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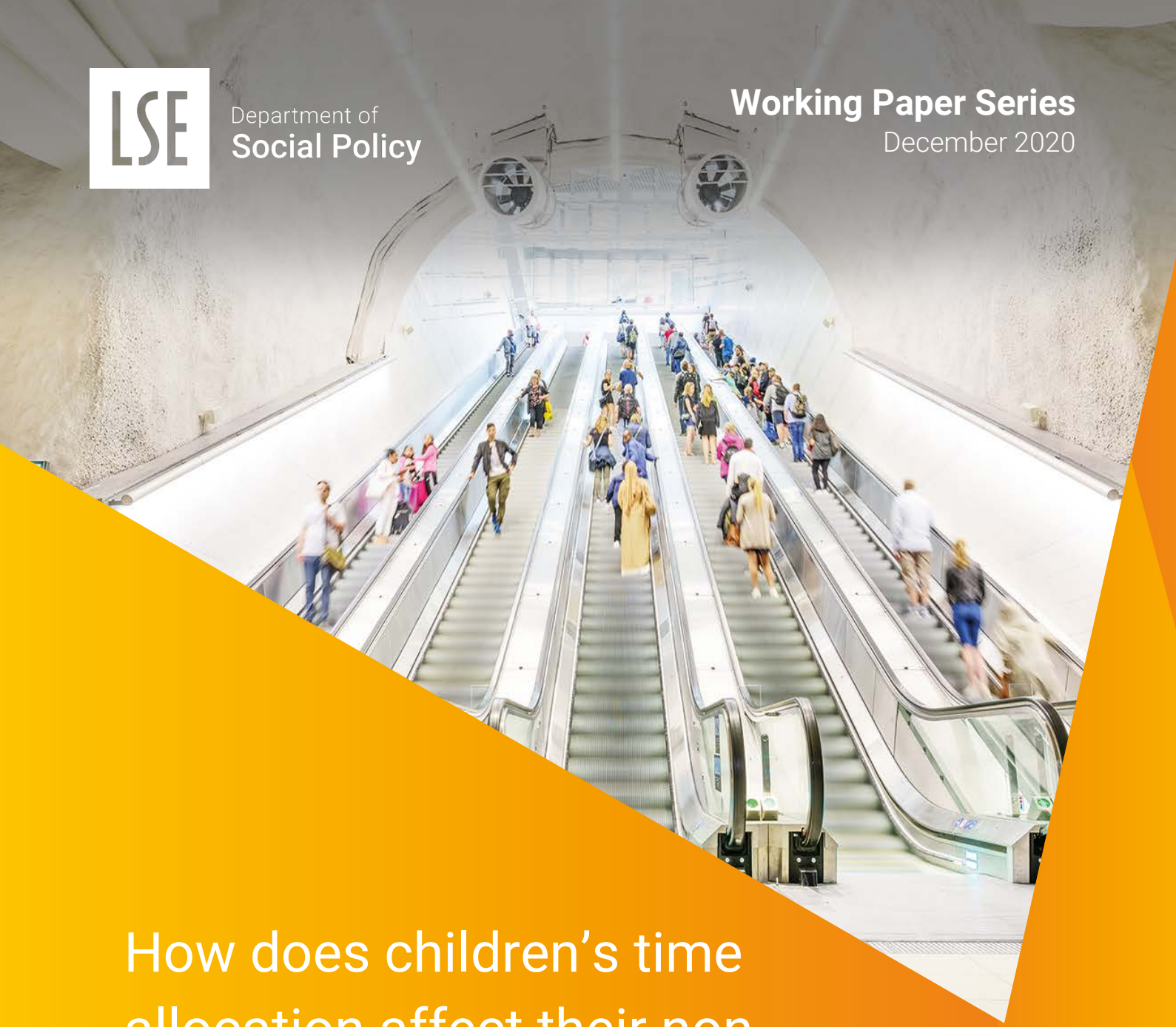

How does children's time allocation affect their non-cognitive skills? Evidence from four developing countries

Working Paper 11-20

Grace Chang

Social Policy Working Paper 11-20

LSE Department of Social Policy

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Abstract

Children's time allocation are important determinants of their skills formation, but evidence for developing countries are few. I use longitudinal data in four developing countries to estimate how children's time allocation determine their non-cognitive production at age 15, characterising substitution between different activities. In Ethiopia, India, and Vietnam, attending school and studying outside school build children's non-cognitive skills whereas leisure, economic work and domestic work do not. More time in economic or domestic work that reduces study time are most harmful for children's skills, especially for girls. However, work that reduces leisure instead is least harmful. In Peru, children engage in work and study without compromising their non-cognitive skills. The harmful effects of children's work are contextual, depending on the activity substituted, as well as the country studied.

