Work versus School? The Effect of Work on Educational Expenditures for Children in Mexico

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ABSTRACT

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This paper explores the impact of child labor on child welfare, with a specific focus on the relationship between working and education. I look at the empirical relationship between working and educational expenditure budget shares for children age 5-14 in Mexico. I accomplish this using a household fixed effects model and data from two waves of the Mexican Family Life Survey (MxFLS). The results indicate that working increases school expenditure shares for working children. In particular, on average, girls engaged in paid work have total annual education expenditure shares that are 48.6% higher than girls who do not work. This relationship varies significantly with characteristics of both the individual and the household, including the child's gender and type of work performed, as well as the household's income, location, and relative female bargaining power. The results indicate that working does not appear to translate into a decrease in welfare and the additional expenditure is directed towards goods that improve the quality of education.

JEL Classification: D13, I21, J22, O15

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1. Introduction

Child labor is an issue of worldwide concern. In the academic as well as popular literature, most see child labor as harming vulnerable members of society by exposing them to dangerous and exploitative work. In addition, child labor might also harm children because work interferes with the child's ability to attend school and thus lowers human capital, leading to a reduction in lifetime earnings that can perpetuate across generations (Basu and Tzannatos, 2003).[1,2]

It is important to keep in mind, however, that not all child employment harms child welfare. Some jobs, such as apprenticeships, may actually increase human capital formation above what is gained in formal schooling.[3] Moreover, work and school investments may be complements rather than substitutes.[4] Blunch and Verner (2000) point out that in more developed countries children perform household chores or work in the labor market to finance their own personal consumption. In a developing world context, child work may allow families to direct a larger share of the household budget towards education expenditure, thus actually improving educational outcomes.

This paper tests whether child labor adversely impacts child welfare, with specific focus on the relationship between working and education. In order to explore this, I look at the empirical relationship between working and education expenditure budget shares for children ages 5-14 in Mexico. This will be accomplished using panel data from two years (2002 and 2005) of the Mexican Family Life Survey (MxFLS). The benefit of this dataset lies in its detailed information on child work as well as education expenditures at both the household and individual level.[5]

Although there are many studies which seek to explore the allocation of resources within the household, few studies have done so in the context of child labor.[6] One exception is Moehling (2006), who uses household level Engel curves and U.S. historical data to explore the relationship between child

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[1] Lower educational levels are also correlated with higher infant mortality and fertility, poorer health, and lower life expectancy (Tauson, 2009).

[2] On the aggregate, reduced lifetime earnings may also translate into a system of state level poverty, where human capital investment remains low, leading to low productivity and technology advancement, which in turn slows growth (Binder & Scrogin, 1999).

[3] The International Labour Organization (ILO) recognizes that "children's or adolescents' participation in work that does not affect their health and personal development or interfere with their schooling, is generally regarded as being something positive... [Some jobs] contribute to the children's development and to the welfare of their families; they provide them with skills and experience and help to prepare them to be productive members of society during their adult life" (International Labour Organization, 2013).

[4] In the Mexican context, enrollment rates are known to be high for both male and female children. In the data used in this analysis, enrollment rates are near 100% for both male and female children, regardless of their work status. This is likely due to the fact that education is compulsory and provided free by the government through grade 9.

[5] The survey also includes data on health expenditures for individual children, but the results are omitted from this paper due to the fact that observations are limited, no clear pattern emerges in the analysis, and federal law actually requires regular health check-ups for working children.

[6] For example, the allocation of resources in the household is explored in Deaton (1987, 1989), Hoddinott & Haddad (1995), Vermeulen (2005), Duflo & Udry (2004), Lancaster et al. (2008), and Zimmerman (2011), to name only a few. Many of these studies are also constrained by the use of adult assignable goods.

income and household budget shares. She finds that earnings from children alter household resource allocation by shifting consumption from private goods such as father's clothing, to publicly consumed goods, particularly food expenditures. In addition, there are few studies which explore the empirical relationship between child work and expenditures using individual level data.[7] Again, one exception is Moehling (2005) where the same data are used to explore the impact of working on an individual child's private clothing expenditure. She finds that working children have higher clothing expenditures than non-working children, and that expenditures are increasing in the amount of child income earned.

However, to my knowledge, this is the first paper to examine the relationship between working children and education expenditure shares using individual level data.[8] The benefit of acquiring data on an individual child's expenditure, as opposed to goods that are simply assignable to adult or child household members, is that we can see the direct impact of that child's labor market outcome on his household resource allocation.[9] As will be discussed further below, theory provides multiple channels through which child work can be associated with education expenditure shares. Understanding this relationship, along with the mechanisms through which it occurs is essential for constructing effective policy in regards to both child labor and education.

My results indicate that engaging in paid work has the ability to increase school expenditure shares for working children. In particular, on average, girls in paid work have education expenditure shares that are 48.6% higher than girls who are not working. This translates into an average education budget share that increases from 1855.20 to 2756.71 Mexican pesos annually.[10] However, this relationship varies significantly by individual characteristics including gender and the type of work performed, as well as household characteristics, such as income, location and female bargaining power. The results indicate that working does not appear to translate into a decrease in welfare and the additional expenditure is directed towards goods that improve the quality of education.[11] These relationships are explored further in the results section of the paper.

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[7] This is not to say that others haven't explored household resources allocation with individual level data. For example, see Deolalikar (1997) and Irving & Kingdon (2008). However, none of these studies include an analysis of how child work impacts such allocation.

[8] The idea that child work negatively impacts educational outcomes is common in the child labor literature, but looking at the relationship between work and expenditures provides new insights by exploring the actual education allocation for a child. It should also be noted that this is the only sufficient measure of private consumption available in the survey.

[9] Adult assignable goods are those which are consumed by adult household members as opposed to child household members. Common examples include tobacco, alcohol, and adult clothing (Deaton, 1997).

[10] Using the official exchange rates provided by the Federal Reserve Bank of New York in 2005 found at <https://apps.newyorkfed.org/markets/autorates/fxrates/external/home>, one US dollar is equal to 10.7370 Mexican pesos. Thus an increase of 901.51 pesos translates into about 83.96 dollars annually. The results section will provide additional details on the type of goods this money is spent on.

[11] It should be noted here that in this analysis, welfare is measured by private consumption expenditure. I also explore the impact of work on additional educational outcomes including, but not limited to attendance and grade repetition. This definition does not include every aspect of welfare and has ignored other impacts on the child's development, health and nutrition.

The rest of the paper will be structured as follows; Section 2 discusses relevant background literature and the conceptual approach used in this paper. Section 3 presents the empirical framework, while Section 4 describes the data. Section 5 presents the baseline results, along with evidence regarding heterogeneity, while section 6 further explores welfare implications and robustness. Section 7 is left for discussion and conclusions.

2. Background and Conceptual Approach

For international policy purposes, child labor is defined as the number of economically active children under the age of 15 years.[12] As with most other countries across the world, regulation of child labor in Mexico comes in the form of laws restricting its practice. Although Mexico has not yet ratified ILO Convention 138 on the minimum age of employment, at the national level the Mexican Constitution establishes 14 as the basic minimum age for work. Part of the Constitution, the Federal Labor Law (LFT) discusses the specifics regarding working children, including limiting work time to six hours a day, along with requiring permission from a legal guardian and regular medical checkups. It also prevents any work that is dangerous or unhealthy, underground or underwater. The federal government is responsible for enforcement in some cases, but in most cases, enforcement falls under the jurisdiction of the state (Bureau of International Labor Affairs, n.d.).[13] Despite these regulations and a World Bank classification as an upper middle income country, in 2004, it was estimated that 9% of children in Mexico between the ages of 7 and 14 were engaged in work (The World Bank Group, 2013b).[14]

Based on previous literature, there are many potential relationships between working and education expenditure shares within the household. First, it is possible that there is no statistically significant relationship. This is likely to be true under the traditional unitary model in which the household maximizes one welfare function subject to a single joint budget constraint. Practically, this implies that the household behaves as though they are a single decision making unit (Vermeulen, 2002) and the source of income is irrelevant. Applications of the unitary household model to the child labor literature lead to the conclusion that children's income from working would be shared by everyone in the household through a relaxed budget constraint.[15,16] An insignificant relationship is also consistent with the

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[12] This is set at 14 years in specific developing countries. The exact definition also depends on the type of work, hours performed, and the impact on the health and education of the child.

[13] For example the federal government is responsible in the case of textiles, chemicals, automobiles and metals.

[14] This has been recalculated by the World Bank and only includes their definition of "economically active" children. It does not include unpaid household services.

[15] The unitary household assumption in the child labor literature is supported by the fact that many children actually work within the household and any schooling is typically financially supported by parents (Edmonds, 2008).

