
SD	1.732	1.737	1.750	1.715	1.725

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. India's National Sample Survey collects data on employment for individuals in the 14-65 age range every five years or so. The 2000, 2005, and 2008 waves contain employment data. I aggregate employment at the state, district, four-digit industry, and age quartile level. In doing so, I use the sample weights provided in the survey waves. I regress the log aggregate employment on the real minimum wages as well as the interactions between the minimum wages and the routineness and offshorability indexes in Column (1). I include fixed effects for the age quartile in that column only. In Column (2) to (5), I run the same regression for each age quartile separately. All specifications include district, year, and four-digit-industry fixed effects. I also include the average minimum wage in the same industry across other states and its interaction with the routineness and offshorability measures in all specifications. I report White standard errors in parenthesis. The largest 5% of values of aggregate employment are winsorized. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The minimum wage data spans from 2002-2008. When merging in the wage data, I attribute the 2002 wages to the 2000 employment wave. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

O Layoff regulations intensity

O.1 Capital

Table O.1: Effect of a minimum wage increase on overall capital investment using variation from pro-employer and neutral states

	Capital			
	(1)	(2)	(3)	(4)
Minimum wage	0.0904	0.0129	0.116	0.0355
	(0.116)	(0.144)	(0.120)	(0.144)
Minimum wage X RTI		0.390		0.525
		(0.354)		(0.346)
Minimum wage X Offshore			-0.138	-0.266
			(0.219)	(0.197)
Observations	11813	11813	11813	11813
Mean of Y	11.31	11.31	11.31	11.31
SD	66.30	66.30	66.30	66.30

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. In this exercise, I keep observations in pro-employer and neutral states only. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table O.2: Effect of a minimum wage increase on overall capital investment using variation from pro-worker states

	Capital			
	(1)	(2)	(3)	(4)
Minimum wage	0.0599	-0.00329	0.0670	0.00109
	(0.0616)	(0.0861)	(0.0645)	(0.0866)
Minimum wage X RTI		0.262		0.278
		(0.281)		(0.284)
Minimum wage X Offshore			0.166	0.190
			(0.391)	(0.390)
Observations	26101	26101	26101	26101
Mean of Y	12.01	12.01	12.01	12.01
SD	68.99	68.99	68.99	68.99

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. In this exercise, I keep observations in pro-worker states only. I regress investment on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index in Column (2). In Column (3), I include the interaction between the real minimum wages and the index of offshorability. Column (4) is the preferred specification and includes both interactions. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% and smallest 1% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

O.2 Number of employees working in a typical workday

Table O.3: Total effect of a minimum wage increase on the number of employees working in a typical workday using variation form pro-employer states

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	.05	-1***	-.28	.09	.35***
	(.085)	(.337)	(.326)	(.168)	(.121)
MinXContract	.03	.7***	.36*	.15	-.08
	(.053)	(.175)	(.215)	(.111)	(.074)
MinXManager	-.02	.58***	.15	-.02	-.2***
	(.042)	(.176)	(.191)	(.105)	(.059)
MinXRTI	.59**	-.69**	.87***	1.53**	.53**
	(.259)	(.35)	(.331)	(.758)	(.247)
MinXRTIXContract	-.35***	.62***	.69***	-.87***	-.47***
	(.148)	(.223)	(.265)	(.348)	(.138)
MinXRTIXManager	-.35***	.32	.51**	-.66***	-.48***
	(.114)	(.223)	(.231)	(.242)	(.131)
MinXOff	-.49***	-1.48***	-1.86***	-.09	-.3
	(.198)	(.38)	(.384)	(.366)	(.211)
MinXOffXContract	.4***	.8***	-.03	.25	.36***
	(.12)	(.252)	(.277)	(.237)	(.134)
MinXOffXManager	.29***	.69***	-.31	.08	.15
	(.091)	(.262)	(.267)	(.197)	(.107)
Observations	163281	26907	12021	33066	90693
Mean of Y	43.764	40.686	42.386	51.237	42.32
SD	83.649	83.523	86.328	95.675	78.51

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. In this exercise, I keep observations in pro-employer states only. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table O.4: Total effect of a minimum wage increase on the number of employees working in a typical workday using variation from neutral states

