Two Birds, One Stone: Minimum Wage and Child Labor

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Abstract

This paper investigates the effect of an exogenous and sizable increase in minimum wage on child labor outcomes in Turkey. Using data from the 2012 and 2019 Child Labor Surveys, we employ a difference-in-differences method to compare the impact of minimum wage increases on children from minimum wage-earning families with children from other households. We find that minimum wage policies, which are set to alleviate poverty by increasing household income, can also reduce the prevalence of child labor. The results demonstrate the favorable impact of parental income on reducing the incidence of child labor, which constitutes an important part of the policy toolkit for combating child labor.

Keywords: Child labor, minimum wage, household income, luxury axiom

JEL Codes: J22, J31, J38, O12

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1. Introduction

The COVID-19 pandemic has had a major impact on child labor, with income losses, lockdowns, and school closures stalling progress in reducing the incidence of child labor. For the first time in 20 years, the number of children in labor is increasing. Currently, 160 million children, 10% of children worldwide, are in child labor, with an additional 9 million expected to be drawn into labor by the end of 2022[2]. This has made child labor a central concern in economic and social policy. Despite extensive research on child labor, there remain important questions about how policy makers can decrease its incidence and which tools are effective in alleviating the negative economic and social consequences of child labor.

In this study, we explore the impact of an exogenous and significant increase in the minimum wage on child labor in Turkey. Despite the fact that children who work informally are not likely to be directly affected by changes in the minimum wage, they may be indirectly affected through changes in household income. Therefore, we investigate whether minimum wage policies, which are intended to reduce poverty by increasing household income, can also be effective in addressing child labor.

Theoretically, one might expect that an increase in household income, as a result of a higher minimum wage, would lead to a reduction in child labor. First, as suggested by luxury axiom of Basu and Van (1998) if families derive positive utility from their children having leisure time, they will only send their children to work if their income is below a certain level, often referred to as the subsistence level that. Second, the value of a child's income to the household decreases as the household's income increases, due to diminishing marginal returns (Basu, 2000; Dessing, 2004). Third, higher household income may reduce the productivity of children in household work, as the family can afford to purchase substitutes for child labor, thus reducing the need for child labor (Edmonds, 2008). And finally, higher household income may also increase the productivity of

[2] Child Labor: Global estimates 2020, trends and the road forward (ILO and UNICEF, 2021).

children in activities that build human capital, as parents can devote more resources to necessary inputs (Edmonds, 2008)3. Theoretical expectations about the negative relationship between household income and child labor are supported by empirical studies that show the impact of low income on the incidence of child labor. (Cigno and Rosati (2002); Dayıoğlu (2006); Dimova et al. (2015); Chiwaula (2010); Edmonds (2005); Duryea et al. (2007); Wahba (2006); Beegle et al. (2006); Sulistyo and Syafitri (2021); Soares et al. (2012)).

However, increases in minimum wage challenge the theoretical expectations and makes it ambiguous whether they lead to a reduction or an increase in the prevalence of child labor. On the one hand, with higher household income, parents can afford to not send their children to work. On the other hand, if the minimum wage is set above a threshold level it may lead to higher unemployment among adults, particularly among low skilled whom might be replaced by informal child labor, then minimum wage increases might bolster child labor. This theoretical ambiguity warrants further investigation into the causal link between minimum wage and child labor, however, empirical evidence on this topic is limited.

We use 2012 and 2019 Child Labor Surveys (CLS) and employ a difference-in-differences method in which we compare the children from minimum wage-earning families with children from other households. With this approach, this paper has several contributions to the existing empirical literature. First, we contribute to the scarce international literature on the causal effects of minimum wage policies on the incidence of child labor and to the general economic understanding of child labor and household income. One notable exception is Menon and van der Meulen Rodgers (2018), who find that minimum wage has no impact on child work outside of the home in India, except for reducing child labor in household work. They identify the effect of minimum wage on child labor using regional variation in minimum wage, while we are able to deduce the effect using variation at the household level. This allows us to better account for

[3] Rogers and Swinnerton (2004) show a case where high parental income may increase the child labor supply. If the parents with higher incomes believe that their children will be less willing to support them when they are old, they would be less inclined to invest in their child's education.

household decision-making by controlling for household and child characteristics in our analysis. Moreover, in contrast to our study, the definition of employment within the household in the study by Menon and van der Meulen Rodgers (2018) includes own-account workers, unpaid family workers, and children engaged in house chores. This makes it difficult to determine whether the results are driven by unpaid family work or house chores.

Second, we are providing complementary evidence to a few studies that investigated the effect of minimum wages on youth (15-24 year olds) in Turkey, but not directly on children. Bakış et al. (2015) investigate the impact of the 2004 minimum wage increase on the labor market and education outcomes of young adults (15-19) and find that increases in the minimum wage reduce their labor supply. Dayioglu-Tayfur et al. (2022) analyze the effect of the abolishment of a lower minimum wage for those aged between 15-16 on the employment of young males in Turkey and find a reduction in youth employment and labor force participation and an increase in unemployment and the probability of being neither in employment nor in education. On the other hand, Gurcihan-Yunculer and Yunculer (2016) study the wages and hours worked of young workers (15-24) in response to the minimum wage increase and find that the minimum wage increase did not have a significant impact on youth employment. In these studies, however, the minimum wage effect is mainly induced by the labor supply decision of young adults. In our paper, we treat the minimum wage increase as a booster of household income - generated by parents - and investigate how increased household income affects child labor. Finally, our paper provides evidence on the favorable impact of parental income on reducing the incidence of child labor, contributing to the broader literature on this topic, despite evaluating a variation in the minimum wage.

Turkey specifically provides a suitable setting to investigate the unintended consequences of minimum wage increases on child labor in developing countries. First, the share of minimum wage earners is high, 41 percent of the wage earners receive the minimum wage or a wage below that, therefore the marginal effect of minimum wage improvements on economic and social

wellbeing of households are expected to be substantial. Secondly, the minimum wage increases in 2016 and 2019 were exogenous and sizable (30% and 26%, respectively in nominal terms; 35.1% combined in real terms) change, enabling us to isolate quasi-experimental shocks to study the effect on child labor outcomes. Thirdly, as an emerging economy with high informality rate, child labor is also considerably high in Turkey – 5.1% over the sample period in our data. Overall, the wide presence of minimum wage earners and the sizeable real increases of the minimum wage in Turkey, along with their quasi-exogenous nature, make the evaluation of the effects of minimum wage close to an evaluation of an economy-wide real income shock and provide an opportunity to assess the effectiveness of minimum wage policies as a tool against child labor.

We find that a minimum wage increase significantly reduces the employment probability of girls under the age of 15, as well as the probability of working longer hours for 15-17-year-old boys. This decrease in employment probability is also observed for unpaid family workers across age groups. However, no significant impact is observed on the probability of being a wage earner, similar to the findings of Menon and van der Meulen Rodgers (2018). The minimum wage increase also reduces the probability of working in the agricultural sector, but has no impact on the service sector and a limited impact on the manufacturing sector. Additionally, there is no impact on either the extensive or intensive margin for children in single-adult-worker households.

The rest of the paper proceeds as follows. Sections 2 presents the conceptual framework; Section 3 summarizes the institutional background. Section 4 describes the data and provides descriptive statistics. Section 5 lays out the empirical strategy and Section 6 provides the main results followed by robustness checks in Section 7. The last section concludes the paper.

2. Conceptual Framework

In this section, we present a conceptual framework based on a simple household decision-making model to discuss the role of household income policies in eliminating child labor and the channels through which it operates. The framework is adapted from the analytical model of

Edmonds (2008), which is a condensed version of the earlier models developed, such as by Basu and Van (1998), Baland and Robinson (2000), and Cigno and Rosati (2005).

Consider a household that comprises a parent and a child.[4] There are two time periods regarding the life of the child. In the first period, the child is young, and the parent allocates the child's time. The second period represents the child's future. The parent earns an exogenous wage income Y by supplying labor inelastically and has no future in the model. The standard of living of the family in the current period, S, and the child's future welfare, V_k, are the main drivers of the utility of the parent, which is represented as $u(S, V_k)$.

The child's time is allocated across four activities: Education, E; work outside home, M; work at home, H; and leisure and play, P. Work outside the home is mainly the market work where the child earns a wage income. The work done at home comprises the production of goods and services either to be sold at the market or to be used at home to satisfy the standards of living. Thus, the unit time of the child is distributed across these four activities, where $E + H + M + P = 1$.

Edmonds (2008) considers a linear homogenous production function that generates the living standard by using purchased inputs c, and the child's time at home production H. The standard of living in the current period is represented as $S = F(c, H)$. Meanwhile, the child's future welfare is the outcome of a production function that uses education and leisure time as inputs: $V_k = R(E, P)$. The welfare increases in both arguments, and the inputs exhibit diminishing marginal returns.

Schooling has a direct cost, e, which increases with the time spent in education. In units of foregone current consumption, the direct cost of education is eE. A child's labor supplied outside of the home is matched in the labor market and gets a wage rate of w, summing to a child's wage

[4] This can also be considered as both parents, receiving the same utility from of child's activities, jointly decide on how to allocate the child's time.

income of wM. Overall, the parents' exogenous income and child's labor income are used for purchasing the inputs for producing standards of living and paying for the direct costs of education. That is, $Y + wM = c + eE$.