[16] It should be noted that although the unitary approach is common in modeling the child labor decisions of the household, the unitary model itself has been criticized heavily on both theoretical and empirical grounds in the last thirty years. Some criticisms include the importance of methodological individualism and resource allocation within the household, and how this translates into education, food, and human capital investment for specific individuals (Vermeulen, 2002).

idea that households simply expect certain children to work, that children are altruistic towards the household, or that children's income is used for purposes other than their own education. In any of these cases, we would not expect to find a significant relationship between working and education expenditure shares.

On the other hand, the literature has also indicated a potential negative relationship between child work and education expenditure shares. One possibility comes directly out of the idea that every individual is faced with time constraints, and thus if a child goes to work, less time is left for schooling and leisure. Edmonds (2008) documents that on average, school attendance rates are lowest and hours worked are highest among children in market work outside the household.[17] However, in the Mexican case, many children have the ability to simultaneously attend school and engage in work. I explore this relationship further in the results section of the paper using detailed information on the paid work hours per week for each child. An additional mechanism behind a negative correlation could be that child income is treated as a separate account in the household expenditure decision. As Moehling (2006) points out, according to Basu and Van (1998) the "luxury axiom" indicates that parents only send children to work when consumption falls below a subsistence level. Thus parents prefer not to send children to work, and only do so when it is necessary for household survival. If this is correct, we would expect child income to go towards paying off debts or to essential goods (Moehling, 2006). The empirical results then depend on how the household classifies the good in question.

However, this last point also provides a channel through which child work can have a positive impact on education expenditures. More specifically, in the above context, if education expenditures are considered a necessary good within the household, then working should lead to higher education expenditure shares. In line with this idea, a positive relationship between child work and education expenditure shares could exist if working actually helps the child attend school. In this situation, contributing to household income through work could induce an increase in the education budget share without interfering with the child's ability to attend school. These ideas provide evidence that total household income plays an essential role in the relationship between work and education. More specifically, we would expect the relationship to be stronger for households below the poverty line, where the budget constraint is especially binding, than for those above it. This idea is explored further in the results section.

Additionally, an increase in education expenditure shares for working children would be consistent with a unitary or collective bargaining model of household decision making. More precisely, a positive relationship could be the result of parents rewarding children for working or the child gaining

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[17] See Edmonds (2008) for a review on the relationship between work and schooling attendance, attainment, and achievement.

power within the household through work.[18,19,20] This leads to the idea that children may actually have incentives to work. Moehling (2005) provides the best evidence of this concept by historically looking at the role of children in the family decision making process. Using data from the Bureau of Labor Statistics Cost of Living Survey 1917-1919, she shows that despite the fact that at that time working children turned almost all of their earnings over to their parents, they still had higher clothing expenditures than non-working children. Further, their clothing expenditures were increasing in the amount of income they earned.

Thus as in Moehling (2005), the child may have a financial incentive to choose to work or to cooperate with their parent's desire to send them to the labor market. Regardless of whether the child makes an independent decision or whether he simply has the ability to express his preferences to his parents, compensation within the household may be one way in which households induce children to work. If we believe this to be true we would expect the relationship to be stronger for older children, who better understand their labor market opportunities and can articulate their preferences. Further, we expect different levels of compensation depending on the type of work the child is engaged in. If paid work is more difficult or time consuming than working within the household, a child should be compensated at a higher rate. Our data allows us to explore both of these factors in the results section below.

The numerous potential relationships between work and education expenditure shares lead to the conclusion that this relationship is likely to vary with aspects of the child and the household. The most important characteristic to impact the relationship is the child's gender. This stems out of the idea that girls and boys typically engage in different types of work, which require diverse time commitments and are also treated differentially within the household. Thus the baseline regression tries to account for these

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[18] The first model which incorporates child behavior is attributed to Becker (1974). This model involves a self-interested child who is induced to act in an unselfish and efficient manner through transfers from his altruistic parent. In the child labor literature, this would be similar to the idea that parents compensate children for their work by increasing the amount of household expenditures they earn.

[19] Due to criticisms of the unitary model, numerous alternatives emerged which specifically sought to focus on the individual and differing preferences of household members (i.e. Manser and Brown, 1980; McElroy and Horney, 1981; Lundberg and Pollack, 1993 to name a few). One such set of models are known as collective bargaining models in which each person in the household has different preferences and bargaining between those individuals is what determines the allocation of resources (Vermeulen, 2002). In addition, many have conducted empirical tests of these collective household models and have shown that the source of income has a significant effect on household resource allocation (Fortin and Lacroix, 1997). For example, Browning et al. (1994) use Canadian data to show that allocations of expenditure depend significantly on relative incomes, ages and lifetime wealth of respective household members (Also see Hoddinott and Haddad (1995), Udry (1996), Maitra & Ray (2002), Duflo & Udry (2004)). In fact the idea of pooling income within a household, which is the main property of unitary models (Chiuri, 2000), has been strongly rejected (Moehling, 2005). Instead much of this literature has indicated that the power of a particular individual determines household outcomes (Moehling, 2006).

[20] The concept of child agency in household decision making is controversial, but increasingly interesting. There is a small set of literature which show that children are rational actors (Harbaugh et al. 2001), they understand the bargaining process (Harbaugh et al., 2003), and they independently influence household consumption and activities (Dauphin et al., 2011; Lundberg et al., 2009). Iverson (2002) also finds anecdotal evidence that boys age 13 and 14, exhibit autonomy and independence in their decisions to enter the labor force or avoid education. Further, through a field experiment, Berry (2013) finds differential impacts of giving incentives to children over adults in educational outcomes.

differences by focusing on the impact of paid work for girls and boys ages 5-14 separately. Following this baseline, I then explore additional heterogeneity and robustness of the results.

3. Empirical Framework

The approach of this analysis involves empirically examining how individual education expenditure shares vary with a child's labor market outcomes. One major issue with this type of exercise is that we would have to assume the demand for goods and labor supply decisions are independent within the household. However, it is more likely that these decisions are made simultaneously. More specifically, labor supply is endogenous to the household expenditure decision in that the presence of working children is likely correlated with other household characteristics which affect household expenditure allocations. Some of the characteristics are observable, such as household size, the age and sex composition of household members, and expenditure per capita. For example, households with fewer children, but the same income will have more to spend per capita on every member of the household and are less likely to send children to work.[21] Controlling for household income is also particularly important because households with higher income will have more to spend on child related goods and will find child work less necessary.[22] Failing to control for these observable omitted variables will bias our estimates, though the direction of the bias is not entirely clear.[23]

In addition to these characteristics, which are common in Engel curve specifications of the gender discrimination literature, there are likely other important socioeconomic factors which influence child expenditures.[24] In particular, characteristics of the household head including gender, education and employment status, as well as the location and ownership status of the house will affect how resources are allocated (Kingdon, 2003).[25] For example, numerous papers assert that women with higher levels of education are more likely to invest in children's goods and other factors that will improve overall household welfare.[26] Further, as we have individual level data, characteristics of the individual child, such

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[21] Grootaert and Kanbur (1995) use Becker's (1960) quantity-quality tradeoff regarding fertility decisions to suggest that larger households reduce educational participation of children as well as the investment in education that parents make.

[22] Here expenditure per capita is a proxy of household income. As Lancaster et al. (2008) note, household expenditure is easier to measure, less prone to measurement error, and is less subject to transitory fluctuations. Further, in the data used here, expenditures receive a much higher response rate than questions regarding household income. However, it should be noted that this may be correlated with other unobserved determinants of budget shares and thus these regressions are run without including expenditure per capita as well.

[23] For instance, household size is likely to be positively correlated with child work, but negatively correlated with expenditure shares. On the other hand, income is negatively correlated with child work and positively correlated with expenditure shares.

[24] For examples in the gender discrimination literature see Case and Deaton (2003), Gong et al (2000), Lancaster et al (2008), Irving and Kingdon (2008).

[25] Similar characteristics are controlled for in multiple studies including Deolalikar (1997).

[26] As a specific example, Bobonis (2009) shows that women's income compared to overall household income is more often used for these reasons. Although the main specification doesn't include women's income directly, I control for the gender of the household head. The data does provide a measure of female income share, which can be used to proxy for bargaining power. However, due to low response rates, including female income share as a control in our baseline regression reduces sample size by

as his age and whether he receives a scholarship, will determine both expenditure and labor market decisions.[27,28] Fortunately, many of these aspects can be and are controlled for in this analysis. Accounting for these household and individual level characteristics reduces any omitted variable bias and helps get a clearer picture of the relationship between work and education expenditure shares.