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	-.27*	-.89*	-.23***	-.21	.13
	(.156)	(.524)	(.094)	(.138)	(.315)
MinXContract	.22**	.68*	.07	.09	-.06
	(.105)	(.359)	(.086)	(.124)	(.208)
MinXManager	-.03	.34	-.06	-.16***	-.4*
	(.071)	(.217)	(.055)	(.059)	(.206)
MinXRTI	.08	-.45	0	.22	.42
	(.199)	(.592)	(.175)	(.198)	(.485)
MinXRTIXContract	-.01	.39	.1	-.09	.12
	(.124)	(.537)	(.16)	(.158)	(.306)
MinXRTIXManager	-.12	.7***	-.05	-.36***	-.24
	(.09)	(.286)	(.105)	(.144)	(.28)
MinXOff	-.47**	-.82	-.5***	-.49**	.14
	(.202)	(.502)	(.15)	(.229)	(.514)
MinXOffXContract	.49***	.91***	.08	.29*	.07
	(.138)	(.387)	(.163)	(.172)	(.301)
MinXOffXManager	.09	.42*	-.04	-.16	-.39
	(.098)	(.254)	(.126)	(.11)	(.296)
Observations	94446	9492	19659	29844	34266
Mean of Y	36.919	33.802	27.009	39.439	41.856
SD	72.629	63.311	59.829	77.624	77.368

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. In this exercise, I keep observations in neutral states only. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Table O.5: Total effect of a minimum wage increase on the number of employees working in a typical workday using variation from pro-worker states

	(1) Pooled	(2) Group 1	(3) Group 2	(4) Group 3	(5) Group 4
Minimum wage	.02	.39	.21	.13	.2*
	(.077)	(.97)	(.364)	(.125)	(.116)
MinXContract	0	.09	.29	-.03	.04
	(.055)	(.99)	(.32)	(.092)	(.071)
MinXManager	-.07*	.7	.3	-.15*	-.07
	(.04)	(.96)	(.335)	(.087)	(.062)
MinXRTI	.29**	-.67	2.08**	.64***	.61***
	(.143)	(.74)	(1.05)	(.256)	(.229)
MinXRTIXContract	-.21***	-1.2	1.5	-.02	-.03
	(.077)	(.86)	(.992)	(.184)	(.155)
MinXRTIXManager	-.2***	-.59	1.62	-.11	-.01
	(.075)	(.803)	(1.014)	(.19)	(.109)
MinXOff	-.39*	2.65***	-1.24	-.55**	-.46
	(.199)	(.995)	(.922)	(.256)	(.319)
MinXOffXContract	.42***	2.82***	-.41	.06	.19
	(.102)	(1.013)	(.922)	(.175)	(.203)
MinXOffXManager	.37***	3.37***	-.37	-.08	.12
	(.091)	(.992)	(.887)	(.153)	(.143)
Observations	113634	4008	8259	17160	83781
Mean of Y	44.871	23.858	29.078	48.615	46.819
SD	78.524	59.652	60.307	83.591	79.625

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. In this exercise, I keep observations in pro-worker and neutral states only. I regress the number of employees working during a typical 8-hour workday on the real minimum wages and the interaction between these wages and the routineness and offshorability indexes. Each variable is further interacted with the type of employee, namely, contract workers and managers. Regular workers are the excluded type of employee. I compute the total effect of a typical real minimum wage increase of 2.5 rupee for each type of employee. Column (1) reports the results for all firms. Columns (2)-(5) report the results for firms in the first-fourth compensation groups, respectively. For every district, industry, year, I compute the median compensation per day across firms for regular workers and average it across years. Then, I compute the ratio of the median compensation for regular workers across firms to the average minimum wage prevailing in the district over the study sample. Columns (2)-(5) reports the results of the regression for firms in districts where the median firm-level compensation paid to regular workers is less than 105%, between 105 and 130%, between 130 and 180%, and above 180% of the average minimum wage in the district over the study period, respectively. All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. Standard errors are clustered at the four-digit-industry-by-state level. The largest 5% of values of the dependent variable are winsorized. All firms with a positive number of employee for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

P Outsourcing

I compute the firms expenditure on outsourced work and services. This includes expenditures for intermediary goods produced by other firms, outsourced software development, outsourced consulting, etc. I exclude outsourcing expenditures related to audits, and any legal charges. I compute the growth rate in expenditure like the investment variables. I divide the change in expenditure over the year by the expenditure of the previous year. The latter is captured by the average between the end-of-year and beginning-of-year expenditure of the previous year.

