Shocks on the labor market, youth's time allocation and women's empowerment: Insights from the 2011 Egyptian uprising

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Abstract

This paper investigates the impacts of a dual shock on the Egyptian labor market following the 2011 uprising, on youth's time allocation. We estimate the effects of reported changes in the father's working conditions on youth's work participation and school enrollment in bivariate probit models, using the 2012 round of the Egypt Labor Market Panel Survey. We link two strands of the literature by exploring the role of the mother's empowerment in shock transmission. Following Reggio (2011), we address the endogeneity of the mother's bargaining power by estimating it separately from the other parameters of the model. We find that reported positive changes lowers daughters' participation in intensive domestic work. This result only holds at a higher level of the mother's bargaining power. It suggests that a woman's say in household decisions can affect the reallocation of resources following a change in the family income. The results are robust to a difference-in-difference approach and to propensity score matching.

Keywords: Labor market shocks, Schooling decisions, Work decisions, Women's empowerment, Egypt

1. Introduction

Children and youth's time allocation in work and schooling determines their current and future well-being. There is evidence that lower schooling decreases future earnings (Glewwe, 2002) and that child and youth work, including domestic work, can be detrimental to schooling (e.g. Levison et al., 2001; Gunnarsson et al., 2006; Amin et al., 2006) and to future human capital and earnings (Beegle et al., 2004). Inefficient investment in children's human capital can contribute to an intergenerational transmission of poverty that could trap several generations of individuals in child labor and in poverty as adults (Wahba, 2005). Thus, it is crucial to understand how factors external to individuals' control affect these choices. Economic and political shocks are such determinants whose expected impacts are uncertain (Ferreira and Schady, 2008). The mother's bargaining power is another determinant that was found positively related with children's human capital outcomes (e.g. Hou, 2011; Reggio, 2011; Lépine and Strobl, 2013). Thus, a woman's say in the family reallocation decisions could mitigate the transmission of these shocks. This constitutes a potential channel through which women's bargaining power can affect children and youth's human capital outcomes and development, something which was yet unexplored by the literature.

The aim of this paper is twofold. First, we explore the differential impacts of a dual economic shock, following the political regime reversal in Egypt, on 16-20 year-old youth's decisions to work and to go to school. [3] We refer to the 2011 Egyptian uprising as a source of shocks on male household heads' labor market. The political instability contributed to an economic slowdown that deteriorated the working conditions of a part of the population. However, the massive protests also lead to the improvement of some workers' working conditions. Thus, these shocks are expected to affect youth's time allocation decisions through their impact on the family income. Second, we investigate the role of the mother's bargaining power in the transmission of these shocks through her influence in the resource reallocation decisions induced by these shocks.

We take as a main data source the 2012 round of the Egypt Labor Market Panel Survey (ELMPS). This is a longitudinal nationally representative survey that includes detailed module on engagement

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[3]While schooling is close to universal until 15 years old, school enrollment rates significantly drop after this age.

in market and non-market oriented activities and schooling, as well as self-reported measures of women's say in household decisions. We estimate the 16-20 year-old youth's decisions to work and to go to school simultaneously in bivariate probit regressions. Our main measure of labor market shocks consists of the father's reported changes in his working conditions following the social uprising. We explore the role of the mother's bargaining power by interacting an indicator of bargaining power with our measure of shocks. To address the endogeneity of the mother's bargaining power, we follow Reggio (2011) by estimating it separately from the other parameters of the model. We explore the sensitivity of our results to measurement errors and the potential endogeneity of shocks. Our results are robust to a propensity score matching estimation and a difference-in-difference approach.

We find that the probability of working of 16 to 20 year-old youth decreases with a positive change in their father's working conditions, while we find no impact on the schooling decision. However, these decisions are not affected by a negative change. The effect of a positive change on youth's work is driven by the impact on daughters' participation in domestic work. This impact is stronger for girls belonging to poorer households. However, this effect only holds at a higher level of the mother's bargaining power. Overall, our results suggest that the positive shock lowered the need of girls' domestic work by alleviating the household financial constraints. Our study provides evidence of differences in parents' preferences, leading to different choices of resource allocation. Our results suggest that the mother's influence in household decisions allows her to direct new resources towards investment in youth's human capital, even in the case of a shock on the father's labor market.

Our analysis constitutes the first contribution on the aftermath of the Egyptian uprising on youth's time allocation. Determinants of children and youth's work and schooling are numerous, but household income remains the most decisive one. Under imperfect credit markets, child and youth labor may appear as a last resort solution to allow the family to meet the subsistence level of consumption (Basu and Van, 1998). To better understand the mechanisms at play and address the endogeneity of changes in family income, a large body of literature has developed on the impact of shocks on children and youth's work and schooling, to which this analysis contributes. Studies

on positive shocks explore mainly, but not solely, the impact of the receipt of new social benefits (e.g. Edmonds, 2006; De Carvalho Filho, 2012; Edmonds and Schady, 2012; Aizer et al., 2016). Positive shocks do not always lead to an improvement in children and youth's human capital outcomes. For instance, Kruger (2007) relates an increase in the value of coffee production in Brazil with a decrease in children's school attendance and an increase in child work, in regions where coffee is economically important. Løken (2010) fails at finding a causal impact of an increase in family income, following a positive oil shock in the 1970s, on children's schooling in Norway. Negative shocks encompass a decrease in wages, economic crisis, unemployment of the household head, death or illness of one parent (e.g. Beegle et al., 2006; De Janvry et al., 2006; Alam, 2015; Bandara et al., 2015). They tend to find a negative impact of these shocks on children and youth's human capital outcomes, but again exceptions arise (e.g. Cruces et al., 2012; Dasgupta and Ajwad, 2011).

Overall, the impacts of shocks are uncertain. In their review, Ferreira and Schady (2008) conclude that schooling tend to be pro-cyclical in low-income countries and counter-cyclical in high-income countries. These differences arise from the interplay of two conflicting effects, that of income and substitution. The change in income induces a counter-cyclical investment in human capital, while the substitution effect affects opportunity costs of home production, leisure and schooling. Which effect dominates will depend notably on the level of household wealth and of the country's economic development (Skoufias, 2003; Ferreira and Schady, 2008), as well as on its traditions and socio-cultural characteristics (Mottaleb et al., 2015). Therefore, the effects of shocks following the Egyptian social uprising are an empirical matter, whose impacts are particularly ambiguous for a low middle-income country. To our knowledge, we are the only study exploring the impacts of a contemporaneous dual shock.

This paper also contributes to the literature on intra-household allocations, by providing the first evidence of the impact of the mother's bargaining power on the transmission of shocks on the father's labor market on youth's time allocation. A flourishing literature links a woman's increased ability to make choices to an improvement in children's human capital outcomes (e.g. Thomas, 1994; Lundberg et al., 1997; Quisumbing and Malluccio, 2003; Hou, 2011; Reggio, 2011). Hou

(2011) jointly estimates women's participation in household decisions, per capita expenditure and budget shares and shows that a woman's greater say has a positive effect on education expenditure and on children's schooling in Pakistan. The most notable empirical works on child labor are the studies of Basu and Ray (2002) and of Reggio (2011). For Basu and Ray (2002), a very unequal distribution of power allows one parent to appropriate gains derived from child labor for her preferred consumption, which overtakes her disutility from sending children to work. They provide evidence of such a non-monotonic relationship in Nepal. Reggio (2011) argues that an increase in a woman's bargaining power decreases child labor when women's marginal disutility from child labor is greater than men's and when their marginal utility to consume is lower than men's. The last point is relevant in the Egyptian context in which women have still a limited access to some private goods and economic resources. The author estimates the bargaining power as a linear function of the distribution factors, whose effects are estimated separately from the other parameters of the model in simultaneous multinomial logit regressions of women's participation in household decisions. The author shows that a mother's bargaining power decreases child labor in Mexico, but only of daughters. Our approach differs from these papers in investigating the role of women's bargaining power when a shock does not directly affect them but their husband in the subsequent reallocation of household resources.