Substituting the purchased inputs into S, one can write the parent's utility function as $u(S, V_k) = u\big(F(c, H), R(E, P)\big) = u\big(F(Y + wM - eE, H), R(E, P)\big)$. Then, analogous to Edmonds (2008, eq. 1.1), the problem for the parent is to:

$$\max_{E,P,M,H} u\big(F(Y + wM - eE, H), R(E, P)\big)$$

s. t. $E + H + M + P = 1$ and $E \geq 0, P \geq 0, M \geq 0, H \geq 0$.

The first-order condition with respect to education yields:

$$\frac{\partial U}{\partial S}\frac{\partial F}{\partial c}(-e) + \frac{\partial U}{\partial V_k}\frac{\partial R}{\partial E} - \lambda = 0 \; if \; E > 0$$

and

$$\frac{\partial U}{\partial S}\frac{\partial F}{\partial c}(-e) + \frac{\partial U}{\partial V_k}\frac{\partial R}{\partial E} - \lambda \leq 0 \; if \; E = 0.$$

In the interior solution where a child goes to school, the marginal utility of improving child welfare through higher education is equal to the marginal utility of consumption loss due to the direct cost of education and the marginal utility of time. Likewise, a child does not go to school only if the marginal utility of the welfare improvement through education falls short of the marginal cost of schooling and the opportunity cost of time spent in education.

Recalling that the first-order conditions with respect M, H, and P (and assuming interior solutions) are

$$\frac{\partial U}{\partial S}\frac{\partial F}{\partial c}w - \lambda = 0; \; \frac{\partial U}{\partial S}\frac{\partial F}{\partial H} - \lambda = 0; \; \frac{\partial U}{\partial V_k}\frac{\partial R}{\partial P} - \lambda = 0,$$

suggests that the marginal utility of time is equal to the marginal utility of time in home production, leisure time's marginal utility, and the marginal utility of time spent at market work.

One can consider how household income affects child labor in the model. Primarily, household income influences how parents value the child's time in various activities. For instance, in the model, parents get positive utility from the child's time spent either in education or leisure. Therefore, a higher household income can reduce the value of the child's time spent at home production or market work. Next, take the marginal utility of the contribution of the child through wage work and home production:

$$\frac{\partial U}{\partial S}\frac{\partial F}{\partial c}w \;\; and \;\; \frac{\partial U}{\partial S}\frac{\partial F}{\partial H}$$

Edmonds (2008) notes that the marginal utility of the child's contribution through wage work is equal to the marginal utility of the parent's income (through its contribution to the provision of the standard of living) times the wage rate that the child receives. An increase in the parent's income reduces the marginal utility of household income and thus reduces the marginal utility of the child's contribution through wage work. On the other hand, the marginal utility from the contribution of the child's home production depends on the child's productivity in producing the standard of living ($\partial F/\partial H$). Higher household income may enable the family to replace the child's input in home production of standards of living with other inputs (i.e., purchase of a washing machine). In that case, the child's productivity in home production declines as well as the demand for the child's time in home production. Note that this may shift the child's time to wage work, but it reduces the total hours worked if the optimal hours of wage work are zero (the corner solution). Finally, an increase in the parent's income might affect the marginal contribution of education to the child's welfare by increasing the child's productivity at school ($\partial R/\partial E$), provided that extra income can be devoted to the purchase of better inputs to support child's education such as a computer.[5]

[5] This simple framework has been used and/or extended in various studies. In earlier examples, Basu and Van (1998) discuss the general equilibrium effects by introducing the substitution and luxury axioms; Baland and Robinson (2000) add credit constraints due to capital market imperfections; Doepke and Zilibotti (2005) integrate child labor laws; Hazan and Berdugo (2002) discuss the role of technological progress; Cigno and Rosati (2005) provide a more general model integrating earlier contributions. In recent theoretical contributions, Basu and Dimova (2021) explicitly model the role of preferences; Mizushima (2021) integrates the social capital accumulation in addition to human capital

3. Institutional Background

The share of minimum wage earners is very high in Turkey, depicted in Figure 1. The minimum wage, which stood at the 32nd percentile of the wage distribution in 2012, moved up to the 41st percentile in 2019. In other words, more than 40% of the wage earners receive the minimum wage or lower. The diffusion of the minimum wage is even higher once the immediate observations to the right of the minimum in the wage distribution.

The minimum wage increases in Turkey have surpassed the growth rate of other wages over the last decade, with specific hikes at certain years (Figure 2). Such surprisingly high increases in net minimum wage took place in 2016 (30%) and 2019 (26%). With these increases, in real terms (CPI-adjusted), from 2012 to 2019 net minimum wage increased by 35.1%, meanwhile, the public sector wage index has declined by 4.4% and private sector wages stagnated (up by only 2%). Thus, the minimum wage earners have secured sizable real wage increases compared to other wage earners in the economy. This is not surprising as these sizable minimum wage hikes occurred not based on increasing productivity gains or restoring the diminished purchasing power, but instead based on political incentives and promises offered at the years of elections (general elections in 2015 and the municipal elections in 2019). In that sense, the minimum wage hikes over this period can also be considered somewhat exogenous.

Overall, the widespread presence and significant real increase of the minimum wage, as well as the quasi-exogenous nature of its rise, make the evaluation of its effects in Turkey similar to assessing the impact of an economy-wide real income shock.

accumulation; Katav Herz and Epstein (2022) introduce the social norms into the model. Providing the most recent evaluation of the household decision-making model of child labor and policies targeted at eliminating child labor, Rosati (2022) notes that most of the theoretical contributions took place in the early 2000s and that the additions to the model have been marginal since then.

4. Data

We use 2012 and 2019 Child Labor Force Survey (CLS) conducted by the Turkish Statistical Institute (Turkstat). It is a nationally representative survey specifically designed to take a closer look at the education and work status of the children aged 5-17 (6-17 in the 2012 round). The CLS is conducted concurrently with the Household Labor Survey, and all children in representative households are included in the survey. The survey is conducted in the final quarter of the vintage year, which is the year for which the survey data are collected. The survey includes very detailed questions on the work and education status of the children. On the work front, employment status, the type of work (paid, unpaid family), time spent at work, the conditions at the workplace (whether it is a hazardous job, whether the child is maltreated at work, etc.), the sector of employment are among the information available in the survey. CLS also includes detailed information on the house chores the child contributes to. Finally, detailed questions on schooling including the level completed, whether child is still studying, type of school attended, reasons for never-been to school or for dropping out are available. The survey includes 27,118 and 25,190 observations in the 2012 and 2019 rounds respectively. In the survey, child labor related questions are directly addressed to the child rather than the parents or take-careers.[6]

We have also been granted access to additional data not present in the standard microdata of CLS. This additional data includes the total wage income of the household, employment status of the household head, sector of employment of the household head, and total number of employed individuals in the household. Total wage income is particularly important for our analysis as it is a key factor in families' decisions on child labor and central to our identification strategy for differentiating between households affected and not affected by the minimum wage increase. In contrast to previous research in Turkey, we also have information on the age of the child, allowing us to account for the heterogeneous effects across the age distribution of children.

[6] For a discussion of possible differences between the labor market outcomes reported by the child or by the caretaker see Janzen (2018), Dillon et al. (2012), and Galdo et al. (2019), among others.

Using this wage information, we generate the main treatment indicator of whether a child belongs to a minimum wage family or not. Minimum Wage Family (MWF) refers to *"households where the average wage income per adult worker is equal to the minimum wage"*. TurkStat provides total wage income of all the adults and children aged 15-17 in the household. We deduct wage income of the children aged 15-17 from this sum and divide by the number of working adults to generate the *"average wage income per adult worker"*.[7, 8] Finally, the treatment indicator, MWF, takes the value of 1 if the child is from a household where the average wage income per working adult is equal to the minimum wage (± 5% to account for rounding in the responses), and 0 otherwise.[9] The distribution of the wage income per adult worker calculated from the CLS also resembles the wage distribution observed in the HLS as discussed before (Figure 3).

The labor market outcomes investigated are represented by the following dummy variables: Employed, works more than 40 hours per week, wage earner, unpaid family worker, employed in agriculture, employed in manufacturing, employed in the services sector, and the reason to work is to contribute to family income or to help to the family business. In each case, the variable takes the value of 1 if the child is in that category and 0 otherwise. The reference brackets in the survey for the time spent at work are used to determine those working longer than 40 hours per week. Also, children from the households in the top 5% of the average adult wage income distribution are omitted.

To account for the potential heterogeneity of the treatment effect across gender and different age groups, several subsamples are considered in the analysis. These samples include All observations; Children aged 15-17; Children aged 5-14; Boys; Girls; Boys aged 15-17; Boys aged 5-

[7] Since the income earned by children are available as income brackets in the CLS, the midpoints of the brackets are used to approximate the wage income generated by 15-17-year-olds.

[8] The only data available regarding the adult wage income is the total wage income of the household. Therefore, it is not possible to identify the exact wage income of the adults in the household. This is the reason behind the choice of the approximation used in the study.

[9] For instance, in the 2012 HLS, several respondents declare 750 TL, when the minimum wage is 740 TL; or in the 2019 HLS, several respondents declare 2000 TL, when the minimum wage is 2020 TL. Moreover, the calculation of the average wage income per working adult also justifies the description of a range.