Table P.1: Outsourcing growth

	Growth in outsourcing expenditure	
	(1)	(2)
Minimum wage	0.0323	0.00837
	(0.0580)	(0.0918)
Minimum wage X RTI		0.242
		(0.266)
Minimum wage X Offshore		-0.276
		(0.200)
Observations	54997	54997
Mean of Y	8.601	8.601
SD	81.95	81.95

Note: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. I regress the growth in offshring expenditures in percent on real minimum wages in Column (1). I also include the interaction between the real minimum wages and the routineness index and the interaction between the real minimum wages and the index of offshorability in Column (2). All specifications include firm, district-by-year, and four-digit-industry-by-year fixed effects. All specifications include fourth-degree polynomials in age, lagged revenue, lagged profit margin, and revenue growth. Standard errors are clustered at the four-digit-industry-by-state level. The largest and smallest 5% of values of the dependent variable are winsorized. All firms with positive net value in machinery and/or computers and report outsourcing spending for any number of year during the study period are included in the analysis. Real minimum wages are obtained by deflating the nominal minimum wages by the national CPI index of that year. When no statutory minimum wages exist, the real minimum wage is set to 0. The routineness and offshorability indexes are computed at the industry level and measured in standard deviations from the average level of routineness and offshorability across all industries prior to the study sample.

Q Proof of Propositions 1 and 2

Q.1 Proposition 1

PROPOSITION 1: *Suppose that tasks are perfect complements, but inputs are not ($\sigma = 0$ and $\varepsilon_i > 0\ \forall i$). In any given task, the demand will increase for the input that experiences the smallest percentage increase in wage. On the other hand, the demand for the input with the largest percentage increase in wage will decrease.*

When $\sigma = 0$, Equation (8) becomes:

$$d\mathscr{L}_j(i) = \varepsilon_i(\frac{dp}{p(i)} - \frac{dw_j}{w_j}) \tag{12}$$

This expression indicates that any input for which the relative wage increases less (more) than the relative cost of the tasks will experience an increase (decrease) in demand in task i. With 3 inputs, we can write the change in demand as follows:

$$\begin{aligned}
d\mathscr{L}_j(i) &= \varepsilon_i(\frac{p(i)^{\varepsilon_i}(\delta_1(i)^{1-\varepsilon_i}w_1^{-\varepsilon_i}dw_1 + \delta_2(i)^{1-\varepsilon_i}w_2^{-\varepsilon_i}dw_2 + \delta_3(i)^{1-\varepsilon_i}w_3^{-\varepsilon_i}dw_3)}{p(i)} - \frac{dw_j}{w_j}) \\
&= \varepsilon_i(\frac{\delta_1(i)^{1-\varepsilon_i}w_1^{-\varepsilon_i}dw_1 + \delta_2(i)^{1-\varepsilon_i}w_2^{-\varepsilon_i}dw_2 + \delta_3(i)^{1-\varepsilon_i}w_3^{-\varepsilon_i}dw_3}{p(i)^{1-\varepsilon_i}} - \frac{dw_j}{w_j}) \\
d\mathscr{L}_j(i) &= \varepsilon_i(\frac{\delta_1(i)^{1-\varepsilon_i}w_1^{-\varepsilon_i}dw_1 + \delta_2(i)^{1-\varepsilon_i}w_2^{-\varepsilon_i}dw_2 + \delta_3(i)^{1-\varepsilon_i}w_3^{-\varepsilon_i}dw_3}{(\delta_1(i)w_1)^{1-\varepsilon_i} + (\delta_2(i)w_2)^{1-\varepsilon_i} + (\delta_3(i)w_3)^{1-\varepsilon_i}} - \frac{dw_j}{w_j})
\end{aligned} \tag{13}$$

Q.1.1 When all inputs experience a decrease in wage

Let $\frac{dw_1}{w_1} < \frac{dw_2}{w_2} < \frac{dw_3}{w_3}$ which we can express as $dw_1 = aw_1,\ dw_2 = abw_2,\ dw_3 = acw_3$ with $a < 1, b, c \in (0,1)$, and $b > c$. Then, (13) becomes:

$$d\mathscr{L}_j(i) = \varepsilon_i(a\underbrace{\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i} + (\delta_2(i)w_2)^{1-\varepsilon_i} + (\delta_3(i)w_3)^{1-\varepsilon_i}}}_{\theta\in(0,1)} - \frac{dw_j}{w_j})$$

Given that b and c are both less than 1, it follows that $0 < \theta < 1$.