Thus, I estimate Engel curves linking expenditures on individual goods with total expenditures and demographic characteristics of the household. The functional form used here is drawn from Working-Leser (1943, 1963). The benefits of this specification are in its simplicity as well as the fact that it conforms to the data in a wide range of circumstances (Deaton, 1997). Following Moehling (2006), I can then augment the original Working-Leser equation to include the concept of child labor in the following way:

$$w_{jit} = \alpha + \beta \ln\left(\frac{x_{it}}{n_{it}}\right) + \delta \ln(n_{it}) + \sum_{k=1}^{K-1} \gamma_k \left(\frac{n_{kit}}{n_{it}}\right) + \boldsymbol{Z_{it}}\tau + \boldsymbol{C_{jit}}\rho + \mu ChildWork_{jit} + \varepsilon_{jit} \qquad (1)$$

where w_{jit} is the education budget share of child j in household i at time t.[29] x_{it} is the total expenditure of household i at time t, n_{it} is household size, and thus $\ln\left(\frac{x_{it}}{n_{it}}\right)$ is the natural log of expenditure per capita in the household.[30] $\ln(n_{it})$ is included to allow for the household size to independently impact expenditure shares on certain goods. As in the gender discrimination literature, $\frac{n_{kit}}{n_{it}}$ is the fraction of household members in age-sex class k, where K is the total number of age-sex classes. This will include the fraction of males age 0-4, females age 0-4, males age 5-14, females age 5-14, males age 15-54, females age 15-54 and males age 55 and over. Since the fraction of household members adds up to unity, one must be omitted in the regression; in this case the category of females over the age of 55. $\boldsymbol{Z_{it}}$ is a vector of other household characteristics including a dummy equal to one if the household is in an urban area, a year dummy, the household head's sex, education, and employment status, and a dummy equal to one if the household owns its residence.[31] $\boldsymbol{C_{jit}}$ is a vector of individual characteristics including the

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more than half. It should be noted that although it is an important factor in the analysis including it does not qualitatively change the results. Thus this measure is reserved as a robustness check.

[27] Similar characteristics are controlled for in many other studies including (Aslam and Kingdon, 2008).

[28] It should be noted here that the majority of the gender discrimination literature looks at the impact of girls versus boys by using adult or child assignable goods at the household level. The availability of individual level data allows this study to look directly at the impact on the individual child. This provides a much clearer picture of the relationship between expenditure shares and working.

[29] In this case, we have two time periods: 2002 and 2005.

[30] This functional form assumes that all households treat education as the same type of good. For instance a negative coefficient on the log of per capita expenditures implies that education expenditures are a necessary good for these households. However, it is likely the case that for households with extremely low expenditures, education is considered a luxury good. In order to explore this, I relax the initial assumption by including a quadratic term as a robustness check in the results section.

[31] The location variable is particularly important because in Mexico children in rural areas are much more likely to work than children in urban areas.

child's age and a dummy variable equal to one if he receives a scholarship through Oportunidades or any other source, for the specific purpose of increasing education investment. The main independent variable of interest is $ChildWork_{jit}$, which is an indicator equal to one if child j in household i is engaged in paid work at time t. [32] In the initial analysis equation (1) is run as a repeated cross-section using OLS and standard errors are clustered at the household level. In order to better assess the impacts of including these controls, the regression is first run using only the child's age and a year dummy, then adding the Engel curve controls, and finally using the full set of controls as shown in equation (1). By construction, the sample is restricted to individuals between the age of 5 and 14.

Although the above equation directly estimates the relationship between working children and household budget shares, it fails to account for any of the unobservable household characteristics which impact labor market decisions and consumption. These could include preferences over certain types of goods, the perception of sending children to work, and the relative bargaining power of household members. For example, as Moehling (2005) notes, in households where adult consumption is valued higher relative to child welfare, children are more likely to be working and to have lower child expenditures. Thus households that send children to work are inherently different than those that do not and these differences may influence expenditure shares. Exploring the relationship between work and expenditure shares across households will then be problematic. In order to deal with this, household fixed effects are applied to account for any characteristics of the household which impact both the labor supply and expenditure decisions. The preferred specification includes household-year fixed effects and the regression analysis takes the following form:

$$w_{jit} = \alpha + \beta \ln\left(\frac{x_{it}}{n_{it}}\right) + \delta \ln(n_{it}) + \sum_{k=1}^{K-1} \gamma_k \left(\frac{n_{kit}}{n_{it}}\right) + \boldsymbol{Z_{it}}\tau + \boldsymbol{C_{jit}}\rho + \mu ChildWork_{jit} + \sigma_i + \varepsilon_{jt} \quad (2)$$

where σ_i is a household-specific error term constant across both waves of the survey. All other variables remain as in equation (1). Thus we are now estimating the relationship between expenditures and labor market outcomes of children within a given household in a given time period. The variation that remains is across children within the same household and will be due to their individual characteristics. The benefit of this approach is that these individuals have been exposed to the same household demographics, relative prices, and as well as unobservable characteristics. [33]

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[32] Later on this indicator will be replaced by the actual hours and hours squared that the child works.
[33] A similar approach is used in Moehling's (2005) paper on youth employment and household decision making in the early twentieth century U.S.

One may still be concerned about characteristics which cause households to have different views and preferences across children. This could potentially occur if the household's view of child labor differs by the gender and age of the child. For example, there is some evidence that Mexican parents have a preference for sons which impacts family structure and decisions (Ruiz and Vazquez, 2013). Further, in the case of child labor this son preference is likely to result in girls being more likely to work (Kumar, 2013) and less likely to receive additional education expenditures. In order to account for any differences across gender and age, equation (2) is run separately for male and female children and linear and quadratic age variables are directly controlled for.[34]

One last concern relates to the idea that households may simply prefer one child over another because they have exhibited a higher level of ability. This is not a significant problem in this analysis because even if this were to bias the estimates, it would only bias them downwards. More specifically, as mentioned, I find a positive significant relationship between educational expenditure shares and working for female children. If households chose to invest more in an individual girl because they displayed higher ability, this would likely result in that girl working less and having higher education expenditure shares. Since this bias works in the opposite direction as the relationship found, it would simply imply that the estimates found here are an underestimate of the actual effect.[35]

Although I believe equation (2) addresses the main sources of bias, there could be additional concerns about omitted variables and reverse causality. It is not realistic to completely rule out the possibility that I have left out a relevant variable, but in order to impact the results presented here it would need to be one that has a strong relationship with child labor or expenditure shares even after controlling for all the above mentioned factors. Further, reverse causality would imply that an increase in schooling fees or tuition causes a child to enter the labor market. This is unlikely to be a major issue for several reasons. For one, as previously discussed, education is provided at no cost by the government and most children in Mexico are in school regardless of their work status. Further, as the results will show, the relationship is driven by spending on "extras" which improve the quality of education, but are not required for attendance. The results presented below will compare the estimates from equation (1) using OLS and equation (2) using household-year fixed effects.[36]

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[34] Additionally, to allow for flexibility in the role that age plays the robustness checks include a specification where the child's age and age squared are replaced by dummy variables for each age from 5 to 14.

[35] In the case of male children, this could also explain the lack of relationship found between working and education expenditure share.

[36] It should be noted that an instrumental variables approach was explored as an additional empirical framework. This involves identifying a set of instrumental variables that will only influence household expenditures through their effect on a child's labor market decision. Thus the instrument considered for children in paid work was whether or not the household owns a non-agricultural business at the time of the survey. The idea is that if a household owns a small business, particularly outside of household farming activities, it is more likely that children from that household contribute to the business thus engaging in paid work. This is reflected in the fact that owning a non-agricultural business is positively and statistically significantly correlated with both male and female paid work. Although this instrument appears relevant, it must also be valid, or in other words,

4. Data

The data used in this paper come from the Mexican Family Life Survey (MxFLS). This survey includes nationally representative longitudinal data with a large base of information on socioeconomic factors, demographics and health of the Mexican population. The baseline survey was done by the National Institute of Geography Statistics and Information (INEGI) in 2002 (MxFLS-1). The second wave (MxFLS-2) contacted 90 percent of the original households in 2005-2006. It includes 8,440 households with approximately 35,000 individual interviews in 150 different communities throughout Mexico. The household level survey includes information on expenditures and consumption, education and school attendance variables, employment characteristics of all household members over the age of 5, time allocation and health status. In addition the survey includes information on important community indicators and infrastructure (Rubalcava and Teruel, 2006, 2008).