14; Girls aged 15-17; Girls aged 5-14. The descriptive statistics of the main variables are presented in Tables 1, 2, and 3 for different samples of observations. The overall incidence of child labor is 5.1% over the sample period. The incidence of child labor is 1.8% among children younger than 15 years old and 15.6% among those 15 and above. While 6.9% of boys works, only 3.2% of girls works. Among children working 57% are wage earners and 42% are unpaid family workers. Regarding the sectors, 2%, 1.9%, and 1.2% of the children work in the agriculture, services, and manufacturing sectors, respectively. Around two-thirds of the working children below the age of 15 are employed in the agriculture sector.

For the working children, the probability of being a wage earner is relatively higher for boys and those aged 15-17, meanwhile, the probability of being an unpaid family worker is relatively higher for girls and children younger than 15. Around 10% of the children come from minimum-wage families. For three-fourths of the observations, the household head works, while this figure stands at 84.5% for households with one employed adult. Regarding the treatment status, 2.9% (5.3%) of children in the treatment (control) group are employed, and the mean values of the control variables are similar across both groups.

There is a reduction observed in the incidence of child labor from 2012 to 2019. For those aged 6-17, the share of the working child came down from 5.9% to 4.7%. These figures also confirm the expected link that between child labor and household income. 10.5%, 2.9%, and 2.8% of the children work from families with average adult wages lower than, equal to, or higher than the minimum wage, respectively. Also, 4.7% of the children from families with no wage income work.[10]

[10] The families with no wage income are those whose adult members are employers, self-employed or unpaid family workers, or those with all adult members are unemployed or out of labor force, details of which are not available to the authors. However, the information available at the parent survey (HLS) shows that, for instance in 2019, 63% of the workers are wage workers, while 20%, 13% and 4% are self-employed, unpaid family worker and employer, respectively.

5. Empirical Framework

We employ a difference-in-differences methodology to causally identify the effect of minimum wage increases on child labor incidence using individual child-level data[11]. We define the treatment group as the children from households where the average wage income per adult worker is equal to the minimum wage, and the main control group as the children from all other households, i.e., those with average wage income other than the minimum wage, or those with no wage income reported. More specifically, we examine whether employment probabilities of children from households where the average wage income per adult worker is equal to the minimum wage (Minimum Wage Family-MWF) are differentially affected from the minimum wage increase between 2012-2019 compared to the control group. Here, the assumption is that in the absence of the minimum wage increase, the change in the employment incidence of children in treatment and control groups would be the same. We estimate the following:

$$Y_{i,t} = \beta_0 + \beta_1 Year2019 * MWF_{i,t_t} + \beta_2 MWF_i + \beta_3 Year2019_{i,t} + X'_{i.t}\theta + \varepsilon_{i,t} \quad (1)$$

where $Y_{i,t}$ is the labor market outcome of the child *i* at time *t*. Year2019 takes the value of 1 (0) if the year is 2019 (2012) and thus denotes the period after (before) the treatment. The *MWF* indicates the treatment status and measures whether the child belongs to a minimum wage-earning family (1) or not (0). *X* is a vector of the child or household-related control variables including child's age, gender, enrollment status, and whether subject to higher compulsory schooling, household head's age, a dummy variable indicating whether the household head works, household head's education, as well as age group fixed effects. Here, β_1 is the coefficient of interest showing the effect of minimum wage increase on children from minimum wage-earning families. We use Probit model as the outcome variables are all binary response indicators[12] and to properly test the

[11] The recent literature shows that difference-in-differences strategy can produce biased estimates in the presence of heterogeneous treatment effects (e.g., Goodman-Bacon, 2021; de Chaisemartin and d'Haultfoeuille, 2020). However, this issue does not create any concern in our study since the timing of treatment does not vary over time.

[12] One might model this with a Linear Probability Model as well. However, LPM has two major shortcomings compared to non-linear binary response models. First, the standard errors are heteroskedastic, given the nature of the

statistical significance of the interaction term in this nonlinear model, we bootstrap standard errors with 10000 replications.

For robustness checks, additional analyses are performed. First, the control group is alternated with the children from wage-earning families other than the minimum wage and with the children from no-wage-income households. Second, according to the luxury axiom, a family does not send the child to work if the household income is high enough. The household income is also positively correlated with the number of adult wage earners in the family. Thus, to check whether the treatment effect is valid in a household with only one employed adult, additional regressions are run on that sample. Third, in a separate set of regressions, the sector in which the household head works is also controlled for, rather than a binary indicator of whether the household head works. In the fourth analysis, children aged 5, who are sampled in CLS 2019 but not in CLS 2012, are omitted from the samples including all children and children aged less than 15. For an additional robustness check, the enrollment status of the child, which could potentially be a joint decision with employment, is omitted from the list of control variables to check whether its omission biases the results.[13] Finally, additional data from CLS 2006 are used in order to be able to control for potential differences in time trends between the treatment and control groups.

6. Results

The results of the minimum wage increase on labor market outcomes of children are presented in Tables 4 and 5. The labor market outcomes are listed on the rows of the tables. Each cell reports the coefficient of the interaction term, β_1 in specification (1), estimated for the outcome variable (row) and on the sample (column); the sample mean value of the outcome variable, and

binary response. Second, the predicted values from the LPM do not necessarily lie on the unit interval. Using heteroskedasticity-robust standard errors is a remedy for the first concern. The second concern is more serious as it may lead to LPM producing biased and inconsistent estimates. In this respect, Horrace and Oaxaca (2006) show that the potential bias increases with the share of predicted probabilities remaining outside the unit interval. In our analysis once the specification is estimated with the LPM around one third of the predicted probabilities lie outside the unit interval. Thus, the non-linear specification is preferred, and the difference-in-differences is modeled as a Probit.

[13] Being enrolled or being employed are not mutually exclusive statuses for children in Turkey. After the introduction of 12-year compulsory schooling, the high school enrollment rate increased even for the children who are employed.

the estimated marginal effect in case the coefficient is statistically significant. Column (1) presents the policy effect for the sample of all observations. Effects for children younger than 15 are given in column (2) and column (3) presents the results for children aged 15 or above. The columns (4) -(6) present the effects for all boys, boys younger than 15 and 15-17-year-old boys, respectively. Similarly, columns (7) -(9) present the effects for all girls, girls younger than 15 and 15-17-year-old girls, respectively.

In Table 4, on the employment front, despite having a negative coefficient, the minimum wage increase does not have a significant impact on the incidence of child labor in the whole sample. However, the minimum wage increase significantly reduces the employment probability of children under the age of 15. Given the calculated treatment effect of -0.0022 and the mean child labor incidence of 0.018, the minimum wage increase leads to a 12% decline in the incidence of work among children younger than 15. Delving deeper into gender and age group breakdowns, the effect is driven by girls younger than 15, where the improvement in child labor incidence is as much as 24%. Thus, on the extensive margin, the minimum wage increase has heterogeneous effects on the children as only the employment of younger girls is significantly reduced in the context of Turkey. The presence of heterogeneous effects of family income on child labor is in line with the findings of the literature, for instance, Ray (2000), Wahba (2006), Hong (2013), and Menon and van der Meulen Rodgers (2018).

Next, the effect of the minimum wage increase on the probability of children working long hours (more than 40 hours per week) is analyzed. The impact is statistically significant for all children, 15-17-year-old children and 15-17-year-old boys. The effect is more substantial for 15-17-year-olds, where the minimum wage increase reduces their probability of working longer hours by 14%, and 17% specifically for 15-17-year-old boys. Given that 12.6% of 15-17-year-old boys work more than 40 hours per week, this is a sizable reduction. One can then argue that the impact

on older children is more on the intensive margin as the probability of working longer hours is lower.[14]

Table 5 shows that among the types of employment, the increase in the minimum wage does not affect the probability of being a wage earner, but it reduces the probability of working as an unpaid family worker for all age groups, at around a magnitude of 10% for children younger than 15 and 15-17-year-olds, primarily for girls.

The minimum wage increase significantly reduces the probability of children working in the agriculture sector, which is observed mainly for those younger than 15, at around 10%. The policy reduces the probability of children under the age of 15 working in the manufacturing sector, while it does not affect the probability of working in the services sector.

The reason for which the children work is also altered by the minimum wage increase. The probability of children working to contribute to household income and to help family business is significantly lower across all age groups. The magnitude of the impact is 15% and 14%, respectively, for children younger than 15 and 15-17-year-olds. The impact is strongest amongst the girls younger than 15 (28%).

The findings of the main set of regressions reveal that the minimum wage increase -a relative income shock for a certain portion of the workers- produces favorable results on the labor market outcomes of children, more strongly on girls and those younger than 15 years of age. Considering the luxury axiom, the results suggest that -despite being sizable in real terms- this increase in the minimum wage does not generate enough income to pull all the children out of labor. One might also argue that the increase in minimum wage further induces the supply of child labor and at the same time reduce the demand for child labor by firms in the economy. These two additional motives do not affect the estimated treatment effects given the assumption that they

[14] The results are similar if the probability of working more than 30 hours per week -which may indicate a full-time job- is considered instead.

apply to all the children the same, and that they are captured by the year fixed effects in the specifications.