The change in demand for the first input is then given by the following equation.

$$d\mathscr{L}_1(i) = \varepsilon_i(a\theta - a)$$

Since $a < 0$, $d\mathscr{L}_1(i) > 0$ if $\theta < 1$ which holds always. The change in demand for the second input is given by $d\mathscr{L}_2(i) = \varepsilon_i(a\theta - ab)$. The demand for this input increases or is unchanged if $\theta \leq b$. By writing theta in its long form, we obtain:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i} + (\delta_2(i)w_2)^{1-\varepsilon_i} + (\delta_3(i)w_3)^{1-\varepsilon_i}} \leq b$$

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{b(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_3(i)w_3)^{1-\varepsilon_i}} \leq 1$$

This inequality may or may not hold. As a result, the change in the demand for the second input is indeterminate. The demand for the last input decreases when $d\mathscr{L}_3(i) = \varepsilon_i(a\theta - ac) < 0$. This occurs when $\theta > c$. By writing theta in its long form, we get:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i} + (\delta_2(i)w_2)^{1-\varepsilon_i} + (\delta_3(i)w_3)^{1-\varepsilon_i}} > c$$

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i}}{c(\delta_1(i)w_1)^{1-\varepsilon_i} + c(\delta_2(i)w_2)^{1-\varepsilon_i}} > 1$$

This inequality always holds since $b, c \in (0, 1)$ and $c < b$.

Q.1.2 When all inputs experience an increase in wage

Let $\frac{dw_1}{w_1} < \frac{dw_2}{w_2} < \frac{dw_3}{w_3}$ which we can express as $dw_1 = aw_1$, $dw_2 = abw_2$, $dw_3 = acw_3$ with $a > 1$, $b, c > 1$, and $b < c$. Then, (13) becomes:

$$d\mathscr{L}_j(i) = \varepsilon_i(a \underbrace{\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i} + (\delta_2(i)w_2)^{1-\varepsilon_i} + (\delta_3(i)w_3)^{1-\varepsilon_i}}}_{\theta>1} - \frac{dw_j}{w_j})$$

Given that b and c are both greater than 1, it follows that $\theta > 1$.

The change in demand for the first input is then given by $d\mathscr{L}_1(i) = \varepsilon_i(a\theta - a)$. Given that $a > 0$, $d\mathscr{L}_1(i) > 0$ when $\theta > 1$ which always holds. The change in demand for the second input is indeterminate. Indeed, The demand for this input increases or is unchanged if $\theta \geq b$ which we can express as:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{b(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_3(i)w_3)^{1-\varepsilon_i}} \geq 1$$

Given that $b, c > 1$ and $b < c$, this inequality may or may not hold. The demand for the last input decreases when $d\mathscr{L}_3(i) = \varepsilon_i(a\theta - ac) < 0$. This occurs when $\theta < c$. By writing theta in its long form, we get:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i}}{c(\delta_1(i)w_1)^{1-\varepsilon_i} + c(\delta_2(i)w_2)^{1-\varepsilon_i}} < 1$$

This inequality always holds since $b, c > 1$ and $b < c$.