Table 1 provides summary statistics at the household level for both rounds of data combined.[37] Column 1 shows the statistics for all households with data on children in paid work, while columns 2 and 3 show the differences across households that have working children and those that do not have working children.[38] In this sample, 12.7% of households have a child engaged in paid work. Comparison across columns indicates that households with working children are larger and more likely to have a household head that is female and employed than households with non-working children. Further, they are more likely to be located in a rural area and have a household head with lower educational attainment. They are also more likely to fall below the median poverty line and have expenditure per capita that is well below households with non-working children, which may reflect their overall lower economic status and hence their need to send children to work.[39]

Table 2 shows summary statistics for individual children broken down by gender. Although the majority of kids appear to work within the household, 3.7% of girls and 6.8% of boys are engaged in paid work. In this case household work encompasses tasks such as collecting water or firewood, taking care of

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uncorrelated with the unexplained variation in expenditures. In the case of paid work, business expenses are calculated as a separate category of household expenditures in the survey, thus owning a business should not impact the budget share of female or male children directly. However, due to the fact that threats to the exclusion restriction may exist (i.e. it is possible that households that own businesses are better off and therefore have more income to spend on children's education in general), the IV approach was left out of the formal analysis.

[37] Expenditure data was adjusted for inflation using the Mexican CPI and are in 2005 Mexican pesos. The CPI data came from OECD Stats and are available at: http://stats.oecd.org/

[38] For the purposes of summary statistics, households with working children are those households that have a child engaged in paid work in either 2002 or 2005.

[39] Data from the Poverty Assessment Tools of the U.S. Agency for International Development estimate the median poverty line at 1268.381 pesos per capita per month for urban areas and 715.8926 pesos per capita per month for rural areas in 2008 prices. These estimates were converted to annual figures in 2005 pesos for comparison with the data used in this analysis. The original estimates can be found at: http://www.povertytools.org/countries/Mexico/Mexico.html. Here, Mexico's median poverty lines are calculated as 14,332.94 pesos per capita for urban areas and 7,976.52 pesos per capita for rural areas annually.

younger siblings and the elderly, doing domestic housework such as sweeping, washing dishes, dusting, and any agricultural activity including weeding, sowing, and taking care of animals or the family business. Paid work requires an activity that specifically helps with household expenses by being paid either in cash or kind. As expected, more boys are engaged in paid employment than girls, but more girls participate in household work than boys. It should also be pointed out that the hours of work are extremely long for both girls and boys engaged in paid work, especially relative to household work.

The main dependent variable used in this analysis is the individual child's education expenditure share. Education expenditure includes school fees for enrollment, registration, courses, exams and maintenance, along with spending on school materials such as books, supplies, uniforms and sports, and any additional expenditure on school celebrations and festivities. Initially, total education expenditure is used in the baseline regressions, but the impact of working on school fees versus other additional education expenditure is explored as well. Shares are calculated by dividing annual expenditures on education by total annual household expenditures. It should be emphasized that expenditure shares are used here as opposed to levels. The emphasis is on how working impacts household resource allocation among its members. Table 2 shows that although expenditure shares on education appear similar for boys and girls across all households, they are much higher for girls engaged in paid work than for boys. The difference in working and expenditure shares across genders provides additional support for splitting the baseline regression and analyzing the impacts on girls and boys separately.

5. Working Children and Child Expenditure Shares

5.1. Baseline Results

Tables 3 and 4 show the results of the baseline regression for girls and boys respectively. The OLS results from equation (1) are displayed in columns 1 through 3, beginning with a specification that only controls for the child's age and the year of the survey, followed by the inclusion of the Engel curves controls, and then the full specification of equation (1). Column 4 shows the results from the household-year fixed effects model of equation (2).

The results from these regressions indicate that household demographics are rarely statistically significant. They do confirm that as the log of household size increases, individual child's education expenditure shares fall. Further, the coefficients on the log of expenditure per capita indicate the type of good as either a necessity or luxury. When this coefficient is greater than zero, the share of the budget increases with total outlay, so that total expenditure elasticity is greater than one (Deaton, 1997).[40] Here

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[40] An additional benefit of the Working-Leser specification is that expenditure elasticity can be calculated as:
$\epsilon = 1 + \left(\frac{\beta}{w}\right)$. Thus a negative coefficient on the log of expenditure per capita implies that the good is a necessity.

the consistently negative and statistically significant coefficient on log of expenditure per capita indicates that households consider education expenditures as a necessity for both girls and boys.[41] Further, these results indicate that there are non-linear impacts of the child's age, a relationship that is explored further below.[42,43]

Beginning with the coefficients of interest for girls in Table 3, engaging in paid work is positively and significantly correlated with education expenditure shares. The coefficient is stable in magnitude across all four specifications regardless of the controls included. In the preferred specification of column 4, a coefficient of .933 represents a 0.93 percentage point increase in education expenditure shares for girls in paid work. Based on the average girl's budget share of 1.92% shown in Table 2, this implies a 48.6% increase in education expenditures for girls engaged in paid work over those who do not work. On average, this translates into an increase of 901.51 pesos annually from a baseline of 1855.20 pesos.[44] The heterogeneity and potential mechanisms behind this relationship are explored further below.

The relationship for boys in Table 4 is less clear. The coefficients on the variables of interest are consistently negative, but only statistically significant in columns 1 and 2. The magnitude diminishes rapidly as additional controls are added indicating that education expenditure share and boy's paid work are statistically uncorrelated. Based on the discussion of potential relationships, it is possible that boys' income is shared by everyone in the household through a relaxed budget constraint. This is likely to be true if households simply expect boys to work in order to help with household expenditures. This would also help explain the significantly different impact of boys versus girls work. However, the consistently negative coefficient provides additional potential explanations including the fact that boys paid work may interfere with their ability to attend school, thus rendering education expenditures unnecessary. Similarly, boys' income could simply be used for other purposes. These possibilities, as well as the reason for the difference across gender, are explored further below.

5.2. Exploring the Gender Differential

Potential mechanisms behind the difference across gender are explored in Table 5. This is done in two distinct ways. First, the number of hours each child works is examined in columns 1 and 2 for girls

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[41] The idea that child education is a necessary good in the household is generally accepted. However, there are instances where it is considered a luxury (for instance at very low income levels). For example, Lancaster et al. (2006) find that it is considered a luxury in the Indian data they use, but there is no clear explanation for the finding.

[42] The patterns on the Engel curve and additional control variables are consistent throughout the analysis. In all further tables, these controls are included, but suppressed for brevity.

[43] It should be noted that the R-squared on these regressions is low. However, they are consistent with what is found in other papers, including Deaton (1987), Hoddinott and Haddad (1995), and Irving and Kingdon (2008).

[44] Based on Table 1, average annual expenditures per household are 96,625.42 pesos. 1.92% is about 1855.20 pesos annually, while a .933 percentage point increase is about 901.51 pesos annually. Using official exchange rates provided by the Federal Reserve Bank of New York in 2005, this translates into an increase of 83.96 additional dollars for working girls annually, relative to non-working girls.

and boys respectively. The results indicate that paid work hours are never significantly correlated with boy's education expenditure share, but girls working up to 10.3 hours per day are receiving positive expenditures.[45] These results indicate that working does not appear to impact boy's ability to attend school. If this were the case, we would expect to see a significant relationship between working hours or working hours squared in the regression analysis. This is further supported by the fact that the majority of children in Mexico are enrolled in school regardless of their work status.[46] More interestingly, the results indicate that not only are education expenditure shares increasing in girls working status, but they are increasing in the actual hours of work a girl performs.[47]

Another possibility is that boys' income is viewed differently within the household than income earned by girls and is therefore used for different purposes. This may also be the case if boys and girls have different preferences across goods. In order to test this hypothesis, I exploit the data on child assignable expenditure at the household level. More specifically, I alter the individual level equations by replacing the education expenditure shares of the individual, with total clothing expenditure share for girls and boys in the household.[48] All other aspects of the specification remain as in equation (2). The results in columns 3 and 4 of Table 5, indicate that there is no significant relationship between girls engaging in paid work and total child clothing expenditure shares. However, there is a positive correlation between boys in paid work and total clothing expenditure shares. This provides evidence that boys' contributions to the household are used for different purposes than girls' contributions. It is further interesting to note that households appear to view child clothing expenditures as luxury goods as opposed to necessary goods.[49] Thus the results up to this point are consistent with the idea that paid work undertaken by girls is correlated with an increase in necessary good shares, while paid work by boys is correlated with an increase in luxury good shares. This again supports the idea that boys may simply be expected to contribute to the household through work. Therefore the individual child is not necessarily rewarded for his work with increased expenditures, but his work allows additional expenditures on goods that would otherwise not be purchased by the household. On the other hand, parents may prefer not to send girls into

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[45] This estimate is based on the sample average, but there are many girls working extremely long hours which may be driving the result. It seems unreasonable to think that working 10 hours a day would not interfere with a girl's ability to attend school. Thus this estimate should not be taken as an indicator of the number of hours of work until school is impacted, but simply as additional evidence that girls paid work is helping to increase their financial investment in school.