The remainder of the paper is organized as follows: section 2 presents the dual shock that followed the Egyptian social uprising; section 3 describes the dataset used in this study and provides descriptive statistics on the variables of interest; section 4 presents our empirical strategy, followed in section 5 by the main results; we comment a series of robustness checks in section 6, and section 7 contains concluding remarks.

2. The 2011 social uprising as a source of a dual shock

The Egyptian uprising of January 25, 2011, was part of a series of social upheaval in the Arab world against autocratic regimes. On this day, Egyptians took to the streets to call for the removal of the President Hosni Mubarak and expressed their discontent against lasting poverty, widening inequalities, a lack of labor market opportunities and government corruption (Campante and Chor,

2012; World Bank, 2012). If mainly driven by economic reasons, the size of the protests and the political regime reversal were unexpected by the population. The following period of political instability slowed down economic growth through market disruptions, induced by protests and strikes, and by a drop in tourism and foreign investment because of growing concerns on streets security and economic prospects (CountryWatch, 2015).

The economic incidence of the social uprising first appears to be negative. Using quarterly data of output and investment for twenty sectors, from 2002 to 2012, Hosny (2013) identifies new major constraints on production and investment that followed the event, such as a greater price variation and the real currency depreciation. His study reveals important disparities in the deterioration of economic conditions of sectors of activity. Assaad and Krafft (2013) analyze the evolution of the Egyptian labor market using the three rounds of the Egypt Labor Market Panel Survey (1998, 2006 and 2012). They conclude on a worsening of working conditions in 2012, particularly for workers of the private sector, visible in terms of underemployment and irregular employment, rather than through a rise in unemployment. However, the social uprising was also source of a positive shock. The massive protests lead to the improvement in the working conditions of one strand of workers. A crucial element of these changes has been the rise of the minimum wage, first in the public sector in July 2011, and followed by the private sector in October. This policy represented the first rise of the minimum wage since 1984 from 35EGP (around 6.5US$) to 700EGP per month (around 110US$)[4] Improvements were reported in terms of an increase in wages (hourly wage or total wage) and in job stability, moving from temporary contracts to permanent ones (World Bank, 2012; Assaad and Krafft, 2013). Therefore, the social uprising resulted in a dual shock on the labor market: a sub-group of workers experienced a negative shock while another sub-group a positive one. Changes in male household head's working conditions, the primary earner in the Egyptian context, are likely to affect significantly the family's income, inducing a reallocation of household

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[4]This information is reported in Beinin (2012) and press articles. For instance, see "www.ipsnews.net/2010/02/egypt-minimum-wage-not-enough/". An annual income based on this new minimum wage amount for 32.11% of annual average household expenditures in 2012 (CAPMAS, 2014). . As a result, workers reported improvements in terms of an increase in wages (hourly wage or total wage), bust also in terms of job stability, moving from temporary contracts to permanent ones (World Bank, 2012; Assaad and Krafft, 2013).

resources. These decisions are in turn crucial for investment in children and youth's human capital, by either tightening or relaxing the financial constraints faced by the household.

3. Data and descriptive statistics

3.1. *The Egypt Labor Market Panel Survey*

This analysis is based on a longitudinal and nationally representative household survey, the Egypt Labor Market Panel Survey (ELMPS) administered by the Economic Research Forum[5] in co-operation with Egypt's Central Agency for Public Mobilization and Statistics. To identify changes following the social uprising, we will mainly focus on the 2012 round, carried out from March to June and covering 12,060 households. The database contains detailed information on individuals' employment, socio-economic characteristics and women's status. The latter module provides direct evidence of women's bargaining power, asking married women about their participation in a variety of household decisions.

3.2. *Shocks on the household head's labor market*

We make use of reported changes in working conditions due to the social uprising as indicators of the dual aggregated shock on the labor market. Workers have been asked to compare their economic activity during the three months preceding the date of the survey with that of a month prior to the 25th of January 2011.[6] We classified the reported answers as negative changes (e.g., lack of security, decrease in the wages) and positive changes (e.g., improvement in the working conditions) in the individual's working conditions. We focus the analysis on 16 to 20 year-old children of married male household heads in the primary age of labor and currently working, residing with

their both parents and for those we have complete information on the variables of interest.[7] This sample is made of 2,084 youth, of whom 17.29% of fathers reported negative changes and 8.28% positive changes.

Descriptive statistics on youth's main characteristics according to their father's reported changes in working conditions are given in Table 1. It is reasonable to say that the labor market shocks were unexpected. However, Table 1 reveals some differences between initial characteristics of the affected groups, suggesting that they are not random. The parents' education level is on average higher in households in which the father reported a positive change and lower when a negative change was reported, the difference being more pronounced in the father's level of education. However, households in which the father reported a negative change fare better in terms of the level of household wealth, followed by those reporting a positive change. The household composition seems fairly similar across groups, though the average size of the siblings is slightly greater in households reporting a positive change. Some spatial disparities are visible in the reported shocks.

This indicator of shocks on the father's labor market is believed to encompass changes in the father's income, as well as changes in perceptions of future economic prospects. To prove the pertinence of this indicator, we also consider a reported increase in income after the social uprising as another potential indicator of shocks on the labor market. [8].

3.3. The mother's bargaining power

Another aim of our paper is to investigate the role of the mother's bargaining power in the transmission of these shocks to youth's time allocation decisions. We follow a recent strand of the literature on women's empowerment by using women's reported participation in household decisions as direct indicators of women's bargaining power (e.g. Anderson and Eswaran, 2009; Reggio, 2011; Lépine and Strobl, 2013; see Malhotra and Schuler, 2005, for a discussion on these indicators). The ELMPS asks women who has the final say on a variety of household decisions,

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[7]More than 97% of youth whose both parents are present in the households are youth of the household head in male headed households. Around 97% of them again have a father currently working.

[8]This alternative measure may be believed to be more objective. However, this question was only answered by waged-workers, imposing an important selection on our sample. This limitation supports our choice of reported changes in working conditions as the primary variable of interest

described in Table A1 of the Appendix. Assumptions still need to be made about how to use these variables as different decisions will not be equally representative of relative bargaining power and have the same incidence on household members. In this study, we choose to focus on decisions affecting women's personal sphere (regarding visits to their friends and relatives, their own health and buying their own clothes) as a proxy for the mother's influence in her household's resource allocations.[9] As a robustness check, we also consider alternative measures of bargaining power: the mother's access to household money, her age at first birth and the age difference with her husband.

3.4. Youth's time allocation

We are interested in 16 to 20 year-old youth's decisions in time allocation. Schooling is mandatory in Egypt for the ages 7 to 15. As a result, 96% of children in this age group are enrolled in school in the 2012 survey round of the ELMPS. Reported child labor for these ages is also quite low. Focusing on the 16-20 age group allows us to capture major schooling decisions, those to enter secondary and tertiary education. In contrast with basic education, secondary education suffers in Egypt from a non-negligible drop-out rate. According to the EHDR (2010) reports, in 2008, 15% of 18-29 year-old individuals had dropped out of the secondary school and nearly 30% of those enrolled in school were repeaters. Thus, it seems relevant to investigate the role of family income and of the labor market conditions of the primary earner on children's secondary schooling. Nevertheless, individuals who stopped education after the secondary school face the lowest returns to education and the highest unemployment rate (El-Nashar, 2012). Hence, the choice to enter higher education appears to be decisive and provides a justification for the extension of our age group range until 20 years old. [10]

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[9]Nevertheless, our main conclusions are not sensitive to the choice of decisions. Results with other groups of decisions (e.g., like the economic sphere) are the same and available upon request. Despite their subjective nature, the pertinence of these variables has been proven in a previous work of one the authors (Sadania, 2016). In this paper, this measure of empowerment was found strongly associated with more traditional measures of bargaining power, the woman's relative education and relative income, as well as with other potential indicators, i.e., having direct access to household money, being afraid of disagreeing with your husband or other males in your household, and a score for positive attitudes towards gender roles.