Q.1.3 When some inputs experience an increase in wage

Let's assume that $\frac{dw_1}{w_1} < \frac{dw_2}{w_2} < \frac{dw_3}{w_3}$ and assume that input one and two see a fall in wage, but the wage of input 3 increases. We can express the wage changes as follows $dw_1 = aw_1,\ dw_2 = abw_2,\ dw_3 = acw_3$ with $a < 0$, $b \in (0, 1)$, and $c < 0$. Then, (13) becomes:

$$d\mathscr{L}_j(i) = \varepsilon_i(a \underbrace{\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i} + (\delta_2(i)w_2)^{1-\varepsilon_i} + (\delta_3(i)w_3)^{1-\varepsilon_i}}}_{\theta<1} - \frac{dw_j}{w_j})$$

Given that b and c are both less than 1, it follows that $\theta < 1$. Since $a < 0$, $d\mathscr{L}_1(i) > 0$ if $\theta < 1$ which holds always. The demand for the second input increases or is unchanged if $\theta \leq b$. By writing theta in its long form, we obtain:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i}+b(\delta_2(i)w_2)^{1-\varepsilon_i}+c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i}+(\delta_2(i)w_2)^{1-\varepsilon_i}+(\delta_3(i)w_3)^{1-\varepsilon_i}} \leq b$$

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i}+c(\delta_3(i)w_3)^{1-\varepsilon_i}}{b(\delta_1(i)w_1)^{1-\varepsilon_i}+b(\delta_3(i)w_3)^{1-\varepsilon_i}} \leq 1$$

This inequality may or may not hold. The demand for the last input decreases when $\theta > c$. By writing theta in its long form, we get:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i}+b(\delta_2(i)w_2)^{1-\varepsilon_i}+c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i}+(\delta_2(i)w_2)^{1-\varepsilon_i}+(\delta_3(i)w_3)^{1-\varepsilon_i}} > c$$

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i}+b(\delta_2(i)w_2)^{1-\varepsilon_i}}{c(\delta_1(i)w_1)^{1-\varepsilon_i}+c(\delta_2(i)w_2)^{1-\varepsilon_i}} < 1$$

This inequality always holds since $b \in (0,1)$ and $c < 0$.

Finally, Let's assume that $\frac{dw_1}{w_1} < \frac{dw_2}{w_2} < \frac{dw_3}{w_3}$ and assume that input one experiences a fall in wage, but the wage of input two and three increases. We can express the wage changes as follows $dw_1 = aw_1,\ dw_2 = abw_2,\ dw_3 = acw_3$ with $a < 0$, $b, c < 0$, and $b < c$. Then, (13) becomes:

$$d\mathscr{L}_j(i) = \varepsilon_i(a\underbrace{\frac{(\delta_1(i)w_1)^{1-\varepsilon_i}+b(\delta_2(i)w_2)^{1-\varepsilon_i}+c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i}+(\delta_2(i)w_2)^{1-\varepsilon_i}+(\delta_3(i)w_3)^{1-\varepsilon_i}}}_{\theta<1} - \frac{dw_j}{w_j})$$

Given that b and c are both less than 1, it follows that $\theta < 1$. Since $a < 0$, $d\mathscr{L}_1(i) > 0$ if $\theta < 1$ which holds always. The demand for the second input increases or is unchanged if $\theta \leq b$. By writing theta in its long form, we obtain:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i}+b(\delta_2(i)w_2)^{1-\varepsilon_i}+c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i}+(\delta_2(i)w_2)^{1-\varepsilon_i}+(\delta_3(i)w_3)^{1-\varepsilon_i}} \leq b$$

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i}+c(\delta_3(i)w_3)^{1-\varepsilon_i}}{b(\delta_1(i)w_1)^{1-\varepsilon_i}+b(\delta_3(i)w_3)^{1-\varepsilon_i}} \geq 1$$

This inequality may or may not hold. The demand for the last input decreases when $\theta > c$. By writing theta in its long form, we get:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i} + (\delta_2(i)w_2)^{1-\varepsilon_i} + (\delta_3(i)w_3)^{1-\varepsilon_i}} > c$$

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i}}{c(\delta_1(i)w_1)^{1-\varepsilon_i} + c(\delta_2(i)w_2)^{1-\varepsilon_i}} < 1$$

This inequality always holds since the left hand side is less than one when $b, c < 0$ and $b < c$. ■

Q.2 Proposition 2

PROPOSITION 2 : *Suppose that tasks are more complementary than inputs within tasks such that $\sigma \geq 0$, $\sigma < \varepsilon_i \; \forall i$, and $\varepsilon_i > 0 \; \forall i$. In any task using inputs that all become cheaper, the demand will increase for the input that experiences the largest percentage decrease in wage. In tasks using inputs that all become more expensive, the demand for the input with the largest percentage increase in wage will decrease. In tasks using some inputs that become more expensive and some that become cheaper, the demand will increase for the input that experiences the largest percentage decrease in wage and decrease for the input with the largest percentage increase in wage. The change in demand is indeterminate for other inputs in those tasks.*