Keywords: Child labour, non-cognitive skills, time use.

Author

Grace Chang is a PhD candidate in Demography/Population Studies at the Department of Social Policy, LSE and is funded by the LSE PhD Studentship. She previously worked as a research analyst for about three years in Young Lives, a longitudinal research project that focuses on child poverty, affiliated to the University of Oxford. Grace's research interests are in skills, inequality, and labour market outcomes. Her PhD thesis intends to question the value and definition of skills, what is perceived to be required by the market, and to understand how skills are developed throughout the life course, particularly when analysing it through differences in socio-economic statuses.

1 Introduction

Non-cognitive skills, often termed as personality traits, are found to be important predictors of future education, labour market and social outcomes in Europe and the USA (Heckman et al., 2006; Almlund et al., 2011; Heckman and Kautz, 2013). Given the importance of non-cognitive skills, there is growing research interest in examining the determinants of non-cognitive skill formation at childhood. Studies in Australia, Europe and the USA find that children's skills formation are determined by how parents spend time with their children, as well as allocate children's time (Hsin and Felfe, 2014; Fiorini and Keane, 2014; Bono et al., 2016; Caetano et al., 2019). For developing countries, evidence of this relationship is scant. Challenges stem from the lack of data on children's non-cognitive skills, and that children's everyday activities in developing countries involve domestic and market work. In developing countries where children may face barriers to access and to quality schooling, children may learn important life skills from various activities, including work and play. This paper studies the relationship between the activities in which children typically perform and the formation of their non-cognitive skills in four developing countries.

My study examines whether children's everyday activities help develop or diminish children's non-cognitive skills in developing countries. In my study, I analyse six types of activities which are (i) domestic work i.e. household chores and caring for household members, (ii) economic work i.e. working on the family farm or business (usually unpaid) or paid work outside the house- hold, (iii) leisure, (iv) attending school, (v) studying outside school and (vi) sleep. Previous studies in developing countries have focused on the effect of children's market work and school attendance on their cognitive skills, usually measured by mathematics and verbal test scores (Heady, 2003; Dumas, 2012; Gunnarsson et al., 2006; Sim et al., 2017; Emerson et al., 2017). Few studies have considered other activities such as play or domestic work as potential activities to build skills. In doing so, many previous studies inherently treat school attendance as the only alternative to work. Only recently have Keane et al. (2018) demonstrated the importance of using all activities children perform on a typical day on children's cognitive skills development. Keane et al. (2018) find that children's work reduces their cognitive skills only if it crowds out time in school or study but not if it crowds out leisure. The authors argue that treating school as the only counterfactual activity to work overestimates the detrimental effects of children's work.

My study contributes to the literature by providing new empirical evidence on how different activities children perform shape their non-cognitive skills in developing countries, where studies are few. In addition, I provide evidence on how this relationship differs by gender, important because children tend to be allocated to work according to gender and gender norms (Edmonds, 2007). Using methodology by Keane et al (2018), I also provide evidence in using the children's full set of activities, rarely used in previous work on child labour. Lastly, I study these relationships across four developing countries, allowing me to analyse like-trends across the countries. Given the high profile discussions surrounding child labour in policy and the media, my paper provides evidence on the extent cultural and local factors matter in these relationships across four different countries.