[10]Our results are also robust to the choice of other age ranges (e.g. 16-19, 15-22). Results are available upon request.

In this study, we are interested in two main outcomes: school enrollment and work participation. School enrollment indicates if the youth of interest is studying at the time of the survey. Work participation includes two types of work: non-domestic work, defined as any positive hour spent in a market oriented activity, and domestic work, for which we consider a threshold of ten hours per week spent in a non-market oriented activity.[11] For this age group, giving the same weight to any amount of domestic work lacks of pertinence as one may expect youth to participate in household subsistence work and chores. Hence, we chose to impose a hours cut-off as it has been done in other studies (e.g. Assaad, 2010; Reggio, 2011). However, the results are not sensitive to the choice of this cut-off.[12]

Table 2 describes youth's time allocation distinguishing by gender and work activities. There is a visible tendency of gender differences in the activities they perform. As a demonstration, 54.8% of girls participating in work are also enrolled in school while only 28.4% of boys combine both activities. Table 2 shows that boys and girls perform in average different types of work. Among the sample of girls participating in work activities, 94.9% are entirely or partially involved in domestic work whereas only 19.9% of boys are. Thus, it seems important to distinguish between domestic and non-domestic work activities and by gender in the remaining part of the analysis.

4. Estimation strategy

4.1. Bivariate probit model

We are interested in how changes in the father's working conditions affect youth's probability of being enrolled in school and participating in work. These two decisions cannot be considered independently. To account for the interdependence, we estimate these probabilities simultaneously in a bivariate probit model. The advantage of this model is to allow for correlation between error terms (Greene, 2012).[13]

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[11]Domestic work includes agricultural work for the household consumption, shopping, construction work, water and firewood collection, household chores and taking care of children and elderly members of the household.

[12]As a robustness check, we alternatively use weekly hours spent in domestic work. These results are given in Tables A4 and A5 of the Appendix.

[13]Several papers followed a similar approach, e.g. Duryea and Arends-Kuenning, 2003; Wahba, 2005; Zapata et al., 2011. It is to be noted that this model does not account for the endogeneity of these decisions, removing only part of

The latent variables S^* and W^* represent the decisions of schooling and of working respectively. The first dependent variable is defined 1 if the youth is studying at the time of the survey and 0 otherwise. The second dependent variable is defined 1 if the youth participated in a market-oriented activity during the three months preceding the date of the survey or in a minimum of ten hours of domestic work during the week preceding the date of the survey, and 0 otherwise. These probabilities are characterized by a linear combination of a vector of shocks on the father's labor market (**Shock**); a vector of own characteristics (**X**); a vector of household's characteristics (**H**); and in order to capture specific local conditions, community fixed effects consisting of 22 governorate dummies and an indicator of urban residence (**C**). The main variable of interest, **Shock**, consists of a set of dummy variables indicating if the father reported either no change, a negative change or a positive change in his working conditions after the social uprising.

We estimate simultaneously by Full Information Maximum Likelihood the following system:

$$\begin{cases} S^*_i = \beta_1 + \beta_2 \boldsymbol{Shock}_i + \beta_3 \boldsymbol{X}_i + \beta_4 \boldsymbol{H}_i + \beta_5 \boldsymbol{C}_i + \mu_i, \ \ with \ \ S_i = 1 \ \ if \ \ S^*_i \geq 0 \ \ and \ \ = 0 \ \ otherwise \\ W^*_i = \alpha_1 + \alpha_2 \boldsymbol{Shock}_i + \alpha_3 \boldsymbol{X}_i + \alpha_4 \boldsymbol{H}_i + \alpha_5 \boldsymbol{C}_i + \upsilon_i, \ \ with \ \ W_i = 1 \ \ if \ \ W^*_i \geq 0 \ \ and \ \ = 0 \ \ otherwise \end{cases}$$
$$(1)$$

where i indicates the youth; β_1 and α_1 are constants, $\beta_2, \beta_3, \beta_4, \beta_5, \alpha_2, \alpha_3, \alpha_4$ and α_5 are parameters to estimate and μ and υ the error terms.

We retain a common set of covariates for our two equations that we selected according to the empirical literature exploring the determinants of children and youth's schooling and work (e.g. Levison et al., 2001; Edmonds, 2006b; Reggio, 2011; Webbink et al., 2012; Lafortune and Lee, 2014; Lincove, 2015). At individual level, we include the youth's gender, a dummy for being a first-born child, its age and its square. At household level, we include the parents' level of education and the household socio-economic status, measured by a wealth index. We account for the effects of the sibling composition by controlling for the number of sisters and brothers. The sibling composition reinforces the impact of birth order. In addition, we control for the number

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the bias due to the interdependence between school and work. However, this approach is believed to be superior to the use of poor instruments for youth's schooling and work.

of household members that are not part of the nuclear family. Community characteristics aim at capturing the local impact of social norms on youth work and marriage, of the labor market and of returns to school. Hence, we include a dummy differentiating between urban and rural residence and governorate fixed-effects.

4.2. *Estimation of the impact of the mother's bargaining power*

We want to estimate the impact of the mother's bargaining power on the transmission of these shocks. We choose to measure the mother's bargaining power using their participation in household decisions. We face three main challenges in this attempt. First, a woman's bargaining power is not directly observed. We believe that a woman's say in household decisions offers a good indicator of her empowerment within the household. Nevertheless, one still need to make assumptions about how to use these variety of decisions to measure bargaining power. Second, the bargaining power is partly determined by unobserved household and individual characteristics that may affect the decisions on youth's time allocation. Second, her bargaining power is not directly observed and requires either the use of proxy measures or an estimation procedure. To address both concerns, we follow the estimation procedure described by Reggio (2011). The unobserved bargaining power is considered as one of the determinants of decision-making and defined as a linear function of the distribution factors. These are variables that affect one's power without directly affecting household decisions. The novelty of this approach is to estimate the bargaining power separately from the other parameters of the model. This is possible by estimating simultaneously multinomial logit models of the mother's participation in household decisions and imposing an equality constraint of the coefficients associated with the distribution factors across modalities and decisions. Thus, another advantage of this approach is to allow for the consideration of several household decisions at the same time.

We retain three decisions to be estimated simultaneously by Maximum Likelihood: on visiting friends and relatives, on own health and on buying clothes for self. For each decision, a mother can be excluded from the decision, decide jointly with the father or have the final say alone. Following Reggio (2011), we define the log likelihood of the multinomial logit model to be estimated as

follows:

$$L_h = \prod_{j=1}^{2} \left(\frac{exp(z_h\theta + x_h\beta_{aj})}{\sum\limits_{j=1}^{3} exp(z_h\theta + x_h\beta_{aj})} \right)^{d_{aj}} \tag{2}$$

where h indicates the household, a the household decision, j the decision-making modality, z the set of distribution factors, x variables having a direct effect on decision-making and d a dummy. Our measure of bargaining power consists of a linear function of the distribution factors z and of the set of estimated coefficients θ.

   As distribution factors, we choose the local sex-ratio and average contribution of brides and their family to the costs of marriage. The local sex-ratio is defined as the ratio of men to women and was compiled using the 2006 Census at the governorate level for cohorts of five years range, distinguishing between urban and rural areas.[14] The sex-ratio is considered as an indicator of competition on the marriage market and is positively related to a woman's bargaining power, a higher value indicating a relative scarcity of women. Several studies refer to the sex-ratio as an important determinant of post-marital shares of resources. Chiappori et al. (2002) develop a collective model of household decision-making that accounts for distribution factors, which they apply to the household labor supply. They provide evidence of the impact of sex-ratios on the couple's sharing rule, which attributes one's weight in the share of household resources. Based on the 1989 survey round of the PSID in the United-States, they find that a one percentage point increase in the sex-ratio, compiled by age, race and states, leads to an average increase of husbands' transfer to their wives by \$2,163. Recently, Bulte et al. (2015) show that a relative scarcity of women increases their bargaining power in two counties of China. They rely on an exogenous spatial and temporal variation in sex ratios as a result of differences in the Only Child Policy among ethnic groups. The impact of the sex-ratio is estimated directly and indirectly, using the share of ethnic minorities in the population as an instrument, on subjective and experimental measures of decision-making.