From the theoretical framework presented above, one may track the channels at work in the case of the minimum wage increase. Mainly, the lower probability of younger girls working and older boys working late hours can be considered in line with the diminishing marginal returns to family income. As the family income is higher, the marginal return of the income generated by the employment of girls younger than 15 and by the extra hours of work of 15-17-year-old boys are not high enough and thus, they are not needed. The sizable decline in the probability of girls working as unpaid family workers yields support for the reduced productivity of children at family business or housework, in addition to diminishing marginal returns to income. The lower probability of working to contribute to household income and help family business supports the view that higher household income increases the utility attached to or strengthens the parents' valuation of child's leisure.

7. Robustness Checks

In this section various robustness checks are done on top of the main results discussed in the previous section. The robustness of the results is put to test of alternative control groups, an alternative sample of observations, controlling for the sector in which the household head is employed, as well as excluding 5-year-olds from the sample and excluding the enrollment status from the specification. Plus, results are also checked with the inclusion of separate time trends for the treatment and control group by inserting data from CLS 2006.

Alternative control groups

In the baseline specifications, the outcomes of children from the MWF (the treatment group) are investigated in comparison to all the other children (the control group). Here, three subsets of the original control group are used to check the impacts. The first is the children from families where the average wage-earning per adult worker is different than the minimum wage. That is, the children from MWF are compared with children from other wage-earning families.

Next, the children from MWF are compared with children from families earning lower than the minimum wage. The final control group is the children from households with no adult-wage income. Recall that families with no wage income are those whose adult members are employers, self-employed or unpaid family workers, or those with all adult members are unemployed or out of the labor force.

The results presented in Table 6 first show that the findings are in line with the baseline results and that the minimum wage increase significantly reduces the probability of employment of children younger than 15, and primarily the girls younger than 15, against all control groups. This suggests that the minimum wage earners experienced a relative income gain in comparison to both other wage earners and those with no wage income.

Note that there is no significant effect in other samples against any of the control groups in employment regressions. Regarding the impact on the probability of working longer hours, the effect on 15-17-year-olds is valid against both control groups. Meanwhile, the observed effect on 15-17-year-old boys comes from the comparison of MWF against no-wage-income households. Thus, this robustness exercise also helps determine the source of the impact from another perspective.

The finding that minimum wage increase decreasing the prevalence of child labor among girls younger than 15 might seems questionable at first sight, as the minimum wage earners are more likely to live in urban areas and girls under 15 working in agriculture are more likely to live in rural areas. Unfortunately, the information on the area of residence is not available in the latest round of the CLS. However, additional empirical evidence might shed more light on this issue. As the results in Table 5 show, the significant impact of the minimum wage is observed, not only when compared with the sample of children from no wage income families but also against the sample of children from other wage-earning families (who are more likely to live in urban areas, like MWFs). Another evidence is that the impact of minimum wage on the probability of girls younger than 15 being employed is still significant if the observations from households where the household

head works in the agriculture sector are omitted. Therefore, the additional evidence suggests that the finding is robust. The main reason behind that finding is that being a MWF does not necessarily mean that the family lives in an urban area, and thus, girls in both the treatment and the control group work in all three sectors of agriculture, manufacturing, and services.

Alternative sample: Children from single-adult-worker households

The main pillar of the luxury axiom posits that a family does not send the child to work if the household income is high enough. It is also reasonable to assume that the household income is also positively correlated with the number of adult wage earners in the family. Thus, if this is the case, then, the treatment effect, if it exists, should be lower for single adult employed families. The impact of the minimum wage increase on the primary labor market outcomes is analyzed in the sample of children from households with a single adult worker to test this claim.

The results, presented in Table 7, reveal that the minimum wage does not significantly impact child labor in the extensive or the intensive margin, nor in the type of work, and for any subsample. This finding also strengthens the arguments related to the luxury axiom. The minimum wage increase only reduces the incidence of child labor if enough adults work in the household to secure the subsistence level income pointed out by the luxury axiom.

Alternative Control Variables/Age group:

In this robustness exercise, alternative control variables are employed. First, instead of the binary indicator of whether the household head is employed, the sectors of employment of the household is included, noting that the number of observations is lower given that this set of regressions does not consider children from households where the household head is not working/not in the labor force (Table 8). Next, 5-year-old children who are only sampled in the CLS 2019, are omitted from the sample to check whether the results are robust (Table 9). Finally, the enrollment status of the children, which could potentially be a joint decision with employment, is omitted (Table 10).

The main results regarding the impact of the minimum wage increase on the employment probability of girls under the age of 15, and on the probability of working longer hours of 15-17-year-old boys are intact. The estimated treatment effects for the employment of girls younger than 15 years of age point to an improvement in the range between 24% and 29% in baseline specification and in robustness checks. Similarly, the estimated reduction in the probability of working long hours for 15-17-year-old boys ranges between 13% and 18%.

The results regarding the significant impact of the minimum wage increase on reducing the probability of working in the agriculture sector, being an unpaid family worker, and working to contribute to household income or to help family business are also valid to the checks provided. Moreover, when the household head's employment sector is controlled for, the minimum wage increase significantly reduces the probability of boys younger than 15 working in the manufacturing sector, in addition to the baseline results.

Controlling for time trends

The results of the robustness check, where treatment group-specific time trends are included in the specification by combining with observations from the 2006 survey, are presented in Table 11 for the major variables of interest. The results suggest that findings regarding employment, unpaid family worker, agriculture are similar to the baseline findings. Meanwhile, despite being negative, the coefficients for working more than 40 hours per week are not statistically significant. Nonetheless, the results of this robustness check should be treated carefully because in this case, there is not a direct comparison of 2019 outcomes with 2012 outcomes, but a comparison of 2019 figures with a weighted average of 2006 and 2012 figures, which might suffer from the intrusion of the large minimum wage adjustment observed in 2008.

8. Conclusion

This paper analyzes how minimum wage increases affect the labor market outcomes of children using quasi-exogenous and sizable increases in minimum wage realized in Turkey. On the

theoretical front, the net effect of the increases in minimum wage is ambiguous and on the empirical front available evidence is too sparse to be conclusive. This paper provides causal evidence from a developing country context where the share of minimum wage earners is high, and the prevalence of child labor is also considerably high — 5.1% over the sample period.

Our results show significant effects on various labor market outcomes for different gender and age groups. The minimum wage increase significantly reduces the employment probability of girls under 15 years of age and the probability of working longer hours for 15-17-year-old boys. No impact is observed on the probability of being a wage earner, while the probability of working as an unpaid family worker is lower across age groups. The minimum wage increase also reduces the probability of working in the agriculture sector, but has no impact on working in the services sector, and a limited impact on working in manufacturing. There is no impact on either the extensive or intensive margin if the child is a member of a single-adult-worker household.

The findings of this paper provide evidence for the relevance of the luxury axiom, as the income increase significantly reduces the incidence of child labor for certain groups. However, the effects are bounded by the size of the minimum wage shocks, indicating that the 35% real increase in the minimum wage observed from 2012 to 2019 is not sufficient to eradicate child labor. This is supported by the lack of impact on children from households where only one adult is working. Nonetheless, the increase does provide partial relief for the employment of younger, more vulnerable children under 15 years of age. Additionally, the probability of children having to work to contribute to the family or help with family businesses is lower due to the increase in household income of MWFs. Overall, the findings related to the luxury axiom support the analysis of Dayıoğlu (2006), which suggests that the income increase needed to eradicate child labor could be substantially high. Similar research has found that cash transfers do not induce the poorest households to invest in their children's education, while relatively less poor households do respond to the policy (Pellerano et al., 2020). Balboni et al. (2022) also argue that significant efforts are needed to pull families out of poverty traps.

This paper also provides evidence for the positive impact of parental income on reducing the incidence of child labor, contributing to the literature on the role of income in determining child labor, which has mixed results across different countries and settings. The widespread diffusion of the minimum wage in Turkey – much higher than in developed countries – makes the minimum wage increases not only an income shock on a large scale, but also enables the evaluation of an incomes policy in reducing child labor in a large developing economy.