I am interested in two measures of non-cognitive skills; generalised self-esteem and self-efficacy. Generalised self-esteem measures the extent the child views his/herself favourably, and generalised self-efficacy measures the child's belief in his/her own ability to overcome challenges. Both these skills are important for the well-being of disadvantaged children in developing countries. Self-esteem or pride is important to allow a child to feel a sense of belonging to the family, achieve status in the community and to 'be somebody' (Aufseeser et al., 2018). Self-efficacy on the other hand measures the child's resilience to challenges which in the face of poverty, is important in building appropriate 'life skills' to improve their socio-economic status (Boyden and Mann, 2005). As advocated by Heckman and Kautz (2013), analysing the formation of non-cognitive skills complements studies on cognitive skills formation, which together more accurately represent 'life skills' needed to succeed in many life domains such as the labour market.

To estimate the relationship between children's time allocation and their non-cognitive skills, I employ extended value-added (VA) models, using longitudinal data from Young Lives (YL) on the younger cohort of children up to age 15. Extended VA models are widely used in the literature on children's human capital accumulation because they reflect how children's current skills are determined by historical parental inputs, which affect children's time allocation throughout the life cycle, as well as their previous skills and ability (Todd and Wolpin, 2007; Cunha and Heckman, 2008). Longitudinal YL data allows me to apply the extended VA models because of repeated measures of children's non-cognitive skills, time allocation, and extensive background controls (e.g. household wealth and composition, parental education) between the ages of 1 and 15.

My study finds that in Ethiopia, India and Vietnam, educational activities such as attending school and studying outside school are productive for children's non-cognitive skills while leisure, domestic work, and economic work are not. I also find that in these three countries, domestic and economic work lowers girls' non-cognitive skills more than boys. However, the extent to which domestic and economic work is detrimental depends on the counterfactual activity. Domestic or economic work that reduces time in study or school reduce children's non-cognitive skills, but to a lesser extent if it reduces time in leisure. Shifting children's time away from work into leisure may not be more or less detrimental to children's non-cognitive skills. This finding also questions the measurement of leisure, whether it captures idle or structured forms of play. Finally, I find that children in Peru are the exception, who may be able to balance both forms of work and educational activities without compromising their non-cognitive skills. Policies that shift children's time away from work should consider whether the extra time is then shifted towards education or 'leisure'. The extent interventions can account for 'correct' shifts need to analyse the role of local social norms and institutions e.g. whether families will send children to school, or if the schools are an accessible distance, if children are discouraged from working on the family farm.

The remainder of this paper is organised as follows. Section 2 summarises findings in the literature on children's time allocation and their skills development. Section 3 describes how children's time use and non-cognitive skills are measured in the YL data, as well as the YL country characteristics. I then provide an illustration of the interaction between children's activities in Section 4. I explain my empirical strategy using extended VA models in Section 5. Section 6

demonstrates my estimates from the model and Section 7 ends with a summary and discussion of the findings.

2 Background

Children's work is prevalent in developing countries. In 2016, the International Labour Organization (ILO) finds that 13.8% of children aged 5 to 17 years old worldwide are in economic employment, and this percentage would be higher if domestic work was included (ILO, 2017). However, there is limited evidence on how different children's activities relate to their non-cognitive skills in developing countries, since much evidence focus on how children's work and school affect their cognitive skills (see a review by Edmonds (2007)). The only study to date is by Borga (2018) who finds that undertaking paid work and unpaid family work instead of attending school is detrimental to children's non-cognitive skills. Using YL data up to 2009 (Round 3), the author studies the relationship between children's own time allocation and their cognitive and non-cognitive skills in Ethiopia, India and Vietnam. He finds that older cohort children at age 15 who spend an additional hour in paid work outside the household, care work or work for the household instead of attending school have lower self-esteem and self-efficacy scores, especially for children in Vietnam.

While Borga's research shows some evidence that work which reduces time attending school could be detrimental to children's non-cognitive skills development, the reasons are unclear. On the one hand, activities such as attending school may be a good socialisation (e.g. good role models) and educational environment to develop children's non-cognitive skills. More time in work that reduces time in school may mean less time to gain from these beneficial activities. Some studies in developed countries support the conclusion that educational and socialisation activities are important in improving children's skills. Bono et al. (2016) for the UK and Hsin and Felfe (2014) for the USA find that mother's time spent with the child (up to age 7 and 12 respectively) such as reading to the child and playing music or singing with the child, improves both children's cognitive and non-cognitive outcomes. However, studies such as by Fiorini and Keane (2014) find that different activities may matter for different skills. Fiorini and Keane (2014) find that for Australian children aged 1–9, educational activities such as being read to and playing educational games improve children's cognitive skills, but non-cognitive scores are insensitive to children's time allocation.