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[14]We also compiled the sex-ratio using alternatively the 2006 and the 2012 survey rounds of the ELMPS, without distinguishing between urban and rural areas. The results are robust to these other measures of the sex-ratio.

Our second distribution factors consists of the average contribution of brides and of their family to the costs of marriage, by governorates and cohorts of five years range using the 2006 and 2012 survey rounds of the ELMPS. Resources brought at marriage positively affect a woman's outside options as long as she retains control over them, that we consider the outside option as divorce or as an "unproductive marriage" in which each couple member consumes his own resources (Anderson and Bidner, 2015). The literature reveals a dual role of pre-marital investments, as the money given to daughters at time of marriage acts as a pre-mortem bequest but also as a mean to compete for higher quality grooms on the marriage market (Iyigun and Walsh, 2007; Anderson and Bidner, 2015), both role having a conflicting effect on a woman's future share of resources. In Egypt, this first role is of primary importance. Amin and Al-Bassusi (2004) document on the role of a girls' *gehaz* (trousseau), whose content is made public to enhance the social status of the bride. Material contribution to marriage from the bride and the groom sides are listed in the marriage contract and is a main determinant of a woman's bargaining status in her marriage. This tradition is particularly salient in Egypt where the average marriage costs are substantially high in the Middle-East region. Hence, a woman's and her family's contribution to marriage costs is expected to be positively related to her bargaining power. Because its individual value may be endogenous to other household decisions, we rather focus on averages, which would allow us to capture spatial and temporal differences in the social norms on marriage.

As Reggio (2011), we estimate a polynomial function with interactions and squared terms of the distribution factors to better approximate a woman's bargaining power. The squared terms allow to capture non-linearity in the impacts of the distribution factors. In a collective model of household allocations, Iyigun and Walsh (2007) demonstrate the inter-links between sex-ratios and pre-marital investments: a relative scarcity of men increases a woman's pre-marital investments, decreasing the ability of her contribution to marriage costs to enhance her status within marriage. An interaction term between the local sex-ratio and average contribution to marriage costs will capture such an effect. The impact of distribution factors is net of the impact of explanatory variables that have a direct effect on decision-making. Once more, we follow Reggio (2011) by retaining a woman's and her husband's education level, the level of education of a woman's and her husband's parents as a

proxy for their cognitive capacity and background, and a dummy indicating if a woman works.

Our measure of bargaining power consists of an ordinal scale normalized between 0 and 1, from less to more empowerment relative to other women of the sample, based on a linear function of the distribution factors to which we associate their estimated coefficients. To investigate the role of the mother's bargaining power in the transmission of the father's labor market shocks, we introduce an interaction of this measure with our indicator of shocks in the system of equations (1) described in Section 4.1.

5. Estimation results and analysis

5.1. Impacts of changes in the father's working conditions

The results of the bivariate probit regressions for the probabilities of a youth being enrolled in school and participating in work according to its father's labor market shock are listed in Table 3. Our results reveal a significant negative association between a positive change in the father's working conditions and youth's work participation. At the opposite, there is no significant impact of a negative change in the father's working conditions.[15] This relationship is stronger for girls: daughters whose father reported a positive change have a lower probability of working by 15.5% than those whose father was not affected by a shock, while for boys this probability is lower by 8.34% and only significant at the 90% confidence level.[16]

Differences in the degree of youth's autonomy may be a piece of explanations for differences between girls' and boys' outcomes. The ELMPS inquires children about their main reason for having left school. 28.7% of the 16-20 year-old boys declared that they did not want to continue schooling while only 16.4% of girls mentioned that reason. In contrast, 2.4% of boys declared that their parents did not want them to continue schooling while this is the case for 13.6% of girls. These numbers are suggestive of a higher influence of parental preferences on older girls' decisions

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[15]This could come from a deterioration of the conditions of the youth's labor market along with the household head's working conditions. However, only 2% of our sample declared not working against their will and the probability of unemployment is not affected by these shocks. Results not shown but available upon request.

[16]The model strongly rejects independence between the schooling and work participation equations. The correlation ρ between the unobserved characteristics of the two equations is negative and significant, suggesting that work and schooling are conflicting choices.

and investment in human capital than on older boys. This influence could accentuate the impact of shocks on the household head's labor market.

There is an important gender division of labor that occurs from the youngest age (as seen in Table 2). To account for these differences, we distinguish between non-domestic and domestic work. As Table 4 shows, our significant effect appears driven by the effect on girls' domestic work.[17] This difference could be related to the nature of domestic work. A positive economic shock can have a differentiated impact on child and youth labor depending on the nature of the work (e.g., Del Carpio et al., 2016).Girls are usually associated with more domestic work than boys (e.g. Edmonds, 2006). In our sample, 82.45% of youth participating in domestic work are girls. The majority of youth involved in intensive domestic work are also enrolled in school, while the majority of those engaged in non-domestic work are no longer students (Table 2). As a result, the greater compatibility of domestic work with schooling may lower the perceived costs associated with this type of work as a way to support the family income. Participation and the time spent on domestic work are believed to be more flexible than involvement in the labor market when non-domestic work is not performed in the context of household enterprises, as it is the case for the majority of the non-domestic workers of our sample. Thus, it is not surprising that domestic work can react more directly to changes in the working conditions of the household head. At this age range, decisions to engage in the labor market and to drop-out of school may be less reversible. Yet, our results suggest that a positive change in the primary earner's working conditions reduces the need of daughters' domestic work. [18]

As Tables 3 and 4 show, there is no significant impact of a change in the father's working conditions on youth's schooling. This result seems at odds in comparison with the literature that provides compelling evidence of a positive impact of positive income shocks on children and youth's schooling, essentially in the form of welfare programs (e.g. De Carvalho Filho, 2012; Edmonds

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[17]The results for the probability of participating in non-domestic work are not statistically significant. These are available upon request.

[18]A concern could arise if this lower probability results in a higher probability of idleness. We run a multinomial logit model distinguishing between going to school only, combining it with intensive domestic work, participating in domestic work only and none of these activities. The effect of a positive shock is driven by a lower probability of combining domestic work with schooling. Results are available upon request.

and Schady, 2012; Aizer et al., 2016; Melguizo et al., 2016). There is also substantial evidence that a negative income shock may result in withdrawing children and youth from school (e.g. Beegle et al., 2006; De Janvry et al., 2006; Coelli, 2011; Bandara et al., 2015). However, our results are consistent with the Egyptian context. Egyptian public schools are free and public universities ask for low tuition fees in comparison with private institutes. Indeed, only 5% of 16-20 year-old youth who left school declare the cost of school fees and uniform to be the main reason for dropping out.

Skoufias and Parker (2006) find that the loss of the job of the household head induces a decrease in the time spent on schooling by girls through a reallocation of the time of the household members. Thus, a positive change in the father's working conditions can allow the mother to allocate more time into the household through less participation in the labor market helping to relax the constraint on girls' domestic work. The compatibility of domestic work with school and the low costs to access school can explain why we do not find any significant impact. In the same way, we can expect an opposite effect of a negative shock. A limitation of our approach is the absence of information on the intensity of the shock. This shock is potentially asymmetric. A reported negative change may have less impact than a positive one. An easy access to education may also moderate the negative impact. Furthermore, the decision to withdraw from school is less reversible than the one to work. As a result, Dasgupta and Ajwad (2011) find that self-reported negative shocks reduced households' investment in health more than in education in the context of five Eastern-Europe countries. In their study, shocks following the world financial crisis did not affect children's school attendance but lowered schooling expenditures. Similarly, Cruces et al. (2012) find no effect of the Argentinian economic crisis on children's school attendance and Hilger (2016) shows that parental layoffs during adolescence have a very small impact on college enrolment and youth's labor supply while studying in the United-States.