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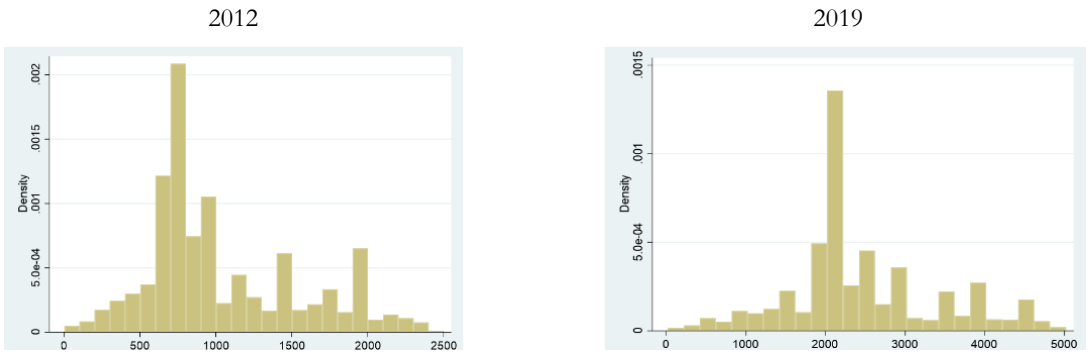
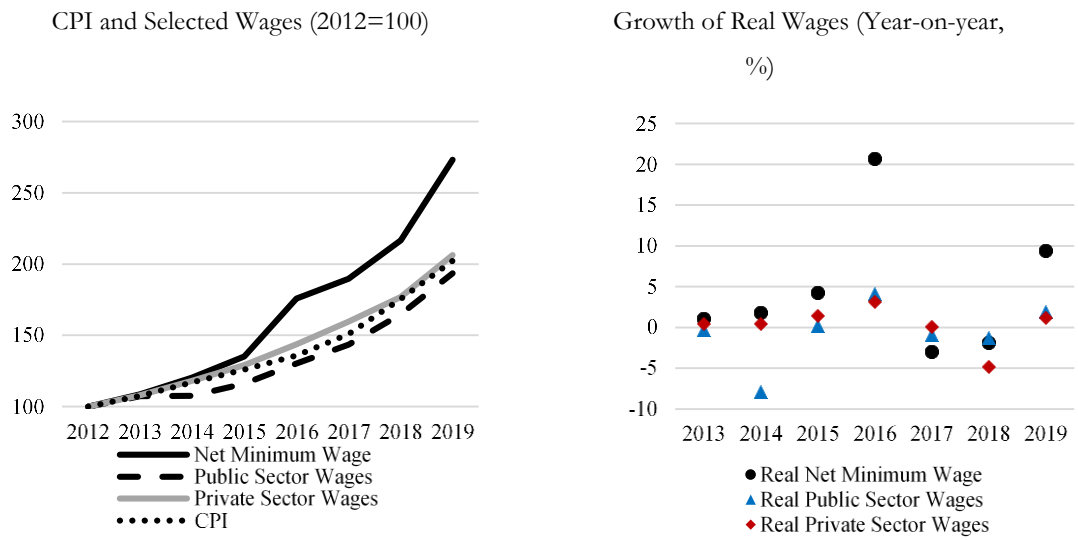
Figure 1. The Distribution of Adult Wages



Note: The first 90th percentile of observations is plotted. The net minimum wage is 740 TL in the second half of 2012 and 2020 TL in 2019.

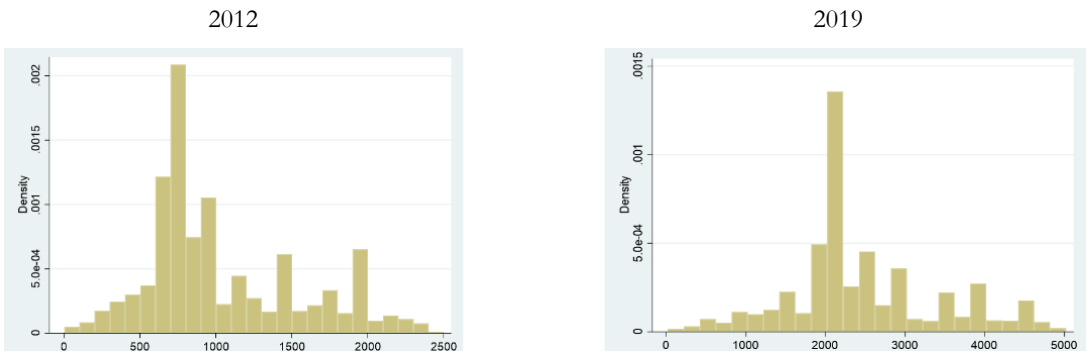
Source: Turkstat HLS 2012, 2019.

Figure 2. Selected Wages, CPI, and Growth of Real Wages



Note: The net minimum wage is the net amount (out of taxes) paid to the employee, available from the Ministry of Labor and Social Security. The public sector wage indicator is the monthly wage coefficient used in wage calculations announced by the Ministry of Treasury and Finance. The private sector wage index is calculated by using the wage increases from the surveys conducted by PERYÖN - People Management Association of Turkey. The Consumer Price Index (CPI) is from TURKSTAT. All real wage indicators are calculated by dividing the nominal figures by year-average CPI.

Figure 3. The Distribution of Wage Income per Adult Worker



Note: The first 90th percentile of observations is plotted. The net minimum wage is 740 TL in the second half of 2012 and 2020 TL in 2019. Source: Turkstat CLS 2012, 2019, Authors' calculation.

Table 1. Descriptive Statistics -I

Variable/Sample:	All					Boys					Girls				
	Obs.	**Mean**	**St. dev.**	**Min**	**Max**	**Obs.**	**Mean**	**St. dev.**	**Min**	**Max**	**Obs.**	**Mean**	**St. dev.**	**Min**	**Max**
Outcome															
Employed	52308	0.051	0.220	0	1	26632	0.069	0.254	0	1	25676	0.032	0.175	0	1
Hours worked>40	52308	0.022	0.148	0	1	26632	0.034	0.181	0	1	25676	0.010	0.101	0	1
Wage earner	52308	0.029	0.168	0	1	26632	0.041	0.199	0	1	25676	0.016	0.127	0	1
Unpaid family worker	52308	0.021	0.144	0	1	26632	0.027	0.162	0	1	25676	0.015	0.123	0	1
Agriculture	52308	0.020	0.138	0	1	26632	0.023	0.151	0	1	25676	0.016	0.124	0	1
Manufacturing	52308	0.012	0.110	0	1	26632	0.019	0.137	0	1	25676	0.005	0.071	0	1
Services	52308	0.019	0.137	0	1	26632	0.027	0.161	0	1	25676	0.011	0.105	0	1
Reason to work: Contribute/Help	52308	0.033	0.179	0	1	26632	0.045	0.207	0	1	25676	0.021	0.143	0	1
Control variable:															
Age	52308	11.206	3.614	5	17	26632	11.213	3.621	5	17	25676	11.199	3.606	5	17
Gender (Female)	52308	0.488	0.500	0	1	26632	0.000	0.000	0	0	25676	1.000	0.000	1	1
Minimum Wage Family	52308	0.098	0.297	0	1	26632	0.097	0.296	0	1	25676	0.099	0.299	0	1
Household head works	52308	0.752	0.432	0	1	26632	0.751	0.432	0	1	25676	0.753	0.431	0	1
Household head's education	49888	2.361	0.766	1	4	25469	2.365	0.768	1	4	24419	2.356	0.763	1	4
Mother's age	51015	38.316	6.942	18	89	26004	38.318	7.044	18	89	25011	38.314	6.834	18	89
Father's age	47352	42.173	7.099	20	85	24232	42.169	7.125	20	85	23120	42.178	7.071	21	85
Enrolled	52308	0.889	0.314	0	1	26632	0.891	0.312	0	1	25676	0.887	0.317	0	1
Higher compulsory schooling	52308	0.878	0.327	0	1	26632	0.878	0.327	0	1	25676	0.879	0.327	0	1

Note: The sample covers all observations, all boys, and all girls from CLS 2012 and 2019, respectively. The descriptive statistics are weighted by sample weights. Reason to work variable consists of contributing to family income and helping the family business. Minimum wage family refers to whether a child belongs to a family where the average wage per adult worker is at the minimum wage level, as described in the data section. Household head's education takes the values of 1, 2, 3, and 4 for "Illiterate", "Less than high school", "High school" and "Above high school", respectively. Higher compulsory schooling refers to whether the child is subject to 12-year compulsory schooling.

Table 2. Descriptive Statistics -II

Variable/Sample:	Age<15					Age>=15					Single-Adult-Worker Households				
	Obs.	**Mean**	**St. dev.**	**Min**	**Max**	**Obs.**	**Mean**	**St. dev.**	**Min**	**Max**	**Obs.**	**Mean**	**St. dev.**	**Min**	**Max**
Outcome															
Employed	39396	0.018	0.133	0	1	12912	0.156	0.363	0	1	26912	0.032	0.177	0	1
Hours worked>40	39396	0.004	0.060	0	1	12912	0.083	0.276	0	1	26912	0.017	0.130	0	1
Wage earner	39396	0.004	0.066	0	1	12912	0.109	0.312	0	1	26912	0.025	0.155	0	1
Unpaid family worker	39396	0.014	0.116	0	1	12912	0.046	0.208	0	1	26912	0.007	0.084	0	1
Agriculture	39396	0.012	0.110	0	1	12912	0.043	0.204	0	1	26912	0.006	0.075	0	1
Manufacturing	39396	0.002	0.048	0	1	12912	0.044	0.205	0	1	26912	0.010	0.098	0	1
Services	39396	0.004	0.060	0	1	12912	0.069	0.253	0	1	26912	0.017	0.129	0	1
Reason to work: Contribute/Help	39396	0.015	0.120	0	1	12912	0.093	0.290	0	1	26912	0.017	0.130	0	1
Control variable:															
Age	39396	9.719	2.751	5	14	12912	15.997	0.815	15	17	26912	10.887	3.590	5	17
Gender (Female)	39396	0.489	0.500	0	1	12912	0.486	0.500	0	1	26912	0.486	0.500	0	1
Minimum Wage Family	39396	0.100	0.301	0	1	12912	0.091	0.287	0	1	26912	0.141	0.348	0	1
Household head works	39396	0.762	0.426	0	1	12912	0.719	0.449	0	1	26912	0.845	0.362	0	1
Household head's education	37683	2.390	0.777	1	4	12205	2.267	0.721	1	4	26033	2.421	0.769	1	4
Mother's age	38602	36.990	6.558	18	89	12413	42.667	6.365	18	89	26327	37.186	6.478	19	89
Father's age	35980	40.883	6.754	20	85	11372	46.469	6.503	28	85	25027	40.995	6.532	22	80
Enrolled	39396	0.922	0.268	0	1	12912	0.782	0.413	0	1	26912	0.900	0.300	0	1
Higher compulsory schooling	39396	1.000	0.000	1	1	12912	0.486	0.500	0	1	26912	0.888	0.315	0	1

Note: The sample covers all children aged less than 15, all children aged >=15, and all children from single adult working households from CLS 2012 and 2019. The descriptive statistics are weighted by sample weights. Reason to work variable consists of contributing to family income and helping the family business. Minimum wage family refers to whether a child belongs to a family where the average wage per adult worker is at the minimum wage level, as described in the data section. Household head's education takes the values 1, 2, 3, and 4 for "Illiterate", "Less than high school", "High school" and "Above high school", respectively. Higher compulsory schooling refers to whether the child is subject to 12-year compulsory schooling.