On the other hand, children's work in developing countries could be difficult and stressful, and more time spent in work could hinder children's non-cognitive skills development. The evidence on the harmful effects of children's work is mixed, with limited evidence on the effects of work on non-cognitive skills. Research on children's work has mainly focused on children's cognitive skills as the main outcome of interest and finds conflicting evidence, depending on the country studied and empirical strategy. Studies that use fixed-effects (within-household) estimates find that child labour reduces children's cognitive skills, measured by mathematics and language test scores (Heady, 2003; Gunnarsson et al., 2006; Sim et al., 2017; Emerson et al., 2017). Dumas (2012), using an instrumental variables (IV) strategy finds no evidence of a negative relationship between past years of work for children in Senegal and their cognitive achievement measured by French and

mathematics scores 8 years later. She even finds a positive impact of children's work on oral mathematics scores.

However, work may also provide important socialisation opportunities for children with their parents, adults and peers. This opportunity may be especially important for poor families where socialisation with family members take place during household chores or work for the family such as tending to the family farm or family business. Qualitative studies such as by Morrow and Boyden (2018) based on YL countries argue that children and parents see economic work as a way to gain knowledge and learn new practical and social skills such as establishing a foothold in the labour market, and learning responsibility as 'part of their adulthood'.

Leisure is also rarely explored as a determinant of children's skills development in developing countries. In developed countries, studies in Pediatrics argue that constructive play enhances brain function and promotes socioemotional and self-regulation skills (Ginsburg, 2007; Yogman et al., 2018). Hsin and Felfe (2014) suggest that 'structured' leisure activities (such as playing sports with the child) in the USA are important activities in improving children's non-cognitive skills while 'unstructured' leisure (e.g. watching television) are not. Certain kinds of play may help children's skills development, but this relationship has rarely been explored in developing countries.

Additionally, the shift in hours spent from one activity to another may also be important for children's skills development. For example, suppose a child's time is divided solely between structured play, studying and performing domestic chores. Structured play might be useful in building the child's non-cognitive skills, but more time spent playing that reduces time for studying may be more counterproductive than if it reduces time for domestic chores. A fundamental issue in the child work literature is that children's work and school participation are often treated as strict substitutes, rather than taking account of the full range of activities. Edmonds (2007) argue that using indicators of work and school assumes that work is the only activity children engage in besides school. Using UNICEF's Multiple Indicator Cluster Surveys data, Edmonds (2007) shows that children's work hours can increase up to a certain level with little effect on school attendance, suggesting a complementary relationship up to a certain point. de Hoop et al. (2019) provide evidence that children's participation in school and paid work can be complementary in the presence of a partial education subsidy. The authors find that incentives to increase school participation through a conditional cash transfer program in the Philippines increased both children's time in school as well as paid work to sustain finances into school. In sum, children's increased time spent in a particular activity such as work does not automatically reduce time in school, but rather, could reduce time in several activities such as leisure, school and/or study.

Keane et al. (2018) demonstrates this issue using children's full time budget from the YL data. They find that domestic and economic work are not detrimental to children's cognitive development if work only substitutes leisure time, but are detrimental if work substitutes for school time. Child work that substitutes study time outside school reduces children's cognitive scores more than if it substitutes school time. Keane et al. (2018) further show that treating work and school as two 'bundles' of activities overestimate the detrimental effects of child labour, highlighting the importance of having different counterfactual activities (e.g. leisure) against work.

Borga's focus on school as the only alternative activity to work limits his analysis because it is possible for children to improve their non-cognitive skills from economic work as well as attending school but with fewer hours in leisure instead.

Finally, the studies cited above are analysed in different countries with different findings. In Senegal, children may acquire cognitive skills through learning-by-doing from activities such as trade or services (Dumas, 2012). For Brazil, Emerson et al. (2017) finds negative and lasting consequences to children performing market work outside the home whilst in school. In developed countries, findings by Fiorini and Keane (2014) for children in Australia find that children's non-cognitive scores are insensitive to their time allocation, contrasting to evidence by Bono et al. (2016) and Hsin and Felfe (2014) in the UK and the USA. The differences in these findings show that there may be country factors such as local institutions and social norms and behaviours which may affect how children's activities relate to their non-cognitive skills, rarely explored in developing countries.