With 3 inputs, we can express Equation (8) as follows:

$$d\mathscr{L}_j(i) = (\varepsilon_i - \sigma)\left(\frac{\delta_1(i)^{1-\varepsilon_i} w_1^{-\varepsilon_i} dw_1 + \delta_2(i)^{1-\varepsilon_i} w_2^{-\varepsilon_i} dw_2 + \delta_3(i)^{1-\varepsilon_i} w_3^{-\varepsilon_i} dw_3}{(\delta_1(i)w_1)^{1-\varepsilon_i} + (\delta_2(i)w_2)^{1-\varepsilon_i} + (\delta_3(i)w_3)^{1-\varepsilon_i}}\right) - \varepsilon_i \frac{dw_j}{w_j} \tag{14}$$

Q.2.1 When all inputs experience a decrease in wage

Let $\frac{dw_1}{w_1} < \frac{dw_2}{w_2} < \frac{dw_3}{w_3}$ which we can express as $dw_1 = aw_1,\; dw_2 = abw_2,\; dw_3 = acw_3$ with $a < 1$, $b, c \in (0,1)$, and $b > c$. Then, (14) becomes:

$$d\mathscr{L}_j(i) = (\varepsilon_i - \sigma)(a\underbrace{\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i} + (\delta_2(i)w_2)^{1-\varepsilon_i} + (\delta_3(i)w_3)^{1-\varepsilon_i}}}_{\theta\in(0,1)}) - \varepsilon_i\frac{dw_j}{w_j}$$

Given that b and c are both less than 1, it follows that $0 < \theta < 1$.

The change in demand for the first input is then given by the following equation.

$$d\mathscr{L}_1(i) = (\varepsilon_i - \sigma)(a\theta) - a\varepsilon_i$$

Since $a < 0$, $d\mathscr{L}_1(i) > 0$ if $\theta < \varepsilon_i/(\varepsilon_i - \sigma)$ which holds always since $\varepsilon_i/(\varepsilon_i - \sigma) > 1$. The change in demand for the second input is given by $d\mathscr{L}_2(i) = (\varepsilon_i - \sigma)(a\theta) - ab\varepsilon_i$. The demand for this input increases or is unchanged if $\theta \leq b\varepsilon_i/(\varepsilon_i - \sigma)$. By writing theta in its long form, we obtain:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{b(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + b(\delta_3(i)w_3)^{1-\varepsilon_i}} \leq \frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$$

This inequality may or may not hold. As a result, the change in the demand for the second input is indeterminate. The demand for the last input decreases when $d\mathscr{L}_3(i) = (\varepsilon_i - \sigma)(a\theta) - ac\varepsilon_i < 0$. This occurs when $\theta > c\frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$. By writing theta in its long form, we get:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{c(\delta_1(i)w_1)^{1-\varepsilon_i} + c(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}} > \frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$$

This inequality holds when $\sigma = 0$ since $b, c \in (0,1)$ and $c < b$. However, it may not hold when $\sigma > 0$ since both sides are greater than one.

Q.2.2 When all inputs experience an increase in wage

Let $\frac{dw_1}{w_1} < \frac{dw_2}{w_2} < \frac{dw_3}{w_3}$ which we can express as $dw_1 = aw_1,\ dw_2 = abw_2,\ dw_3 = acw_3$ with $a > 1$, $b, c > 1$, and $b < c$. Then, (14) becomes:

$$d\mathscr{L}_j(i) = (\varepsilon_i - \sigma)(a\underbrace{\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i} + (\delta_2(i)w_2)^{1-\varepsilon_i} + (\delta_3(i)w_3)^{1-\varepsilon_i}}}_{\theta>1}) - \varepsilon_i\frac{dw_j}{w_j}$$

Given that b and c are both greater than 1, it follows that $\theta > 1$.

The change in demand for the first input is then given by $d\mathscr{L}_1(i) = (\varepsilon_i - \sigma)(a\theta) - a\varepsilon_i$. Given that $a > 0$, $d\mathscr{L}_1(i) > 0$ when $\theta > \frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$ which may or may not hold since both sides are greater than one.