Table 3. Descriptive Statistics – III

	Treatment					Control				
	Obs.	**Mean**	**St. dev.**	**Min**	**Max**	**Obs.**	**Mean**	**St. dev.**	**Min**	**Max**
Outcome										
Employed	4875	0.029	0.168	0	1	47433	0.053	0.224	0	1
Hours worked>40	4875	0.013	0.113	0	1	47433	0.023	0.151	0	1
Wage earner	4875	0.026	0.159	0	1	47433	0.030	0.169	0	1
Unpaid family worker	4875	0.003	0.057	0	1	47433	0.023	0.151	0	1
Agriculture	4875	0.002	0.048	0	1	47433	0.021	0.145	0	1
Manufacturing	4875	0.010	0.098	0	1	47433	0.013	0.111	0	1
Services	4875	0.017	0.130	0	1	47433	0.019	0.138	0	1
Reason to work: Contribute/Help	4875	0.010	0.098	0	1	47433	0.036	0.186	0	1
Control variable:										
Age	4875	11.032	3.610	5	17	47433	11.225	3.614	5	17
Gender (Female)	4875	0.494	0.500	0	1	47433	0.488	0.500	0	1
Minimum Wage Family	4875	1.000	0.000	1	1	47433	0.000	0.000	0	0
Household head works	4875	0.789	0.408	0	1	47433	0.748	0.434	0	1
Household head's education	4658	2.196	0.569	1	4	45230	2.379	0.782	1	4
Mother's age	4781	37.803	6.904	20	68	46234	38.372	6.944	18	89
Father's age	4498	41.482	6.858	23	77	42854	42.250	7.121	20	85
Enrolled	4875	0.897	0.305	0	1	47433	0.888	0.315	0	1
Higher compulsory schooling	4875	0.924	0.265	0	1	47433	0.873	0.333	0	1

Note: The sample covers all children in the treatment and control groups, from CLS 2012 and 2019. The descriptive statistics are weighted by sample weights. Reason to work variable consists of contributing to family income and helping the family business. Minimum wage family refers to whether a child belongs to a family where the average wage per adult worker is at the minimum wage level, as described in the data section. Household head's education takes the values 1, 2, 3, and 4 for "Illiterate", "Less than high school", "High school", and "Above high school", respectively. Higher compulsory schooling refers to whether the child is subject to 12-year compulsory schooling.

Table 4. The Effect of Minimum Wage Increases on Labor Market Outcomes – I

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outcome \ Sample:		**All**	**Age<15**	**Age>=15**	**Boys**	**Boys, Age<15**	**Boys, Age>=15**	**Girls**	**Girls, Age<15**	**Girls, Age>=15**
Employed	(a)	-0.113	-0.349**	-0.0156	-0.00228	-0.141	0.0582	-0.232	-0.660***	-0.0802
	(b)	(0.168)	(0.166)	(0.215)	(0.158)	(0.262)	(0.133)	(0.292)	(0.175)	(0.433)
	(c)		***-0.002***						***-0.003****	
	(d)	*0.0516*	*0.0185*	*0.1565*	*0.0725*	*0.0248*	*0.2194*	*0.0297*	*0.0119*	*0.0876*
Hours worked>40	(a)	-0.345**	-0.265	-0.343***	-0.151	0.105	-0.258**			
	(b)	(0.173)	(0.197)	(0.121)	(0.161)	(0.191)	(0.121)			
	(c)	***-0.0003****		***-0.011****			***-0.021****			
	(d)	*0.0217*	*0.0032*	*0.0800*	*0.0346*	*0.0045*	*0.1274*	*0.0173*	*0.0059*	*0.0298*
Wage earner	(a)	-0.0182	-0.162	0.0323	0.0777	0.0191	0.101	-0.208		-0.0602
	(b)	(0.156)	(0.237)	(0.170)	(0.145)	(0.259)	(0.132)	(0.353)		(0.378)
	(c)									
	(d)	*0.0277*	*0.0040*	*0.1028*	*0.0407*	*0.0061*	*0.1470*	*0.0141*	*0.0019*	*0.0545*
Unpaid family worker	(a)	-0.468**	-0.422*	-0.440**	-0.0951	-0.143	0.0838	-0.713***	-0.504**	
	(b)	(0.182)	(0.235)	(0.211)	(0.194)	(0.214)	(0.198)	(0.245)	(0.214)	
	(c)	***-0.002****	***-0.002****	***-0.005****				***-0.002*****	***-0.002****	
	(d)	*0.0235*	*0.0144*	*0.0522*	*0.0311*	*0.0185*	*0.0699*	*0.0155*	*0.0102*	*0.0346*
Obs.		45,770	34,772	10,998	23,423	17,676	5,747	22,347	17,096	5,251

Note: The sample covers the children from the CLS 2012 and 2019. Each cell shows the results of a separate regression where the outcome variable (row) is regressed on the treatment indicator and the relevant control variables, for a specific sample of observations (column). The control variables include year fixed effects, age, gender, age group fixed effects, mother's and father's age, a dummy variable indicating whether the household head works, household head's education, household size, enrolment status of the child, a dummy variable indicating whether the child is affected from the compulsory schooling policy change. The standard errors are clustered at the birth year level. The bootstrapped standard errors are obtained with 1000 replications. The marginal effect is calculated at the relevant sample means used in that regression. Only the marginal effects for statistically significant coefficients are reported. (a): Coefficient estimate; (b): Standard error; (c) Marginal effect; (d) Sample mean. ***, **, * refer to statistically significant coefficients at 1, 5, and 10% levels, respectively.

Table 5. The Effect of Minimum Wage Increases on Labor Market Outcomes - II

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outcome \ Sample:		**All**	**Age<15**	**Age>=15**	**Boys**	**Boys, Age<15**	**Boys, Age>=15**	**Girls**	**Girls, Age<15**	**Girls, Age>=15**
Agriculture	(a)	-0.497**	-0.661***	-0.233	-0.283	-0.383*	-0.182			
	(b)	(0.209)	(0.226)	(0.161)	(0.185)	(0.224)	(0.205)			
	(c)	***-0.001****	***-0.001****			***-0.001****				
	(d)	*0.0209*	*0.0124*	*0.0478*	*0.0262*	*0.0154*	*0.0595*	*0.0164*	*0.0100*	*0.0370*
Manufacturing	(a)	0.0684	-0.493*	0.267	0.182	-0.240	0.274	-0.212		0.237
	(b)	(0.254)	(0.255)	(0.228)	(0.253)	(0.272)	(0.261)	(0.234)		(0.165)
	(c)		***-0.0002****							
	(d)	*0.0118*	*0.0024*	*0.0416*	*0.0191*	*0.0040*	*0.0656*	*0.0041*	*0.0008*	*0.0152*
Services	(a)	-0.113	0.0418	-0.180	0.00401	0.145	-0.0561	-0.261	-0.0325	-0.340
	(b)	(0.177)	(0.164)	(0.229)	(0.154)	(0.171)	(0.197)	(0.223)	(0.334)	(0.277)
	(c)									
	(d)	*0.0189*	*0.0037*	*0.0671*	*0.0272*	*0.0054*	*0.0943*	*0.0102*	*0.0019*	*0.0373*
Reason to work: Contribute/Help	(a)	-0.477***	-0.471**	-0.423***	-0.227	-0.244	-0.175	-0.948***	-0.657***	
	(b)	(0.152)	(0.231)	(0.131)	(0.193)	(0.258)	(0.163)	(0.245)	(0.219)	
	(c)	***-0.003*****	***-0.002****	***-0.013*****				***-0.004*****	***-0.003*****	
	(d)	*0.0342*	*0.0151*	*0.0945*	*0.0477*	*0.0197*	*0.1336*	*0.0200*	*0.0103*	*0.0546*
Obs.		45,770	34,772	10,998	23,423	17,676	5,747	22,347	17,096	5,251

Note: The sample covers the children from the CLS 2012 and 2019. Each cell shows the results of a separate regression where the outcome variable (row) is regressed on the treatment indicator and the relevant control variables, for a specific sample of observations (column). The control variables include year fixed effects, age, gender, age group fixed effects, mother's and father's age, a dummy variable indicating whether the household head works, household head's education, household size, enrolment status of the child, a dummy variable indicating whether the child is affected from the compulsory schooling policy change. The standard errors are clustered at the birth year level. The bootstrapped standard errors are obtained with 1000 replications. The marginal effect is calculated at the relevant sample means used in that regression. The marginal effects are reported only when the coefficient of the interaction term is statistically significant. (a): Coefficient estimate; (b): Standard error; (c): Marginal effect; (d): Sample mean. ***, **, * refer to statistically significant coefficients at 1, 5, and 10% levels, respectively.