5.2. Heterogeneous impacts by level of household wealth

We investigate the possibility of differences in the impact of changes in the household head's working conditions between households belonging to the poorest quintile of wealth and other households. In contrast with the household income, which is likely affected by the shocks, our

indicator of household wealth is based on the households' assets and dwelling characteristics. As such, it is believed to be less reactive to these changes and a good proxy of the household's initial resources and credit constraints. In the absence of credit constraints, changes in the family income should not affect youth labor and schooling, as parents could borrow the youth's future income to invest it in its education (Basu and Van, 1998).[19] Thus, poverty is a major determinant of labor and of school drop-outs. We test for the hypothesis of the "luxury axiom" (Basu and Van, 1998) by interacting an indicator of belonging to the poorest quintile of wealth with our measure of shocks.

The results on the probabilities of girls' schooling and domestic work by level of household wealth are listed in Table 5. As expected, the negative association between a positive shock and girls' domestic work is stronger in the poorest households. Our results go in the direction of the "luxury axiom". Poverty plays a non-negligible role on the transmission of a positive father's labor condition shock in youth's time allocation. The impacts of economic shocks on education are transmitted through both a substitution and an income effect (Ferreira and Schady, 2008). According to Ferreira and Schady (2008), the substitution effects are more likely to dominate the less households are credit constrained. Although we can expect an income effect on poorer youth's schooling, we still do not find any significant results.

5.3. Impact of the mother's bargaining power in shock transmission

One novelty of this paper is to explore the impact of the mother's bargaining power in the transmission of the father's labor market shocks on youth's time allocation. If the parents' preferences are different, a mother's higher say in resource reallocation decisions would lead to different outcomes than in households in which the mother has a lower influence. To investigate this possibility, we first estimate the mother's bargaining power separately from the estimation of the other parameters of the model following Reggio (2011), as described in Section 4.2. Our measure of bargaining power consists of a linear function of the distribution factors, i.e. the local sex-ratio and average

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[19]This proposition is questioned in Basu et al. (2010) in which they provide theoretical foundations for the existence of an inverted U-shape relationship between household wealth and child labor. This is supported by several pieces of evidence that highlight the potential complementarity between households' assets and child labor. Basu et al. (2010) attribute these effects to labor market imperfections. Still, the existence of this non-monotonic relationship does not reject the crucial role of poverty in explaining child and youth labor.

contribution of brides and their family to marriage costs. The impact of the distribution factors is displayed in Table A2 of the Appendix. As expected, the relative scarcity of women and contribution to marriage costs are associated with a woman's greater say in household decisions. Their impact is non-linear, their squared term being negatively associated with decision-making. However, the effect of the interaction term is negative, though not statistically significant. To distinguish between higher and lower levels of bargaining power, we create a dummy defined 1 if the youth's mother's estimated bargaining power belongs to the 50% highest and 0 otherwise.

The results of the impacts of a positive shock on the probabilities of girls' schooling and domestic work by level of the mother's bargaining power are given in Table 6. A positive change in the father's working conditions is only significantly associated with a decrease in girls' probability of being involved in domestic work when the mother has a higher relative bargaining power. For this group, the probability of participating in intensive domestic work is lower by 26.5% than that of girls whose father was not affected by a shock.   Consistent with the literature on intra-household allocations, it is further evidence that parents may have different preferences, leading to different choices of resource allocations. However, in contrast with these studies, we consider a woman's say in household reallocation decisions following a shock on their husband's labor market, our measure of bargaining power being exogenous to these shocks.[20] Hence, our results highlight another potential channel through which women's bargaining power can affect children and youth's human capital outcomes.

5.4. Robustness checks

We now turn to a number of robustness exercises. There are potential disparities in initial youth's and households' characteristics according to the father's reported shock on the labor market. The intensity of the labor market shock may differ by the father's sector of activity and place of residence. As individuals self-select in an economic activity and can choose their place of residence, individuals affected by a shock could systematically differ from individuals not reporting

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[20]If these shocks would have a direct impact on women's bargaining power, an improvement in their husband's working conditions is expected to decrease their bargaining power (Browning et al., 2014). Thus, this would not threaten our interpretation of the results.

any change in their working conditions. We address the threat of endogeneity of the father's labor market shocks in several ways. First, we follow a propensity score matching [21] procedure in order to control for selection bias by comparing the time allocation of youth whose father reported a positive shock with that of similar youth in other households. First-stage probit results are shown in Table A5 of the Appendix. Balancing-test results in Table 7 show that matching is effective in reducing disparities in observable characteristics at the individual and household levels between the two groups. Results of the average treatment effect (ATT) of having a father reporting a positive shock on youth's school enrollment and work participation are listed in Table 8. These results are consistent across the matching estimators and confirm our earlier findings. A positive change in the father's working conditions decreases the probability of a youth working, the effect being driven by its impact on domestic work whose probability is reduced by around 9 percentage points.[22]

Next, we take advantage of the longitudinal form of the ELMPS to address the sensitivity of our results to unobserved characteristics on a sub-set of individuals interviewed both in 2006 and 2012 [23]. Following a difference-in-difference approach, we can compare changes in continuous measures of work and schooling for youth whose father reported a shock with youth whose father did not, holding constant fixed observed and unobserved characteristics that could affect these changes. We use alternatively weekly hours spent on work, then distinguishing between non-domestic and domestic work, and average daily hours spent in school. The equivalent of our baseline results, but using a difference-in-difference approach, are reported in Table 9.[24] They are relatively similar. A

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[21] A propensity score matching method addresses the threat of endogeneity by constructing a control group whose distribution of initial characteristics is as close as possible to that of the treated group, under the hypothesis that selection into treatment is only based on observable characteristics (Caliendo and Kopeining, 2008).

[22] We reproduce this methodology with having a father reporting a negative shock as an alternative treatment. The results are not statistically significant. We also estimate the ATT on continuous measures of work. A positive shock decreases youth's time spent on domestic work by around 1.9 hours a week.

[23] More than 62% of our sample was also interviewed in the 2006 survey round of the ELMPS, creating a quasi-experimental setting that allows itself to a difference-in-difference estimation. We reckon that this approach suffers from two limitations. First, the time span between the two survey rounds is quite long, which could threaten the parallel trend assumption. Second, this sub-sample may suffer from an attrition bias that does not allow us to generalize the results for the all population. However, due to the unexpected nature of these shocks, we assume that our setting satisfies the conditional exogeneity of placement to changes in outcomes. Thus, this approach can provide further support to our main results.

[24] We reproduce this approach with a negative shock as an alternative treatment, the results are not statistically significant. These results are robust to the inclusion of individual fixed-effects and of interactions between the time trend and observable characteristics.

positive change in the father's working conditions decreases youth's hours spent in work without any particular effect on youth's schooling. In contrast with our earlier results, we also find a significant impact on youth's hours spent on non-domestic. When we distinguish between gender, we see that this effect is focused on boys.

We now test whether our results are sensitive to our measure of shocks by considering an alternative measure which consists of a reported increase in income after the social uprising. This measure may be perceived as more objective, although it reduces our sample to children of waged-workers. Despite this limitation, it allows us to check the consistency of these results with those using a reported positive change in working conditions. Results from the baseline regression are displayed in tables 10 and 11. An increase in the father's income is associated with a decrease in their children's work participation by 6.69%. Here, this effect is slightly higher for boys. Entering into details with the distinction for domestic work confirms our results on girls.

Finally, we consider other proxies of the mother's bargaining power which we introduce directly as interactions with our measure of shocks in our baseline regression.[25] We retained three indicators mentioned in the literature on women's empowerment: the mother's access to household money, her age at first birth and the parents' age difference. Results are displayed in Table 12 and remain unchanged, confirming the important role of women bargaining power in case of shock.