The change in demand for the second input is indeterminate. Indeed, The demand for this input increases or is unchanged if $\theta \geq b$ which we can express as:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{b(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + b(\delta_3(i)w_3)^{1-\varepsilon_i}} \geq \frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$$

Given that $b, c > 1$ and $b < c$, this inequality may or may not hold. The demand for the last input decreases when $d\mathscr{L}_3(i) = (\varepsilon_i - \sigma)(a\theta) - ac\varepsilon_i < 0$. This occurs when $\theta < c\frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$. By writing theta in its long form, we get:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{c(\delta_1(i)w_1)^{1-\varepsilon_i} + c(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}} < \frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$$

This inequality always holds since the left hand side is less than one when $b, c > 1$ and $b < c$ and the right hand side is greater than one.

Q.2.3 When some inputs experience an increase in wage

Let's assume that $\frac{dw_1}{w_1} < \frac{dw_2}{w_2} < \frac{dw_3}{w_3}$ and assume that input one and two see a fall in wage, but the wage of input 3 increases. We can express the wage changes as follows $dw_1 = aw_1$, $dw_2 = abw_2$, $dw_3 = acw_3$ with $a < 0$, $b \in (0, 1)$, and $c < 0$. Then, (14) becomes:

$$d\mathscr{L}_j(i) = (\varepsilon_i - \sigma)(a\underbrace{\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i} + (\delta_2(i)w_2)^{1-\varepsilon_i} + (\delta_3(i)w_3)^{1-\varepsilon_i}}}_{\theta<1}) - \frac{dw_j}{w_j}\varepsilon_i$$

Given that b and c are both less than 1, it follows that $\theta < 1$. Since $a < 0$, $d\mathscr{L}_1(i) > 0$ if $\theta < \frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$ which holds always. The demand for the second input increases or is unchanged if $\theta \leq b\frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$. By writing theta in its long form, we obtain:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{b(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + b(\delta_3(i)w_3)^{1-\varepsilon_i}} \leq \frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$$

This inequality may or may not hold. The demand for the last input decreases when $\theta > c\frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$. By writing theta in its long form, we get:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{c(\delta_1(i)w_1)^{1-\varepsilon_i} + c(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}} < \frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$$

This inequality always holds since the left had side is less than one when $b \in (0,1)$ and $c < 0$, while the right hand side is larger than one.

Finally, Let's assume that $\frac{dw_1}{w_1} < \frac{dw_2}{w_2} < \frac{dw_3}{w_3}$ and assume that input one experiences a fall in wage, but the wage of input two and three increases. We can express the wage changes as follows $dw_1 = aw_1,\ dw_2 = abw_2,\ dw_3 = acw_3$ with $a < 0$, $b, c < 0$, and $b < c$. Then, (14) becomes:

$$d\mathscr{L}_j(i) = (\varepsilon_i - \sigma)(a\underbrace{\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{(\delta_1(i)w_1)^{1-\varepsilon_i} + (\delta_2(i)w_2)^{1-\varepsilon_i} + (\delta_3(i)w_3)^{1-\varepsilon_i}}}_{\theta<1}) - \varepsilon_i\frac{dw_j}{w_j}$$

Given that b and c are both less than 1, it follows that $\theta < 1$. Since $a < 0$, $d\mathscr{L}_1(i) > 0$ if $\theta < \frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$ which holds always. The demand for the second input increases or is unchanged if $\theta \leq b\frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$. By writing theta in its long form, we obtain:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{b(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + b(\delta_3(i)w_3)^{1-\varepsilon_i}} \geq \frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$$

This inequality may or may not hold. The demand for the last input decreases when $\theta > c\frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$. By writing theta in its long form, we get:

$$\frac{(\delta_1(i)w_1)^{1-\varepsilon_i} + b(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}}{c(\delta_1(i)w_1)^{1-\varepsilon_i} + c(\delta_2(i)w_2)^{1-\varepsilon_i} + c(\delta_3(i)w_3)^{1-\varepsilon_i}} < \frac{\varepsilon_i}{(\varepsilon_i - \sigma)}$$