Table 6. The Effect of Minimum Wage Increases on Child Employment: Alternative Control Groups

Control group: Children from Families with Average Wage Income other than the Minimum Wage

Sample:	**All**	**Age<15**	**Age>=15**	**Boys**	**Boys, Age<15**	**Boys, Age>=15**	**Girls**	**Girls, Age<15**	**Girls, Age>=15**
Employed	-0.203	-0.368**	-0.0465	-0.0370	-0.152	0.0757	-0.408*	-0.687**	-0.191
	(0.128)	(0.162)	(0.140)	(0.134)	(0.250)	(0.0832)	(0.245)	(0.277)	(0.345)
Hours worked>40	-0.334	-0.188	-0.322***	-0.102	0.201	-0.209*			
	(0.227)	(0.179)	(0.122)	(0.233)	(0.190)	(0.122)			
Obs.	28,776	21,901	6,875	14,769	11,135	3,634	6,195	3,238	2,957

Control group: Children from Families with Average Wage Income Lower than the Minimum Wage

Sample:	**All**	**Age<15**	**Age>=15**	**Boys**	**Boys, Age<15**	**Boys, Age>=15**	**Girls**	**Girls, Age<15**	**Girls, Age>=15**
Employed	-0.148	-0.293*	-0.0420	0.0226	-0.0417	0.0799	-0.353	-0.675**	-0.162
	(0.120)	(0.158)	(0.161)	(0.128)	(0.264)	(0.0697)	(0.262)	(0.297)	(0.391)
Hours worked>40	-0.354	-0.362**	-0.337**	-0.0814	0.275	-0.200			
	(0.230)	(0.169)	(0.145)	(0.241)	(0.194)	(0.141)			
Obs.	12,418	9,085	3,333	6,390	4,621	1,769	6,028	4,464	1,564

Control group: Children from Families without Wage Income

Sample:	**All**	**Age<15**	**Age>=15**	**Boys**	**Boys, Age<15**	**Boys, Age>=15**	**Girls**	**Girls, Age<15**	**Girls, Age>=15**
Employed	-0.0268	-0.314*	0.0267	0.0176	-0.112	0.00341	-0.0468	-0.623***	0.106
	(0.286)	(0.174)	(0.358)	(0.246)	(0.256)	(0.271)	(0.420)	(0.162)	(0.630)
Hours worked>40	-0.387***	-0.331	-0.419***	-0.280*	0.0299	-0.423***			
	(0.104)	(0.221)	(0.140)	(0.151)	(0.214)	(0.143)			
Obs.	21,444	16,367	5,077	10,892	8,294	2,598	4,617	2,422	2,195

Note: The sample covers the children from the CLS 2012 and 2019. Each cell shows the results of a separate regression where the outcome variable (row) is regressed on the treatment indicator and the relevant control variables, for a specific sample of observations (column). The treatment group is the children from Minimum Wage Families. While the control group in the upper (lower) panel is the children from families with an average adult wage other than the minimum wage (the children from families without wage income). The control variables include year fixed effects, age, gender, age group fixed effects, mother's and father's age, a dummy variable indicating whether the household head works, household head's education, household size, enrolment status of the child, a dummy variable indicating whether the child is affected from the compulsory schooling policy change. The standard errors are clustered at the birth year level. The bootstrapped standard errors are obtained with 1000 replications. ***, **, * refer to statistically significant coefficients at 1, 5, and 10% levels, respectively.

Table 7. The Effect of Minimum Wage Increases on Employment

Children from Single-Adult-Worker Households					
Outcome \ Sample:	**All**	**Boys**	**Girls**	**Age<15**	**Age>=15**
Employed	-0.00147	0.242	-0.336	-0.148	0.0841
	(0.110)	(0.149)	(0.260)	(0.182)	(0.135)
Hours worked>40	-0.323	-0.0166		-0.235	-0.358
	(0.252)	(0.306)		(0.266)	(0.263)
Wage earner	0.0248	0.177	-0.240	-0.0500	0.0464
	(0.130)	(0.154)	(0.308)	(0.264)	(0.131)
Unpaid family worker	-0.0957			-0.124	
	(0.246)			(0.171)	
Obs.	23,077	11,841	11,236	18,014	5,063

Note: The sample is the observations from CLS 2012 and 2019, excluding 5-year-olds. Each row shows the results of a separate regression where the outcome variable is regressed on the treatment indicator and the relevant control variables. The controls variables include year fixed effects, age, gender, age group fixed effects, mother's and father's age, a dummy variable indicating whether the household head works, household head's education, household size, enrolment status of the child, a dummy variable indicating whether the child is affected from the compulsory schooling policy change. The standard errors are clustered at the birth year level. The bootstrapped standard errors are obtained with 1000 replications.

Table 8. The Effect of Minimum Wage Increases on Labor Market Outcomes – Incl. Household Head's Sector of Employment

Outcome \ Sample:		All	Age<15	Age>=15	Boys	Boys, Age<15	Boys, Age>=15	Girls	Girls, Age<15	Girls, Age>=15
Employed	(a)	-0.192	-0.370*	-0.104	-0.0669	-0.230	0.0320	-0.320	-0.557***	-0.229
	(b)	(0.158)	(0.195)	(0.237)	(0.157)	(0.302)	(0.155)	(0.228)	(0.184)	(0.256)
	(c)		***-0.0032****						***-0.004*****	
	(d)	*0.0537*	*0.0202*	*0.1656*	*0.0751*	*0.0273*	*0.2300*	*0.0312*	*0.0128*	*0.0949*
Hours worked>40	(a)	-0.388**	-0.326	-0.347***	-0.184	-0.0855	-0.217**			
	(b)	(0.157)	(0.235)	(0.0914)	(0.194)	(0.256)	(0.106)			
	(c)	***-0.0003****		***-0.010*****			***-0.016****			
	(d)	*0.0208*	*0.0032*	*0.0796*	*0.0333*	*0.0045*	*0.1262*	*0.0171*	*0.0058*	*0.0300*
Unpaid family worker	(a)	-0.523**	-0.364*	-0.766***	-0.201	-0.0803	-0.296	-0.636***	-0.441*	
	(b)	(0.238)	(0.199)	(0.222)	(0.327)	(0.234)	(0.238)	(0.233)	(0.255)	
	(c)	***-0.003****	***-0.002****	***-0.016*****				***-0.004*****	***-0.003****	
	(d)	*0.0272*	*0.0164*	*0.0636*	*0.0363*	*0.0212*	*0.0852*	*0.0178*	*0.0114*	*0.0421*
Agriculture	(a)	-0.568**	-0.595***	-0.451**	-0.341	-0.255	-0.429*			
	(b)	(0.235)	(0.208)	(0.183)	(0.253)	(0.249)	(0.249)			
	(c)	***-0.002****	***-0.002*****	***-0.008****			***-0.016****			
	(d)	*0.0236*	*0.0138*	*0.0562*	*0.0298*	*0.0174*	*0.0702*	*0.0182*	*0.0109*	*0.0431*
Manufacturing	(a)	0.0154	-0.689***	0.254	0.173	-0.526	0.327	-0.263		0.118
	(b)	(0.295)	(0.195)	(0.213)	(0.302)	(0.325)	(0.286)	(0.181)		(0.113)
	(c)		***-0.0001***							
	(d)	*0.0114*	*0.0025*	*0.0413*	*0.0187*	*0.0043*	*0.0653*	*0.0039*	*0.0009*	*0.0149*
Reason to work: Contribute/Help	(a)	-0.500***	-0.462**	-0.487**	-0.269	-0.300	-0.198	-0.841***	-0.569***	
	(b)	(0.181)	(0.190)	(0.228)	(0.260)	(0.236)	(0.190)	(0.258)	(0.214)	
	(c)	***-0.004*****	***-0.003*****	***-0.023*****				***-0.006*****	***-0.004*****	
	(d)	*0.0359*	*0.0166*	*0.1005*	*0.0498*	*0.0220*	*0.1398*	*0.0214*	*0.0110*	*0.0605*
Obs.		36,603	28,175	8,428	18,704	14,291	4,413	17,899	13,884	4,015

Note: The sample covers the children from the CLS 2012 and 2019. Each cell shows the results of a separate regression where the outcome variable (row) is regressed on the treatment indicator and the relevant control variables, for a specific sample of observations (column). The control variables include year fixed effects, age, gender, age group fixed effects, mother's and father's age, household head's sector of employment, household head's education, household size, enrolment status of the child, a dummy variable indicating whether the child is affected from the compulsory schooling policy change. The standard errors are clustered at the birth year level. The bootstrapped standard errors are obtained with 1000 replications. The marginal effect is calculated at the relevant sample means used in that regression. Only the marginal effects for statistically significant coefficients are reported. (a): Coefficient estimate; (b): Standard error; (c) Marginal effect; (d) Sample mean. ***, **, * refer to statistically significant coefficients at 1, 5, and 10% levels, respectively. Wage earner and services rows are omitted to save space, as none of the interaction terms for any sample are significant, in line with the baseline results.