[46] Regressing work on school attendance using the preferred fixed effects model indicates an insignificant relationship between paid work and attendance. The impacts on schooling outcomes are discussed further in the next section.

[47] These specifications are also run using individual as opposed to household fixed effects, which controls for individual level characteristics of children. The results for paid work hours are consistent with what is found here, providing further evidence in support for the result. In particular, the coefficient on girls paid work hours is .108 and statistically significant at the 1% level, while the coefficient on boys paid work hours is -.006 and statistically insignificant at all conventional levels. These results are suppressed for brevity, but available upon request.

[48] This is calculated as the total clothing expenditure for children divided by total household expenditures.

[49] Although suppressed in Table 5, there is a positive significant coefficient on the log of expenditure per capita in both the female and male regressions using clothing expenditure shares.

the formal labor market and thus may feel the need to compensate them. One thing that is clear is that the source of the income is a determining factor in how it is allocated.

5.3. Heterogeneity Behind the Positive Relationship for Girls

The remainder of the paper will focus on the positive relationship between girls in paid work and their education expenditure shares. Table 6 explores three distinct possibilities by splitting the sample to account for specific individual and household characteristics. Column 1 of Table 6 provides the baseline results on our variable of interest for the purpose of comparison.

In columns 2 and 3 of this table, the sample is split into those households with expenditure per capita above the median poverty line and those below the median poverty line respectively. In this paper, Mexico's median poverty lines are calculated as 14,332.94 pesos per capita for urban areas and 7,976.52 pesos per capita for rural areas annually.[50] We should expect to find stronger relationships between work and education expenditures in those households below the poverty line for multiple reasons. For example, according to the "luxury axiom" poorer households are more likely to send their children to work and are also more likely use additional income for necessary goods. Further, since households which send children to work tend to be poorer, it may be the case that working actually enables girls to attend school. Without the additional income earned through work, the household would not have sufficient funds to invest in her education. The results in column 2 indicate that there is no relationship between work and education expenditure shares when the sample is restricted to only households above the poverty line. However, when the sample is restricted to only those households below the poverty line in column 3, the relationship is not only positively and statistically significant, but the magnitude nearly doubles relative to the baseline estimates. Thus the results in columns 2 and 3 confirm the idea that the relationship between working and education expenditures is stronger in households below the median poverty line.

Another possibility is that the location of the household will impact the relationship between work and education expenditures. This is driven by the fact that the majority of child work in Mexico occurs in rural areas (The World Bank Group, 2013a). Thus we would expect to find stronger relationships in areas where child labor is more common and more accepted. Columns 4 and 5 split the sample into urban and rural households respectively. Column 4 indicates that there is no statistically significant relationship between work and girl's education expenditure shares in urban areas, while it is positive and significant in rural areas. Therefore these results are consistent with the hypothesis that the location of the household will significantly impact the relationship of interest.

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[50] Data from the Poverty Assessment Tools of the U.S. Agency for International Development estimate the median poverty line at 1268.381 pesos per capita per month for urban areas and 715.8926 pesos per capita per month for rural areas in 2008 prices. These estimates were converted to annual figures in 2005 pesos for comparison with the data used in this analysis. The original estimates can be found at: http://www.povertytools.org/countries/Mexico/Mexico.html

Work may positively impact education expenditure shares based on the child's age. Earlier, it was argued that a positive relationship could be the result of parent's rewarding children for working or of children actually gaining power in the household through work. If either of these were the case, we would expect stronger relationships for older children. This is due to the fact that as children age, their power within the household increases, they better understand their potential labor market opportunities, and they are increasingly able to articulate their preferences. Columns 6 and 7 of Table 6 explore this idea by splitting the sample into girls age 5 to 10 and age 11 to 14 respectively.[51] Columns 6 and 7 indicate that there is a positive significant relationship for girls in both age groups. Further, statistical tests indicate that the coefficients for each age group are not statistically different.[52] This is somewhat surprising, but still in line with the concept of providing incentives to work. It still remains likely that as these children continue to age and remain in the household their influence will continue to grow. Although education expenditures are only available for children up to the age of 14, it would be interesting to see the relationship for children age 15 to 18 as well.

Another approach to explore the concept of incentives to work is to examine the type of work that is actually performed. The baseline regression investigates the relationship between paid work and education expenditure shares. The reason for this is that paid work implies that children are physically bringing resources into the household (either in-cash or in-kind) and this is likely to have an impact on household resource allocation. However, it is also the case that children in household work contribute by increasing the time adult members of the household have to engage in other income earning activities. Thus it is often argued that both paid and household work make significant contributions to household income. Despite this, these types of work are likely treated in different ways. Similar arguments have been made for females that engage in paid work versus those that solely contribute within the household. In particular, females in paid work tend to have a greater influence on household decisions than those that work within the home (Kantor, 2003). Several studies in the child labor literature also document that the incidence of work and the impact on education varies with the type of work performed (Levison and Moe, 1998; Levison et al., 2001, 2008).

The relationship between the type of work performed and education expenditure shares is examined in column 2 of Table 7. The indicator for paid work in the baseline regression is replaced by an indicator for household work. Comparing columns 1 and 2, we see that the same positive and significant relationship does not exist for household work. Part of the explanation may be that Table 2 indicates that girls in household work only perform 13 hours of work a week, while those in paid work average over 62

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[51] Those particular ages are chosen simply because it splits the number of observations as close as possible to in half.
[52] Statistical tests indicate that we fail to reject the null hypothesis that the coefficient on paid work for children age 5-10 is equal to the coefficient on paid work for children age 11-14 with a Chi-squared value of 0.35.

hours. Thus the contribution from engaging in paid work is much larger than for household work. These results support the idea that not only is the type of work viewed differently, but the reward for working will depend on the actual work performed. The fact that girls only see increases in education expenditure shares for paid work, where they physically bring income into the household and their time commitment is much larger, supports the idea that children may have incentives to engage in paid work.[53]

Up to this point it has been argued that particularly for girls, working has the ability to increase education expenditure shares. One argument supporting this idea is that working enables girls to attend school. However, since attendance is high for both working and non-working children in Mexico, it is also plausible that work provides "extra" benefits for girls. In line with the idea of rewarding children for work, it could be that working supports spending on additional school supplies and school related activities, rather than on school fees. The data used here allow us to explore this question by splitting education expenditures into "fees" and "extras". Here fees include enrollment, registration, exam, course, and school maintenance costs. In other words, fees are the essentials for school attendance. On the other hand, extras include money spent on books, school supplies, uniforms, sports, festivities and celebrations. Spending on the latter category may not necessarily impact attendance, but may help improve the educational experience of the child or act as a reward. In Table 8, the baseline specification is run using school fee expenditure share as the dependent variable in column 2 and school extra expenditure share as the dependent variable in column 3. The baseline results are shown in column 1 for comparison.

The results indicate that the positive significant coefficient on girl's education expenditure shares is driven primarily by spending on "extras". Column 2 shows an insignificant relationship between work and fee expenditure share, while there is a positive and highly statistically significant coefficient on extra expenditure share in column 3. Further, the magnitude of the coefficient in column 3 is similar to the magnitude of the baseline regression. Table 9 shows the same results for each of the line items on education. Columns 1-5 show the fee components of education expenditures. With the exception of column 5, there is no significant relationship between paid work and expenditure going towards school

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[53] As additional evidence, the original Working-Leser Engel curve approach was estimated at the household level without adding the $ChildWork_{jit}$ variable. Instead the fraction of household members in each age-sex class is further split into working males' age 5-14, non-working males' age 5-14, working females' age 5-14 and non-working females' age 5-14. I compute the difference in marginal effects between working and non-working children on household expenditure shares and use F-tests to see whether the differences are statistically significant. Comparing the coefficients on working males and females and non-working males and females allows us to explore whether working children obtain higher expenditures shares relative to their non-working counterparts. The results for education expenditure shares indicate the following, which appears consistent with the results presented here: Boys age 5-14 engaged in paid work have lower education expenditure shares than their non-working counterparts, but the difference is not statistically significant. However, boys engaged in household work are significantly more likely to have higher education expenditure shares than non-working boys. For girls, working in either paid or household work is positively correlated with education expenditure shares, but the difference in marginal effects from non-working girls is only statistically significant in the case of paid work.

fees.[54] Instead the results seem to be driven by increased expenditure shares on books and school supplies, along with school uniforms and sports in columns 6 and 7 of Table 9. These results support the idea that work provides girls with a way to earn money for books, school supplies, uniforms and other school related activities. Although this expenditure may not be necessary for attending school, it is likely to improve the quality of education and the retention of students.