6. Conclusion

In the pursuit of inclusive development, strengthening youth's capabilities by removing external barriers to schooling and lowering the need of an early entry to the labor market is high on the agendas of development programs. To promote investment in children and youth's human capital, understanding how external shocks affect their time allocation is essential. As a result of the interplay of income and substitution effects, their impacts are uncertain, depending, among others, on household characteristics, the characteristics of the shock, the level of urbanization, financial and economic development of the context under study. The mother's bargaining power may affect

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[25]Note that we also check the robustness of our results using a continuous measures of work in tobit regressions. Results, given in Tables A4 and A5 of the Appendix, are qualitatively identical to those of Section 5.

the transmission of these shocks through their influence in household reallocation decisions, and thus constitutes another important determinant of children and youth's time allocation. However, evidence on this channel when the mother may not be directly affected by the shocks appears as missing in the literature. This study aimed to fill this gap, by shedding more light on the impact of a dual economic shock on youth's time allocation and exploring the impact of the mother's bargaining power on the transmission of these shocks.

In this paper, we first explored the average impact of positive and negative shocks on the father's labor market, following the 2011 Egyptian social uprising, on 16-20 year-old youth's decisions to work and to go to school. We estimated the probabilities of these decisions simultaneously in bivariate probit regressions, taking advantage of reported changes in the father's working conditions as the main measure of shocks in the 2012 survey round of the ELMPS. A positive change in the father's working conditions appears to decrease the probability of youth's work. This effect is driven by the impact on daughters' participation in intensive domestic work. This result is robust to a continuous measure of domestic work, another measure of shocks, a propensity score matching analysis and a difference-in-difference approach. Distinguishing by level of household wealth, this impact is stronger for girls belonging to poorer household.

Our main contribution is to investigate the impact of the mother's bargaining power on the transmission of these shocks. We find that the impact of a positive change on daughters' domestic work only holds at higher level of the mother's bargaining power. This result is robust to other indicators of bargaining power. Our results suggest that the mother's influence in household decisions allows her to direct new resources towards investment in youth's human capital, even in the case of a shock on the father's labor market. This constitutes another channel through which women's bargaining power can affect children and youth's human capital outcomes and development. Therefore, this paper provides further support to the promotion of women's empowerment.

We believe that the role of women's empowerment on shock transmission deserves further investigation. Future research should test if such a result holds true in other context and if the couple's share of household decisions is able to mitigate the impacts of negative shocks. A better understanding of the mechanisms at play and their identification would help to guide public policies

in order to break intergenerational transmission of poverty and inequalities.

Table 1: Summary statistics on 16-20 year-old youth, by the father's change in working conditions

| | Change in the father's working conditions | | | |
VARIABLES	No change	Negative change	Positive change	Total
School enrollment (%)	70.59	73.51	80.84	71.88
Work participation (%)	31.94	29.46	14.37	30.13
Father in the public sector (%)	33.30	2.88	7.53	43.71
The father's education (%):				
No education	41.37	41.37	12.57	39.06
Less than inter.	13.98	20.24	8.38	14.54
Inter. and above	30.55	26.19	54.49	31.77
Uni. and above	14.10	12.20	24.55	14.64
The mother's education (%):				
No education	52.62	49.11	32.34	50.43
Less than inter.	12.14	16.37	8.98	12.57
Inter. and above	26.63	27.38	49.70	28.60
Uni. and above	8.60	7.14	8.98	8.40
Wealth index (%):				
Poorest quintile	19.99	17.26	12.57	18.95
Second quintile	22.14	19.64	13.17	21.02
Third quintile	20.24	16.96	28.14	20.35
Fourth quintile	17.46	18.75	22.75	18.09
Richest quintile	20.18	27.38	23.35	21.59
Number of sisters	1.20	1.22	1.35	1.21
Number of brothers	1.52	1.32	1.54	1.49
Number of other members	0.25	0.21	0.20	0.24
Region of residence (%):				
Great Cairo	9.74	14.29	2.40	9.88
Alex., Suez Canal	7.40	12.50	4.79	8.01
Urban Lower	9.80	13.10	7.78	10.17
Rural Lower	25.93	29.17	39.52	27.54
Urban Upper	15.62	9.52	20.96	15.07
Rural Upper	31.50	21.43	24.55	29.32
Observations	1,581	336	167	2,084

Source. Calculations from authors based on the ELMPS-12

Note. Mean weekly hours of work were compiled for any positive amount of work. Intensive domestic work is defined as participation in domestic work more than 10 hours a week. A wealth index was compiled using Principal Components Analysis. Following Filmer and Pritchett (2001), it is based on asset ownership and housing characteristics, and characterizes a household's economic status.

Table 2: Summary statistics on youth's time allocation, by work activities

	Domestic work (%)	Non-domestic work (%)	Both (%)	Schooling and dom. work (%)	Schooling and non-dom. work (%)	Schooling and both kinds (%)
Girls	37.5	4.8	2.9	54.2	0.3	0.3
Boys	1.3	61.1	9.2	6.6	19.0	2.8

Source. Calculations from authors based on the ELMPS-12

Table 3: Bivariate probit regressions of the probabilities of 16-20 years old children's work and school enrollment on changes in the working conditions of the household head (Marginal effects)

			Interactions by gender			
	All		Girls		Boys	
	School enrollment	Work (any kind)	School enr.	Work (any kind)	School enr.	Work (any kind)
	(1)	(1')	(2)	(2')	(2)	(2')
Negative changes	0.00762	-0.0242	0.0241	-0.0123	-0.00359	-0.0325
	(0.0243)	(0.0268)	(0.0363)	(0.0418)	(0.0310)	(0.0323)
Positive changes	0.0121	-0.114***	0.0284	-0.155***	-0.000677	-0.0834*
	(0.0362)	(0.0358)	(0.0530)	(0.0551)	(0.0468)	(0.0447)
ρ [1]	-0.628***	-0.628***	-0.629***	-0.629***	-0.629***	-0.629***
Observations	2,084	2,084	2,084	2,084	2,084	2,084

Source. Calculations from authors based on the ELMPS-12

Work is defined as any positive hours in market work or involvement in domestic work for more than 10 hours a week. Regressions control for gender, age, age square, if the child is the first-born, the number of sisters and of brothers, the number of household members outside the nuclear family, the household wealth status, parents' education, if the household head works in the public sector, the governorate of residence and urban residence.

[1] Correlation between the error terms of the schooling and work participation equations. A significant ρ indicates that the Wald test rejected independence between the two equations.

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Bivariate probit regressions of the probabilities of 16-20 year-old youth's participation in domestic work and school enrollment on changes in the working conditions of the household head (Marginal effects)

| | All | | Girls | | Boys | |
				Interactions by gender		
	School enrollment	Domestic work	School enr.	Dom. work	School enr.	Dom. work
	(1)	(1')	(2)	(2')	(2)	(2')
Negative changes	0.00688	-0.00903	0.0218	0.00495	-0.00280	-0.0168
	(0.0243)	(0.0214)	(0.0366)	(0.0430)	(0.0309)	(0.0153)
Positive changes	0.00737	-0.0804***	0.0207	-0.171***	-0.00337	-0.0154
	(0.0366)	(0.0261)	(0.0536)	(0.0518)	(0.0474)	(0.0236)
ρ [1]	-0.350***	-0.350***	-0.351***	-0.351***	-0.351***	-0.351***
Observations	2,084	2,084	2,084	2,084	2,084	2,084

Source. Calculations from authors based on the ELMPS-12

Domestic work is defined as involvement in households chores for more than 10 hours a week. Regressions control for gender, age, age square, if the youth is the first-born, the number of sisters and of brothers, the number of household members outside the nuclear family, the household wealth status, parents' education, if the household head works in the public sector, the governorate of residence and urban residence.