Table 9. The Effect of Minimum Wage Increases on Labor Market Outcomes – Excluding 5-year-olds

Outcome \ Sample:		All	Age<15	Boys	Boys, Age<15	Girls	Girls, Age<15
Employed	(a)	-0.113	-0.358**	-0.00283	-0.156	-0.232	-0.665***
	(b)	(0.178)	(0.174)	(0.180)	(0.280)	(0.253)	(0.178)
	(c)		***-0.0025*****				***-0.0033***
	(d)	*0.0536*	*0.0194*	*0.0752*	*0.0260*	*0.0309*	*0.0125*
Hours worked>40	(a)	-0.346**	-0.265	-0.152	0.104		
	(b)	(0.161)	(0.211)	(0.160)	(0.227)		
	(c)	***-0.0003*****					
	(d)	*0.0225*	*0.0034*	*0.0359*	*0.0047*	*0.0173*	*0.0059*
Unpaid family worker	(a)	-0.473**	-0.427*	-0.0983	-0.148	-0.722***	-0.509**
	(b)	(0.186)	(0.240)	(0.222)	(0.205)	(0.273)	(0.211)
	(c)	***-0.0019*****	***-0.0017****			***-0.003******	***-0.002*****
	(d)	*0.0244*	*0.0151*	*0.0323*	*0.0194*	*0.0161*	*0.0107*
Agriculture	(a)	-0.506**	-0.671***	-0.289*	-0.391*		
	(b)	(0.208)	(0.225)	(0.162)	(0.222)		
	(c)	***-0.001*****	***-0.001******	***-0.001****	***-0.001****		
	(d)	*0.0217*	*0.0131*	*0.0272*	*0.0162*	*0.0170*	*0.0105*
Manufacturing	(a)	0.0685	-0.493**	0.183	-0.242	-0.212	
	(b)	(0.224)	(0.234)	(0.302)	(0.279)	(0.219)	
	(c)		***-0.0002*****				
	(d)	*0.0122*	*0.0025*	*0.0198*	*0.0042*	*0.0043*	*0.0008*
Reason to work: Contribute/Help	(a)	-0.485***	-0.479**	-0.235	-0.254	-0.959***	-0.661***
	(b)	(0.167)	(0.188)	(0.200)	(0.253)	(0.205)	(0.215)
	(c)	***-0.003******	***-0.003*****			***-0.004******	***-0.003******
	(d)	*0.0355*	*0.0159*	*0.0495*	*0.0207*	*0.0208*	*0.0108*
Obs.		44,096	33,098	22,586	16,839	21,510	16,259

Note: The sample covers the children from the CLS 2012 and 2019 (excluding 5-year-olds). Each cell shows the results of a separate regression where the outcome variable (row) is regressed on the treatment indicator and the relevant control variables, for a specific sample of observations (column). The control variables include year fixed effects, age, gender, age group fixed effects, mother's and father's age, a dummy variable indicating whether the household head works, household head's education, household size, enrolment status of the child, a dummy variable indicating whether the child is affected from the compulsory schooling policy change. The standard errors are clustered at the birth year level. The bootstrapped standard errors are obtained with 1000 replications. The marginal effect is calculated at the relevant sample means used in that regression. Only the marginal effects for statistically significant coefficients are reported. (a): Coefficient estimate; (b): Standard error; (c) Marginal effect; (d) Sample mean. ***, **, * refer to statistically significant coefficients at 1, 5, and 10% levels, respectively. Wage earner and services rows are omitted to save space, as none of the interaction terms for any sample are significant, in line with the baseline results.

Table 10. The Effect of Minimum Wage Increases on Labor Market Outcomes – Excluding Enrollment Status

Outcome \ Sample:		All	Age<15	Age>=15	Boys	Boys, Age<15	Boys, Age>=15	Girls	Girls, Age<15	Girls, Age>=15
Employed	(a)	-0.123	-0.317*	-0.0239	-0.0207	-0.0867	0.00895	-0.242	-0.691***	-0.0567
	(b)	(0.163)	(0.163)	(0.177)	(0.174)	(0.245)	(0.155)	(0.259)	(0.183)	(0.391)
	(c)		***-0.003****						***-0.004*****	
	(d)	*0.0536*	*0.0194*	*0.1565*	*0.0752*	*0.0260*	*0.2194*	*0.0309*	*0.0125*	*0.0876*
Hours worked>40	(a)	-0.278	-0.175	-0.300**	-0.0960	0.230	-0.237**			
	(b)	(0.171)	(0.123)	(0.135)	(0.168)	(0.152)	(0.111)			
	(c)			***-0.013****			***-0.023****			
	(d)	*0.0225*	*0.0034*	*0.0800*	*0.0359*	*0.0047*	*0.1274*	*0.0173*	*0.0059*	*0.0298*
Unpaid family worker	(a)	-0.473***	-0.427**	-0.425**	-0.124	-0.147	0.0129	-0.687***	-0.513**	
	(b)	(0.159)	(0.188)	(0.173)	(0.177)	(0.225)	(0.193)	(0.218)	(0.231)	
	(c)	***-0.002*****	***-0.002****	***-0.005****				***-0.002*****	***-0.002****	
	(d)	*0.0244*	*0.0151*	*0.0522*	*0.0323*	*0.0194*	*0.0699*	*0.0161*	*0.0107*	*0.0346*
Agriculture	(a)	-0.500***	-0.660***	-0.255*	-0.307*	-0.388	-0.205			
	(b)	(0.192)	(0.239)	(0.144)	(0.179)	(0.256)	(0.193)			
	(c)	***-0.001*****	***-0.001*****	***-0.002****	***-0.001****					
	(d)	*0.0217*	*0.0131*	*0.0478*	*0.0272*	*0.0162*	*0.0595*	*0.0170*	*0.0105*	*0.0370*
Manufacturing	(a)	0.0283	-0.442**	0.237	0.150	-0.145	0.235	-0.264		0.229*
	(b)	(0.205)	(0.176)	(0.241)	(0.260)	(0.218)	(0.258)	(0.220)		(0.121)
	(c)		***-0.0003****							***0.0037****
	(d)	*0.0122*	*0.0025*	*0.0416*	*0.0198*	*0.0042*	*0.0656*	*0.0043*	*0.0008*	*0.0152*
Reason to work: Contribute/Help	(a)	-0.449**	-0.462**	-0.360**	-0.219	-0.225	-0.173	-0.899***	-0.681***	
	(b)	(0.178)	(0.229)	(0.145)	(0.218)	(0.240)	(0.141)	(0.269)	(0.198)	
	(c)	***-0.003****	***-0.003****	***-0.013****				***-0.004*****	***-0.003*****	
	(d)	*0.0355*	*0.0159*	*0.0945*	*0.0495*	*0.0207*	*0.1336*	*0.0208*	*0.0108*	*0.0546*
Obs.		44,096	33,098	10,998	22,586	16,839	5,747	21,510	16,259	5,251

The control variables include year fixed effects, age, gender, age group fixed effects, mother's and father's age, household head's employment status, household head's education, household size, and a dummy variable indicating whether the child is affected by the compulsory schooling policy change. The standard errors are clustered at the birth year level. The bootstrapped standard errors are obtained with 1000 replications. The marginal effect is calculated at the relevant sample means used in that regression. Only the marginal effects for statistically significant coefficients are reported. (a): Coefficient estimate; (b): Standard error; (c) Marginal effect; (d) Sample mean. ***, **, * refer to statistically significant coefficients at 1, 5, and 10% levels, respectively. Wage earner and services rows are omitted to save space, as none of the interaction terms for any sample are significant, in line with the baseline results.

Table 11. The Effect of Minimum Wage Increases on Labor Market Outcomes – Including Treatment Group Specific Time Trends

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Outcome \ Sample:		**All**	**Age<15**	**Age>=15**	**Boys**	**Boys, Age<15**	**Boys, Age>=15**	**Girls**	**Girls, Age<15**	**Girls, Age>=15**
Employed	(a)	-0.0327	-0.426*	0.172	0.234	-0.0912	0.453	-0.345	-0.840***	-0.181
	(b)	(0.442)	(0.248)	(0.329)	(0.292)	(0.398)	(0.287)	(0.295)	(0.171)	(0.470)
Hours worked>40	(a)	-0.258	-0.584	-0.0965	-0.0817	-0.346	-0.0353			
	(b)	(0.337)	(0.361)	(0.0888)	(0.199)	(0.661)	(0.233)			
Unpaid family worker	(a)	-0.921**	-0.800**	-0.988**	-0.0768	-0.202	0.270	-1.465***	-1.018*	
	(b)	(0.412)	(0.330)	(0.463)	(0.548)	(0.486)	(0.192)	(0.269)	(0.611)	
Agriculture	(a)	-0.646	-0.941*	-0.136	-0.277	-3.513***	0.215			
	(b)	(0.589)	(0.501)	(0.220)	(0.395)	(0.335)	(0.487)			
Obs.		70,828	54,170	16,658	36,165	27,608	8,557	34,663	26,562	8,101

Note: The sample covers the children from the CLS 2012 and 2019. Each cell shows the results of a separate regression where the outcome variable (row) is regressed on the treatment indicator and the relevant control variables, for a specific sample of observations (column). The control variables include year fixed effects, age, gender, age group fixed effects, mother's and father's age, a dummy variable indicating whether the household head works, household head's education, household size, enrolment status of the child, a dummy variable indicating whether the child is affected from the compulsory schooling policy change. The standard errors are clustered at the birth year level. The bootstrapped standard errors are obtained with 1000 replications. The marginal effect is calculated at the relevant sample means used in that regression. (a): Coefficient estimate; (b): Standard error. ***, **, * refer to statistically significant coefficients at 1, 5, and 10% levels, respectively.