This section explores the relationship between child labor and educational expenditure shares. Unsurprisingly, the positive relationship between girl's work and education expenditure shares is strongest among children residing in poorer households in rural areas, and only holds for paid work. Additionally, the relationship seems to be driven by an increase in expenditures that improves the quality of education over the quantity. Thus, the evidence presented here is consistent with the idea of children having incentives to work. It could be the case that parents are rewarding children for their contributions to the household, or that the actual bargaining power of the child increases with work. Either way, these results provide support for a new approach to both child labor and education policy in which the incentives of the child are considered.

6. Welfare Implications and Robustness of Main Results

6.1. Girl's Educational Welfare Impacts

This section seeks to more formally address the idea that child labor is bad for children's welfare. Up to this point, welfare has been measured in terms of children's personal consumption and their share of resources within the household. At least for girls, it seems that paid work can improve one aspect of welfare by increasing their personal consumption share in the household. Here, we can explore whether this translates into improved outcomes by augmenting this welfare measure to look at the impact on other educational outcomes.[55] Table 10 show the results of the full specification in equation (2) for girls replacing the outcome of interest. In column 1, the outcome of interest is now an indicator equal to 1 if the child is currently attending school, zero otherwise. Columns 2 and 3 explore the impact on the actual hours per day and days per week spent at school. Column 4 looks at the hours spent per week on homework outside of school. Column 5 is concerned with whether the child has passed the expected level of school relative to their actual age.[56] While in columns 6 and 7 the outcomes are indicators equal to 1 if

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[54] There is a positive significant relationship for school maintenance fees in column 5 of Table 9, but the observations are extremely low in that particular case.

[55] In this section, we are restricted by the outcomes available in the survey. We cannot account for all aspects of the quality of educational attainment or any other impacts on the child's health, development or nutrition.

[56] The original variable from which this outcome is a derived takes on values from 0 to 7, where 0 =no formal schooling, 1 = first grade, 2 = second grade, 3 = third grade, 4 = fourth grade, 5 = fifth grade, 6 = sixth grade, and 7 = higher than sixth grade. The variable has been transformed to equal 1 if the child has passed the grade appropriate relative to their age, based on national standards, and equals zero otherwise. In particular, no formal schooling is appropriate for children age 5 or 6, first grade is appropriate for children age 6 or 7, second grade is appropriate for children age 7 or 8, third grade is appropriate for children age

the child ever repeated a school year or has stopped attending school for a period of at least 4 weeks, zero otherwise.

The results indicate that in most cases, paid work has little significant impact on these outcomes One exception is in column 4 where paid work appears to decrease the time spend on homework by 1.2 hours per week. This may have significant impacts on the quality of education, but additional measures, such as test scores or long run impacts are not available. One comforting fact is that in column 5, the results indicate that a child being in paid work is still positively associated with whether they have passed their age appropriate grade level. Although we cannot confirm that work results in an increase in welfare based solely on the increase in personal consumption, we can at least feel more confident in stating that work has not negatively impacted any of these other factors that influence child educational welfare.

6.2. Robustness

In this paper we have explored several reasons for the difference between work and education expenditure shares across gender. This sub-section considers several factors that may confound our results. Table 11 provides results on five different robustness checks for girls in our sample. Column 1 includes the baseline for comparison. It should be noted that all of these checks were also performed for the sample of boys, and the negative insignificant coefficient remained.[57] The results indicate that the results are robust to a wide range of specifications.

One concern is based on the calculation of expenditures at the household level. In particular, the expenditure measure used in this analysis does not include spending on rent. Therefore it is likely the case the households which own their homes and those that are renting have extremely different levels of disposable income which could impact our estimates. In order to account for this, column 2 restricts the sample to include only households which own the homes they reside in. The coefficient of interest increases slightly, indicating the baseline results may be downward biased, but the change is not qualitatively significant.

As mentioned earlier, we know that age will play a significant role in determining whether or not a child works, along with her allocations within the household. The inclusion of linear and quadratic age terms may not sufficiently capture the relationship. In column 3, we allow for a different functional form by replacing the age variables with dummy variables which take on the value of one for each age between 5 and 14 years.[58] The results are extremely similar to the baseline.

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8 or 9, fourth grade is appropriate for age 9 or10, fifth grade for age 10 or 11, sixth grade for age 11 or 12, and above sixth grade for children age 12, 13 or 14.

[57] These results are suppressed for brevity.

[58] For example, a dummy for age 12 would equal 1 if the child is age 12, 0 otherwise. A dummy for each age is included with age 14 omitted for comparison.

As mentioned earlier, one possible omitted variable relates to women's bargaining power within the household. In order to account for this, in column 4, I control for the total adult female income share of the household. In this case, female income share is a proxy for female bargaining power. This variable is not included in the baseline regression due to a low response rate which effectively reduces the sample size by half. The results indicate that this may actually be an important omitted variable. Not only does female income share positively and significantly impact education expenditure shares, but it drastically increases the magnitude of our coefficient of interest. This result is consistent with other papers who find that female bargaining power both decreases the incidence of child labor (Reggio, 2011) and increases the amount of household income spent on child related goods (Bobonis, 2009). Since children are less likely to work in households where female power is higher, after controlling for this factor we expect children that engage in work to be rewarded at a higher rate. Omitting this variable biases our results downward, so that the baseline may actually underestimate the relationship between work and education expenditure share for girls. If we assume the correct specification should include an indicator for female bargaining power, the magnitude of the result increases to 1.776. This is equivalent to a 92.5% increase in girl's education expenditure share, or an increase of 1716.06 pesos annually, on average. Due to this, all regressions discussed in Tables 5 through 10 are rerun including total female income share. Further, the baseline results are run using only the sample of households in column 4 to ensure the coefficients are not a result of sample selection. Although some of the magnitudes of the coefficients change, the qualitative results remain.[59]

Column 5 of Table 11 allows expenditure per capita to vary in a non-linear way. The Working-Leser functional form imposes the restriction that all households treat goods the same way regardless of their total outlay. In reality, although most households may view education expenditure as a necessary good, it is possible at very low income levels that it is a luxury. In order to account for this, a quadratic term of expenditure per capita is included as an additional control in column 5 of Table 11. The results indicate that there is indeed a non-linear relationship between total outlay and education expenditure. However, the inclusion of this quadratic term does not significantly impact our variable of interest.

Further, it is possible that part of the increase in education expenditure shares that accompanies paid work is due to the fact that the child's siblings are working as well. In order to account for this, an indicator equal to one if at least one of the child's siblings is working is added as an additional control to the baseline regression. There are two interesting points to note in column 6 of Table 11. First, the coefficient on sibling work is insignificant, indicating that it has no independent impact on girl's education expenditure shares. Second, by comparing the coefficients on paid work in columns 1 and 6, it

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[59] These results are suppressed for brevity.

appears that the inclusion of this additional control has little impact on our variable of interest. Therefore, the results are robust to accounting for sibling work. Further, when household work is used as the variable of interest instead of paid work, working siblings have a positive and significant impact on education expenditure shares, but the coefficient on household work remains insignificant.[60] These results support the idea that sibling work can help other children in the family gain higher expenditure shares, but only when the child herself does not engage in paid work.

The results presented in Table 11, show that the relationship between paid work and education expenditure shares is robust across a variety of circumstances. In addition, previous results in this section indicate that this form of child work does not appear to negatively impact other measures of a child's educational welfare. Overall, the results are consistent with the idea that work is not interfering with the ability to attend school, but rather it helps children earn higher education expenditure shares in the household.

7. Discussion

This paper has added to the literature by using a unique dataset with detailed information on work and spending to test whether child labor adversely impacts child welfare. More specifically, the empirical relationship between child work and education expenditure shares is explored in the context of Mexico. The results imply that in some cases, engaging in work may actually be welfare improving for children, as it increases their share of household resources. However, the impacts differ by characteristics of both the child and the household. In particular the child's gender and the type of work performed have significantly different impacts on education expenditure shares. Further, characteristics of the household, including income, location, and female bargaining power have independent impacts as well. Overall, girls who reside in poorer households located in rural areas see the largest benefits from paid work. Additionally, the benefit appears to be in improvements in the quality of the girl's educational experience as opposed to strictly increasing their school attendance. One possible mechanism through which this occurs is that by contributing to household income, children are rewarded with higher expenditure shares within the household.

These results are consistent with a small literature which looks at the impact of working on household expenditures. In particular, Moehling (2005) finds that girls who engage in work have higher private clothing expenditures than non-working children, thus providing a benefit and an incentive to work. However, they are in contrast with a large portion of the child labor literature which posits that working interferes with both the quantity and the quality of a child's educational experience. Much of the

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[60] These results are suppressed for brevity.

popular and economic literature also take the position that work is particularly harmful for female children. Due to the double burden that female children face, both their incidence of work (Blanco Allasi, 2009) and the actual hours they engage in work tend to be higher than their male counterparts (Kumar, 2013).[61] Part of this contrast may be due to the focus on the case of Mexico, where school attendance rates are known to be high among both working and non-working children.