[1] Correlation between the error terms of the schooling and work participation equations. A significant ρ indicates that the Wald test rejected independence between the two equations.

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Bivariate probit regressions of the probabilities of 16-20 year-old girls' domestic work and school enrollment on changes in the working conditions of the household head, by level of household wealth (Marginal effects)

	School enrollment		Domestic work	
	Other	Poorest quintile	Other	Poorest quintile
	(1)	(1)	(1')	(1')
Negative changes	0.0511	-0.0291	-0.0183	0.0724
	(0.0374)	(0.0834)	(0.0450)	(0.102)
Positive changes	0.00875	-0.138	-0.144**	-0.331***
	(0.0582)	(0.161)	(0.0562)	(0.0411)
ρ [1]	-0.479***	-0.479***	-0.479***	-0.479***
Observations	935	935	935	935

Source. Calculations from authors based on the ELMPS-12

Domestic work is defined as involvement in household chores for more than 10 hours a week. Regressions control for gender, age, age square, if the youth is the first-born, the number of sisters and of brothers, the number of household members outside the nuclear family, if the household belongs to the poorest quintile of wealth and its interaction with the variable of interest, parents' education, if the household head works in the public sector, the governorate of residence and urban residence.

[1] Correlation between the error terms of the schooling and work participation equations. A significant ρ indicates that the Wald test rejected independence between the two equations.

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Bivariate probit regressions of the probabilities of 16-20 year-old girls' domestic work and school enrollment on changes in the working conditions of the household head, by the mother's bargaining power (Marginal effects)

	School enrollment	Domestic Work
	(1)	(1')
Positive change	-0.0240	-0.0777
if Lower Bargaining Power	(0.0709)	(0.0768)
Positive change	0.0946	-0.265***
if Higher Bargaining Power	(0.0860)	(0.0589)
ρ [1]	-0.405***	-0.405***
Observations	675	675

Source. Calculations from authors based on the ELMPS-12

Lower bargaining power is defined as having a mother belonging to the 50% least empowered, as defined by their estimated bargaining power following the method detailed in Section 4.3. Regressions control for reported negative change according to the mother's bargaining power, if the household head works in the public sector, if the youth is first-born, age and its square, the level of education of both parents, region of residence, indicators of the household demographic composition. The results are robust to different weighting scheme between the household decisions, the use of sex ratios without distinguishing by urban residence, sex ratios based on the ELMPS with and without sampling weights.

[1] Correlation between the error terms of the schooling and work participation equations. A significant ρ indicates that the Wald test rejected independence between the two equations.

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Matching quality indicators before and after matching on a positive shock

	Pseudo R^2	LR χ^2(p)	Mean % absolute standard bias	CS restriction	Total % bias reduction
Before matching	0.228	265.13 (0.000)***	15.49		
After nearest neighbor matching	0.020	9.01 (0.0983)	5.81	5	62.47
After kernel matching	0.005	2.11 (1.000)	1.80	3	88.39

Source. Calculations from authors based on the ELMPS-12

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Impact of a positive shock on youth's time allocations (ATT)

	School enrollment	Work (any kind)	Non-domestic work	Domestic work
Unmatched sample	0.808***	-0.144***	-0.084**	-0.079***
	(0.0362)	(0.0368)	(0.0289)	(0.0304)
Nearest neighbour matching (1)	0.802	-0.148**	0.086	-0.074**
	(-0.309)	(0.0440)	(0.0297)	(0.0366)
Kernel matching (1)	0.805	-0.146**	-0.0854	-0.073***
	(0.0359)	(0.0333)	(0.0262)	(0.0255)
Nearest neighbour matching (2)	-0.014	-0.077*	0.025	-0.096**
	(0.046)	(0.048)	(0.032)	(0.041)
Kernel matching (2)	0.019	-0.100***	-0.014	-0.090***
	(0.035)	(0.031)	(0.024)	(0.024)

Source. Calculations from authors based on the ELMPS-12

We impose a common support condition to reduce poor quality matches. For the nearest-neighbor matching, we retain a Caliper equal to 0.02 as the maximum distance between the propensity scores and matching is without replacement. Standard errors for kernel matching are bootstrapped with 500 replications.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 9: Results of OLS regressions of the impact of a positive shock (Coefficients)

	Weekly hours of work (any kind)	Weekly hours of non-dom. work	Weekly hours of domestic work	Daily hours in school
Panel A: All youth				
Year 2012	1.241	-0.139	1.380**	-0.649***
	(1.111)	(0.906)	(0.560)	(0.105)
Positive change	1.777***	1.041**	0.736	-0.0995
	(0.676)	(0.459)	(0.501)	(0.131)
Year 2012 X Pos ch	-6.319***	-3.749***	-2.570***	0.229
	(1.070)	(1.007)	(0.651)	(0.189)
Observations	2,596	2,596	2,596	2,273
Panel B: Girls				
Year 2012	0.867	-0.848	1.715*	-0.629***
	(1.253)	(0.709)	(1.025)	(0.156)
Positive change	2.008**	0.0650	1.943**	0.178
	(1.020)	(0.293)	(0.951)	(0.177)
Year 2012 X Pos ch	-5.038***	-0.00619	-5.032***	0.0706
	(1.668)	(1.110)	(1.216)	(0.240)
Observations	1,243	1,243	1,243	1,091
Panel C: Boys				
Year 2012	1.307	0.960	0.346	-0.654***
	(1.811)	(1.622)	(0.493)	(0.140)
Positive change	2.275**	2.563***	-0.288	-0.286*
	(0.944)	(0.860)	(0.268)	(0.170)
Year 2012 X Pos ch	-7.181***	-6.914***	-0.267	0.344
	(1.614)	(1.591)	(0.473)	(0.270)
Observations	1,353	1,353	1,353	1,182

Source. Calculations from authors based on the ELMPS-06 and ELMPS-12

The sample is made of youth of 16-20 years of age in 2012 who have been interviewed in 2006 and for whose there is no missing information on variables of interest. Regressions make use of the two survey rounds as pooled cross-sections. For our measure of shock, the category of reference is having a father not declaring a positive change in his working conditions. Standard errors are clustered at the household level. Regressions control for household head working in the public sector, the youth being first-born, its gender, age and its square, the level of education of both parents, the household's wealth, the governorate of residence, urban residence, indicators of the household demographic composition.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 10: Bivariate probit regressions of the probabilities of 16-20 year-old youth's work participation and school enrollment on an increase in wages of the household head (Marginal effects)

	All		Girls		Boys	
	School enrollment	Work (any kind)	School enr.	Work (any kind)	School enr.	Work (any kind)
	(1)	(1')	(2)	(2')	(2)	(2')
Increase in income	0.00780	-0.0669**	0.00935	-0.0663*	0.00663	-0.0672**
	(0.0258)	(0.0269)	(0.0341)	(0.0388)	(0.0332)	(0.0315)
ρ [1]	-0.654***	-0.654***	-0.654***	-0.654***	-0.654***	-0.654***
Observations	1,421	1,421	1,421	1,421	1,421	1,421

Source. Calculations from authors based on the ELMPS-12

Work is defined as any positive hours in market work or involvement in domestic work for more than 10 hours a week. Regressions control for gender, age, age square, if the youth is the first-born, the number of sisters and of brothers, the number of household members outside the nuclear family, the household wealth status, parents' education, if the household head works in the public sector, the governorate of residence and urban residence.

[1] Correlation between the error terms of the schooling and work participation equations. A significant ρ indicates that the Wald test rejected independence between the two equations.