This inequality always holds since the left hand side is less than one when $b, c < 0$ and $b < c$. ■

R Estimates of elasticities of substitution

To get estimates for the elasticities of substitution, we need to make a series of simplifying assumptions about the model. First, let's assume that all tasks in firms in the average industry combine only regular workers and contract workers. Moreover, let's assume that all tasks are identical. In such case, the change in log-demand for input j is as follows. Given that tasks are identical and that there is a continuum of tasks on the interval 0-1, this is also the change in log-demand for that input at the firm level.

$$d\mathscr{L}_j = (\varepsilon^{lab} - \sigma)(\frac{dp}{p}) - \varepsilon^{lab}\frac{dw_j}{w_j}.$$

In the equation, ε^{lab} is the elasticity of substitution between labor inputs. The change in log-demand, dp/p and dw_j/w_j are the change in demand, price, and wages expressed in percentage. Let's rewrite the equation as follows:

$$\Delta\%x_j = (\varepsilon^{lab} - \sigma)(\Delta\%p) - \varepsilon^{lab}\Delta\%w_j,$$

where $\Delta\%x_j$ is the percentage change in demand for input j. $\Delta\%p$ and $\Delta\%w_j$ are the percentage change in the price of tasks and in the wage of input j. Taking the difference between the two inputs yields:

$$\frac{\Delta\%x_c - \Delta\%x_r}{(\Delta\%w_r - \Delta\%w_c)} = \varepsilon^{lab}.$$

To get a value, I use estimates from the change in number of employees working during a typical workday for firms in the first compensation group (Table L.5, Column(2)). The average increase in the real minimum wage is 3.1%. If we assume that the wage of regular workers increases by that percentage and the wage of contract workers increases by half of that percentage we have $\varepsilon^{lab} = \frac{0.98\%+0.93\%}{(3.1\%-1.55)} = 1.24$. The elasticity gets larger if we assume that the wage of regular workers increases by less than 3.1% or if we assume that the effect on the wage of contract workers is more than half of the effect for regular workers.

For firms in industries more intensive in routine tasks (by one SD), let's assume that the output is produced by combining n identical labor tasks described above. The remaining $1-n$ tasks combine regular workers and capital. In these firms, the change in demand for regular workers, contract workers, and capital at the firm level are:

$$\Delta\% x_r = n[(\varepsilon^{lab} - \sigma)(\Delta\% p_{lab}) - \varepsilon^{lab}\Delta\% w_r] + (1-n)[(\varepsilon^{rk} - \sigma)(\Delta\% p_{rk}) - \varepsilon^{rk}\Delta\% w_r]$$

$$\Delta\% x_c = n[(\varepsilon^{lab} - \sigma)(\Delta\% p_{lab}) - \varepsilon^{lab}\Delta\% w_c]$$

$$\Delta\% x_k = (1-n)[(\varepsilon^{rk} - \sigma)(\Delta\% p_{rk}) - \varepsilon^{rk}\Delta\% w_k]$$

Taking the difference between the three inputs we get:

$$\Delta\% x_r - \Delta\% x_c - \Delta\% x_k = n\varepsilon^{lab}[\Delta\% w_c - \Delta\% w_r] + (1-n)\varepsilon^{rk}[\Delta\% w_k - \Delta\% w_r]$$

Then, plugging in the equation for the elasticity between labor inputs obtained above, we obtain:

$$\varepsilon^{rk} = \frac{\Delta\% x_r - \Delta\% x_c - \Delta\% x_k - n[\Delta\% x_c - \Delta\% x_r]}{(1-n)[\Delta\% w_k - \Delta\% w_r]}$$

To get a value of the elasticity, I use estimates from the same specification as before for the change in demand for regular workers. Assuming that 10% of tasks are labor tasks, that there is no change in employment of contract workers, that the wage of regular workers increases by 3.1%, and that the price of capital falls by 0.1% (Karabarbounis and Neiman (2014)), we have $\varepsilon^{rk} = \frac{-0.5\% - 6.5\% + 0.1[0.5\%]}{0.9[-0.1\% - 3.1\%]} = 2.4$. The elasticity gets larger if the proportion of labor tasks increases, if the number of contract workers increases, and when the wage of regular workers increases by less than 3.1%.