In fact, it is likely that the relationship varies significantly depending on the severity of the child labor problem and the context in which it occurs. Future research should focus on poorer country contexts and exploit information on the actual jobs children are engaged in, as well as the income they bring into the household. As the richness of household datasets improve, these tasks will become more necessary and informative. Understanding the relationship between child labor and education expenditure in various contexts provides new insight into the relationship between work, education, and overall investments in children. Examining these complex relationships is essential to developing effective policy at both an international and national level in regards to child labor and education.

This paper provides preliminary evidence that is in contrast to the traditional views of child labor. It further provides results that are consistent with the idea that children may actually have incentives to work. If this is the case, a new view of the child labor issue may be necessary. As Edmonds (2008) points out, if the child plays a major role in the decision-making process, common policy responses, which include laws banning child labor and anti-poverty policies, may not be effective. Instead, programs which directly target the incentives of these children are more likely to decrease the number of working children, particularly those involved in dangerous tasks.

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[61] This double burden is likely the result of traditional gender roles which cause females to engage in outside market work as well as household work.

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Table 1: Household Summary Statistics

	Means: Household Characteristics		
	All HH	**HH with Children in Paid Work**	**HH with No Children in Paid Work**
Average Education of HH Head	3.94	3.49	4.00
	(2.06)	(1.84)	(2.09)
Head Employed in Past 12 Months (%)	87.69	88.13	87.62
	(32.86)	(32.38)	(32.94)
Female Headed HH (%)	16.94	20.52	16.41
	(37.51)	(40.42)	(37.04)
Located in Urban Area (%)	56.96	53.92	57.40
	(49.52)	(49.90)	(49.46)
Own House (%)	70.09	70.42	70.04
	(45.79)	(45.69)	(45.81)
Below Median Poverty Line (%)	57.40	63.58	56.50
	(49.46)	(48.17)	(49.58)
Annual Expend per Capita (2005 pesos)	18369.76	14674.62	18907.06
	(104437.8)	(49245.8)	(110179)
Average HH Size	5.26	5.78	5.18
	(1.81)	(2.03)	(1.76)
Share Males Age 0 to 4	4.01	3.58	4.07
	(8.36)	(7.65)	(8.45)
Share Females Age 0 to 4	3.97	2.84	4.13
	(8.41)	(6.77)	(8.61)
Share Males Age 5 to 9	9.09	8.40	9.19
	(12.68)	(11.87)	(12.79)
Share Females Age 5 to 9	8.92	7.44	9.14
	(12.32)	(11.21)	(12.46)
Share Males Age 10 to 14	9.22	14.47	8.46
	(12.56)	(13.55)	(12.22)
Share Females Age 10 to 14	9.26	10.95	9.01
	(12.61)	(12.56)	(12.60)
Share Males Age 15 to 54	22.37	21.12	22.55
	(13.38)	(13.93)	(13.30)
Share Females Age 15 to 54	26.94	25.86	27.09
	(12.35)	(11.84)	(12.42)
Share Males Age 55 and Over	2.75	2.32	2.81
	(7.20	(6.21)	(7.34)
Share Females Age 55 and Over	2.78	2.35	2.84
	(7.66)	(6.53)	(7.80)
Observations	3915	497	3418
Households with Child Workers (%)		12.69	

Notes: Standard errors in parentheses.

Table 2: Individual Summary Statistics

	Means: Individual Characteristics			
	All Children		**Children in Paid Work**	
	Girls	**Boys**	**Girls**	**Boys**
Children in Paid Work (%)	3.73	6.79	100	100
	(18.95)	(25.18)	(0.00)	(0.00)
Paid Work Hours per Week	2.57	4.79	62.03	64.66
	(15.38)	(21.32)	(46.46)	(49.38)
Child in Household Work (%)	73.86	53.66	94.02	76.14
	(43.94)	(49.87)	(23.79)	(42.68)
Household Work Hours per Week	7.73	4.66	13.10	9.72
	(10.27)	(8.41)	(13.18)	(12.97)
Education Expenditure Budget Share (%)	1.92	1.84	2.97	1.68
	(3.69)	(3.10)	(9.68)	(2.47)
Age (Years)	10.35	10.34	12.09	12.08
	(2.34)	(2.36)	(1.80)	(1.74)
Receive Scholarship (%)	31.69	30.61	36.87	37.56
	(46.53)	(46.09)	(48.36)	(48.49)
Observations	5816	5795	217	394

Notes: Standard errors in parentheses.

Table 3: Baseline Results Girls age 5 to 14

	Individual Child's Education Expenditure Share			
	(1)	**(2)**	**(3)**	**(4)**
Child Engaged in Paid Work	0.885	0.898	0.961	0.933***
	(0.657)	(0.617)	(0.618)	(0.333)
Age	-0.659***	-0.648***	-0.651***	-0.537**
	(0.171)	(0.166)	(0.165)	(0.212)
Age Squared	0.036***	0.036***	0.037***	0.033***
	(0.009)	(0.008)	(0.008)	(0.010)
Log of HH Size		-2.476***	-2.205***	-4.186***
		(0.315)	(0.277)	(0.924)
Log Expenditures per Capita		-0.997***	-1.333***	-1.930***
		(0.162)	(0.181)	(0.123)
Share Males Age 0 to 4		0.390	0.000	0.100
		(1.110)	(1.049)	(2.231)
Share Females Age 0 to 4		0.181	-0.400	-0.907
		(1.152)	(1.129)	(1.987)
Share Males Age 5 to 14		-0.978	-1.405	-2.000
		(1.009)	(0.938)	(2.293)
Share Females Age 5 to 14		-0.605	-0.977	-1.838
		(0.991)	(0.935)	(2.015)
Share Males Age 15 to 54		0.406	0.139	0.600
		(0.890)	(0.891)	(2.402)
Share Females Age 15 to 54		0.448	-0.007	-2.714
		(1.040)	(0.983)	(2.096)
Share Males Age 55 and Over		0.921	1.814	1.582
		(1.757)	(1.741)	(3.229)
HH Head Education			0.246***	-0.126
			(0.038)	(0.101)
HH Head Employment Status			0.071	0.599*
			(0.189)	(0.323)
Female Headed HH			0.384*	-0.042
			(0.219)	(0.920)
Urban			0.713***	0.267
			(0.127)	(0.559)
House Owned			-0.062	0.116
			(0.118)	(0.196)
Child Receives Scholarship			-0.002	0.014
			(0.120)	(0.156)
Year 2005	0.027	0.075	0.053	0.192
	(0.097)	(0.091)	(0.090)	(0.162)
Constant	4.663***	17.852***	19.369***	29.406***
	(0.836)	(2.475)	(2.373)	(3.070)
Household Fixed Effects	NO	NO	NO	YES
Observations	5871	5871	5816	5816
R-squared	0.01	0.07	0.1	0.11
Number of Households				3065

Notes: Standard errors in parentheses. * denotes significance at 10%; ** denotes significance at 5%; *** denotes significance at 1%

Table 4: Baseline Results Boys Age 5 to 14

	Individual Child's Education Expenditure Share			
	(1)	(2)	(3)	(4)
Child Engaged in Paid Work	-0.362***	-0.282**	-0.158	-0.132
	(0.141)	(0.134)	(0.129)	(0.202)
Age	-0.554***	-0.537***	-0.453***	-0.558***
	(0.161)	(0.159)	(0.146)	(0.163)
Age Squared	0.030***	0.029***	0.025***	0.030***
	(0.008)	(0.008)	(0.007)	(0.008)
Log of HH Size		-1.688***	-1.505***	-3.383***
		(0.158)	(0.158)	(0.734)
Log Expenditures per Capita		-0.476***	-0.762***	-1.015***
		(0.062)	(0.062)	(0.102)
Share Males Age 0 to 4		-0.672	-0.912	1.257
		(0.837)	(0.903)	(1.713)
Share Females Age 0 to 4		-0.133	-0.609	2.181
		(0.849)	(0.928)	(1.616)
Share Males Age 5 to 14		-1.515*	-1.811**	0.735
		(0.779)	(0.891)	(1.719)
Share Females Age 5 to 14		-0.976	-1.17	1.535
		(0.771)	(0.941)	(1.599)
Share Males Age 15 to 54		-0.059	-0.375	1.705
		(0.785)	(1.054)	(1.775)
Share Females Age 15 to 54		-0.138	-0.506	0.065
		(0.685)	(0.766)	(1.592)
Share Males Age 55 and Over		-0.257	0.474	1.62
		(0.949)	(1.032)	(2.341)
HH Head Education			0.196***	-0.163**
			(0.033)	(0.073)
HH Head Employment Status			-0.143	-0.335
			(0.172)	(0.239)
Female Headed HH			0.118	0.029
			(0.156)	(0.724)
Urban			0.614***	-0.216
			(0.094)	(0.395)
House Owned			-0.014	-0.432***
			(0.097)	(0.158)
Child Receives Scholarship			-0.015	-0.015
			(0.103)	(0.119)
Year 2005	-0.133	-0.093	-0.118	0.14
	(0.083)	(0.081)	(0.078)	(0.121)
Constant	4.253***	12.026***	13.248***	19.581***
	(0.828)	(1.366)	(1.391)	(2.438)
Household Fixed Effects	NO	NO	NO	YES
Observations	5839	5839	5795	5795
R-squared	0.01	0.03	0.06	0.06
Number of Households				3093