*** p<0.01, ** p<0.05, * p<0.1

Table 11: Bivariate probit regressions of the probabilities of 16-20 year-old youth's participation in domestic work and school enrollment on an increase in income of the household head (Marginal effects)

	All		Interactions by gender			
			Girls		Boys	
	School enrollment	Domestic work	School enr.	Dom. work	School enr.	Dom. work
	(1)	(1')	(2)	(2')	(2)	(2')
Increase in income	0.00357	-0.0370*	0.00111	-0.0832**	0.00504	-0.00163
	(0.0260)	(0.0206)	(0.0346)	(0.0401)	(0.0332)	(0.0142)
ρ [1]	-0.340***	-0.340***	-0.339***	-0.339***	-0.339***	-0.339***
Observations	1,421	1,421	1,421	1,421	1,421	1,421

Source. Calculations from authors based on the ELMPS-12

Domestic work is defined as involvement in households chores for more than 10 hours a week. Regressions control for gender, age, age square, if the youth is the first-born, the number of sisters and of brothers, the number of household members outside the nuclear family, the household wealth status, parents' education, if the household head works in the public sector, the governorate of residence and urban residence.

[1] Correlation between the error terms of the schooling and work participation equations. A significant ρ indicates that the Wald test rejected independence between the two equations.

*** p<0.01, ** p<0.05, * p<0.1

Table 12: Bivariate probit regressions of the probabilities of 16-20 year-old girls' participation in domestic work and school enrollment on changes in the working conditions of the household head, by other indicators of the mother's bargaining power (Marginal Effects)

	School enrollment		Domestic work	
	Neg change	Pos change	Neg change	Pos change
	(1)	(1)	(1')	(1')
Access to household money				
No access	-0.0101	-0.127	0.0529	-0.0816
	(0.0664)	(0.104)	(0.0785)	(0.108)
Access	0.0281	0.0510	-0.0400	-0.195***
	(0.0467)	(0.0722)	(0.0578)	(0.0691)
First birth below 18 years old				
First birth below 18 years old	0.111	0.0508	0.0819	-0.139
	(0.0837)	(0.126)	(0.136)	(0.144)
Older first birth	-0.00487	-0.0381	-0.0244	-0.161***
	(0.0428)	(0.0684)	(0.0506)	(0.0623)
Age difference above 10 years				
Age diff. above 10 years	0.00643	-0.0264	-0.117	-0.138
	(0.0749)	(0.119)	(0.0914)	(0.128)
Lower age diff.	0.0112	-0.00748	0.0212	-0.166***
	(0.0441)	(0.0688)	(0.0538)	(0.0632)
Observations	675	675	675	675

Source. Calculations from authors based on the ELMPS-12

Regressions control for if the household head works in the public sector, if the youth is first-born, age and its square, the level of education of both parents, household wealth, governorate and urban residence, indicators of the household demographic composition.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Appendix

Table A1: Decision-making module of ELMPS

Question: Who in your family usually has the final say on the following decisions ?
A) Making large household purchases
B) Making household purchases for daily needs
C) Own visits to family, friends or relatives
D) What food should be cooked for each day
E) Getting medical treatment or advice for yourself
F) Buying clothes for yourself
G) Taking child to the doctor
H) Dealing with children's school and teachers
I) Sending children to school on daily basis
J) Buying clothes and other needs for children
Answer: 1. Respondent alone
         2. Husband
         3. Respondent and husband jointly
         4. In-laws
         5. Respondent, husband and in-laws jointly
         6. Others
         7. Not applicable

Source. ELMPS-2012 Individual Questionnaire

Table A2: Effect of distribution factors on bargaining power using decisions on the personal sphere

	θ coefficients
Sex ratio	50.02***
	(10.76)
Sex ratio squared	-24.57***
	(5.402)
Average contribution to marriage costs	0.158**
	(0.0631)
Average contribution squared	-0.00167***
	(0.000440)
Sex ratio X Average contribution	-0.0648
	(0.0615)
Observations	2,822

Source. Calculations from authors based on the ELMPS-12

Note. The sex ratio is defined as the ratio of men over women by governorate and urban residence and 5 years age range. It is obtained by authors' calculations based on the 2006 Census (CAPMAS). The average contribution to marriage costs is based on the average of women's reported contribution of their family and themselves to the costs of the celebration of their marriage by governorate and cohorts of 5 years age range, with sampling weights.

The regression control for the level of own education, that of the spouse, that of own parents and that of parents-in-law and if the woman is working, as in Reggio (2011). The first step consists of three simultaneous multinomial regressions on women's participation in the decisions to visit their family and friends, their own health and buying their own clothes. The decisions have an equal weight.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A3: Probit regressions of fathers' labor market shocks (Coefficients)

	Positive shock
Father is in public sector	1.328***
	(0.145)
Household wealth (ref. cat.: poorest quintile)	
Second quintile	-0.0740
	(0.172)
Third quintile	0.151
	(0.160)
Fourth quintile	-0.186
	(0.176)
Richest quintile	-0.113
	(0.190)
The mother's education level (ref. cat.: no education)	
Less than inter.	-0.176
	(0.180)
Inter. and above	0.0564
	(0.149)
Uni. and above	-0.0840
	(0.226)
The father's education level (ref. cat.: no education)	
Less than inter.	0.194
	(0.186)
Inter. and above	0.423***
	(0.163)
Uni. and above	0.487**
	(0.202)
Region of residence (ref. cat.: Great Cairo)	
Alexandria	0.304
	(0.291)
Urban Lower	0.433
	(0.276)
Urban Upper	0.699***
	(0.245)
Rural Lower	0.914***
	(0.239)
Rural Upper	0.662***
	(0.245)
Nb of sisters	0.0463
	(0.0389)
Nb of brothers	0.0770*
	(0.0466)
Nb of other members	0.0286
	(0.0689)
Constant	-3.402***
	(0.303)
Pseudo R$^2 a$	0.2279
Observations	2,084

Source. Calculations from authors based on the ELMPS-12
Robust standard errors.
*** p<0.01, ** p<0.05, * p<0.1

Table A4: Tobit regressions of 16-20 year-old youth's weekly hours of work on changes in the working conditions of the household head (Marginal effects)

	Work (any kind) (Hours/week)	Non-domestic work (Hours/week)	Domestic work (Hours/week)
	(1)	(2)	(3)
Panel A: All youth			
Negative changes	-3.779*	-11.01	-1.629*
	(1.949)	(8.854)	(0.969)
Positive changes	-7.916***	-14.89	-3.374**
	(2.826)	(16.07)	(1.382)
Observations	1,960	1,960	2,084
Panel B: Girls			
Negative changes	-2.516	-29.58	-1.216
	(1.642)	(0)	(1.363)
Positive changes	-3.693	24.97	-3.911**
	(2.356)	(0)	(1.962)
Observations	934	934	935
Panel C: Boys			
Negative changes	-6.997	-5.228	-2.064*
	(4.269)	(9.383)	(1.231)
Positive changes	-11.27*	-25.02	-2.588
	(6.326)	(19.27)	(1.703)
Observations	1,026	1,026	1,149

Source. Calculations from authors based on the ELMPS-12

Regressions control for gender, age, age square, if the youth is the first-born, the number of sisters and of brothers, the number of household members outside the nuclear family, the household wealth status, parents' education, if the household head works in the public sector, the governorate of residence and urban residence.

*** p<0.01, ** p<0.05, * p<0.1

Table A5: Tobit regressions of 16-20 year-old girls' weekly hours in domestic work on changes in the working conditions of the household head, by level of the mother's bargaining power (Marginal effects)

| | Domestic Work |
| | (Hours/week) |
	(1)
Positive change	-1.631
if Lower bargaining power	(2.533)
Positive change	-8.621**
if Higher bargaining power	(3.390)
Observations	675

Source. Calculations from authors based on the ELMPS-12

Lower bargaining power is defined as having a mother belonging to the 50% least empowered, as defined by their estimated bargaining power following the method detailed in Section 4.3. Regressions control for reported negative change according to the mother's bargaining power, if the household head works in the public sector, if the youth is first-born, age and its square, the level of education of both parents, region of residence, indicators of the household demographic composition. The results are robust to different weighting scheme between the household decisions, the use of sex ratios without distinguising by urban residence, sex ratios based on the ELMPS with and without sampling weights.

*** p<0.01, ** p<0.05, * p<0.1

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