Notes: Standard errors in parentheses. * denotes significance at 10%; ** denotes significance at 5%; *** denotes significance at 1%

Table 5: Exploring the Gender Differential

	Individual Child's Education Expenditure Share		Household Child Clothing Expenditure Share	
	Girls (1)	Boys (2)	Girls (3)	Boys (4)
Children Engaged in Paid Work			-0.189	0.856***
			(0.335)	(0.282)
Paid Work Hours	0.072***	-0.002		
	(0.012)	(0.007)		
Paid Work Hours Squared	-0.001***	0.000		
	(0.000)	(0.000)		
Observations	5807	5787	5852	5829
R-squared	0.12	0.06	0.05	0.05
Number of Households	3065	3092	3073	3095

Notes: Standard errors in parentheses. Results displayed in each column come from separate regressions that also control for household and time fixed effects, the share of household members in each age-sex category, log of total household size, log of expenditures per capita, household head's education, employment status, and gender, a dummy equal to one if the household owns the house they reside in, a dummy equal to one if the household is in an urban area, and a dummy equal to one if the individual receives scholarships or money from Oportunidades for the purpose of attending school.

* denotes significance at 10%; ** denotes significance at 5%; *** denotes significance at 1%

Table 6: Heterogeneity in Positive Relationship for Girls

	Individual Girl's Education Expenditure Share						
	Baseline	Above Median Poverty Line	Below Median Poverty Line	Urban	Rural	Girls Age 5-10	Girls Age 11-14
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Child Engaged in Paid Work	0.933***	-0.345	1.793***	0.504	1.347***	2.019**	1.194*
	(0.333)	(0.340)	(0.539)	(0.549)	(0.410)	(0.800)	(.718)
Observations	5816	2175	3641	3125	2691	2988	2828
R-squared	0.11	0.09	0.15	0.07	0.16	0.1	0.15
Number of Households	3065	1456	2005	1791	1324	2157	2105

Notes: Standard errors in parentheses. Results displayed in each column come from separate regressions that also control for household and time fixed effects, the share of household members in each age-sex category, log of total household size, log of expenditures per capita, household head's education, employment status, and gender, a dummy equal to one if the household owns the house they reside in, a dummy equal to one if the household is in an urban area, and a dummy equal to one if the individual receives scholarships or money from Oportunidades for the purpose of attending school.

* denotes significance at 10%; ** denotes significance at 5%; *** denotes significance at 1%

Table 7: Type of Work

	Individual Girl's Education Expenditure Share	
	Baseline	**HH Work**
	(1)	**(2)**
Child Engaged in Paid Work	0.933***	
	(0.333)	
Child Engaged in Household Work		0.119
		(0.153)
Observations	5816	5815
R-squared	0.11	0.1
Number of Households	3065	3064

Notes: Standard errors in parentheses. Results displayed in each column come from separate regressions that also control for household and time fixed effects, the share of household members in each age-sex category, log of total household size, log of expenditures per capita, household head's education, employment status, and gender, a dummy equal to one if the household owns the house they reside in, a dummy equal to one if the household is in an urban area, and a dummy equal to one if the individual receives scholarships or money from Oportunidades for the purpose of attending school.

* denotes significance at 10%; ** denotes significance at 5%; *** denotes significance at 1%

Table 8: Type of Education Expenditures Shares

	Individual Girl's Education Expenditure Share		
	Baseline	**Education Fees Share**	**Education Extras Share**
	(1)	**(2)**	**(3)**
Child Engaged in Paid Work	0.933***	0.088	0.947***
	(0.333)	(0.216)	(0.231)
Observations	5816	5790	5779
R-squared	0.11	0.03	0.13
Number of Households	3065	3057	3052

Notes: Standard errors in parentheses. Results displayed in each column come from separate regressions that also control for household and time fixed effects, the share of household members in each age-sex category, log of total household size, log of expenditures per capita, household head's education, employment status, and gender, a dummy equal to one if the household owns the house they reside in, a dummy equal to one if the household is in an urban area, and a dummy equal to one if the individual receives scholarships or money from Oportunidades for the purpose of attending school.

* denotes significance at 10%; ** denotes significance at 5%; *** denotes significance at 1%

Table 9: Type of Education Expenditure Shares

	Individual Girl's Education Expenditure Share							
	Enrollment Fees	Registration Fees	Exam Fees	Course Fees	School Maintenance Fees	Books and School Supplies	School Uniforms and Sports	School Festivities and Celebrations
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Child Engaged in Paid Work	0.033	-0.079	0.016	-0.013	0.149**	0.401***	0.523***	0.032
	(0.246)	(0.085)	(0.024)	(0.036)	(0.061)	(0.127)	(0.165)	(0.036)
Observations	5730	5626	5686	5617	271	5685	5695	5621
R-squared	0.01	0.01	0.05	0.01	0.92	0.08	0.08	0.03
Number of Households	3033	3011	3024	3010	220	3029	3029	3012

Notes: Standard errors in parentheses. Results displayed in each column come from separate regressions that also control for household and time fixed effects, the share of household members in each age-sex category, log of total household size, log of expenditures per capita, household head's education, employment status, and gender, a dummy equal to one if the household owns the house they reside in, a dummy equal to one if the household is in an urban area, and a dummy equal to one if the individual receives scholarships or money from Oportunidades for the purpose of attending school.

* denotes significance at 10%; ** denotes significance at 5%; *** denotes significance at 1%

Table 10: Educational Welfare Impacts for Girls

	Girl's Education Outcomes						
	Attends School	**Hours/Day at School**	**Days/Week at School**	**Hours/Week Homework**	**Passed Age Appropriate Grade**	**Repeat School Year**	**School Disruptions**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Child Engaged in Paid Work	0.000	-0.074	-0.006	-1.232**	0.072*	-0.026	-0.015
	(0.002)	(0.085)	(0.030)	(0.555)	(0.043)	(0.031)	(0.021)
Observations	5898	5884	5889	5833	5895	5887	3943
R-squared	0.01	0.24	0.01	0.02	0.27	0.03	0.02
Number of Households	3087	3077	3083	3067	3085	3086	2629

Notes: Standard errors in parentheses. Results displayed in each column come from separate regressions that also control for household and time fixed effects, the share of household members in each age-sex category, log of total household size, log of expenditures per capita, household head's education, employment status, and gender, a dummy equal to one if the household owns the house they reside in, a dummy equal to one if the household is in an urban area, and a dummy equal to one if the individual receives scholarships or money from Oportunidades for the purpose of attending school.

* denotes significance at 10%; ** denotes significance at 5%; *** denotes significance at 1%

Table 11: Additional Robustness Checks

	Individual Girl's Education Expenditure Share					
	Baseline	**Home Owners**	**Age Dummies**	**Female Power**	**Allow Income to Vary**	**Siblings**
Additional Variable Included				**Total Female Income Share**	**Log Expenditure per Capita Squared**	**Sibling Engaged in Work**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Child Engaged in Paid Work	0.933***	1.087**	0.927***	1.776***	0.792**	0.862**
	(0.333)	(0.424)	(0.334)	(0.572)	(0.326)	(0.371)
Variable				1.213**	0.545***	-0.215
				(0.528)	(0.049)	(0.783)
Observations	5816	4215	5816	2412	5816	4493
R-squared	0.11	0.06	0.11	0.11	0.15	0.09
Number of Households	3065	2406	3065	1568	3065	2275

Notes: Standard errors in parentheses. Results displayed in each column come from separate regressions that also control for household and time fixed effects, the share of household members in each age-sex category, log of total household size, log of expenditures per capita, household head's education, employment status, and gender, a dummy equal to one if the household owns the house they reside in, a dummy equal to one if the household is in an urban area, and a dummy equal to one if the individual receives scholarships or money from Oportunidades for the purpose of attending school.

* denotes significance at 10%; ** denotes significance at 5%; *** denotes significance at 1%