I address the gap in the literature by using non-cognitive skills as my outcome of interest, where previous research has mainly focused on cognitive skills. My non-cognitive skills of interest are generalised self-esteem and self-efficacy scores, which are improved versions of self-efficacy scores in the previous rounds which were later found to be misinterpreted by the children in earlier waves of the data (Yorke and Portela, 2018).[1] My paper extends Borga's study using data up to 2016 (Round 5), and differs from it by following the methodology of Keane et al. (2018) that compares the associations of each activity against different counterfactual activities on children's non-cognitive skills. Specifically, I study the associations between different children's activities – attending school, studying outside school, leisure, economic and domestic work – on their non-cognitive skills, using three counterfactual activities; attending school, studying outside school and leisure. Using YL data allows me to explore the consistency of my findings in four example samples from four different continents. This provides suggestive evidence on the extent country differences such as economic work activities typically performed, access to school and local norms play a role in explaining the relationship between children's time allocation and non-cognitive skills development.

3 The Young Lives Data

My study is based on the YL survey, a longitudinal survey that tracks two cohorts of children in four low and middle-income countries; Ethiopia, India (states of Telangana and Andhra Pradesh), Peru and Vietnam. The YL survey tracks the children across 15 years with five rounds of data, and a 3-4 year gap between each survey round. I use data for the younger cohort (YC) who were born in 2001/2 and aged approximately 1 in Round 1, and 5, 8, 12 and 15 years old in each consecutive round. The older cohort children were not included because the relevant non-cognitive scores were

[1] The statements 'Other people in my family make all the decisions about how I spend my time' and 'I have no choice about the work I do - I must do this sort of work' is negatively correlated with other items of the scale. (Yorke and Portela, 2018) suggest that children may view these statements positively, where obedience may be an attractive attribute. This means that these statements were interpreted differently and the scale is not parsimonious.

only administered in age 19 and 22, and analysing this cohort's decision process of time allocation may be made complicated by their transition into adulthood and potentially forming their own independent families.

There is a total initial sample of about 8,000 YC children. Approximately 2,000 YC children were randomly sampled by selecting 100 YC children and households from each country's 20 sentinel sites (or clusters). A sentinel site is a form of purposive sampling where the site or cluster is seen to represent a certain type of population, and is expected to show typical trends affecting the people of these areas.

The sentinel sites were selected to represent each region, district or province in each YL country. In Ethiopia, the regions are Amhara, Oromia, Southern Nations, Nationalities and Peoples (SNNP), Tigray, and Addis Ababa. In Vietnam, the five provinces are Phu Yen, Ben Tre, Lao Cai, Hung Yen and Da Nang. In India, the sentinel sites were sampled from four districts in Andhra Pradesh, five districts in Telangana and one site from the urban slums of Hyderabad. The sentinel sites in Ethiopia, India and Vietnam were semi-purposively sampled to represent each country's socio-economic and geographic diversity, with a pro-poor bias. Peru instead adopted a random sampling of sentinel sites. The districts were ranked according to factors such as infant mortality, housing, schooling, and infrastructure. Excluding the top 5%, the districts were divided into equal population groups, ordered by a poverty index, and each district had a probability of being selected proportional to its population size. The resulting sentinel sites cover rural, urban, peri-urban, coastal, mountain and Amazon areas.

The YL data are not nationally representative, but studies by Escobal and Flores (2008), Outes-Leon and Sanchez (2008), Nguyen (2008) and Kumra (2009) show that in comparison to larger representative samples such as the Demographic Health Surveys, the YL samples cover a broad range of characteristics and attributes of the population. The strength of the YL data lies in its rich longitudinal data which contain information about the child, his/her household, and community. The study allows representative analysis of differences between groups (e.g. by age, language, ethnicity and wealth levels) as well as across the child's life, important to my analysis.

Crucially, YL data administer the same time use and non-cognitive modules in all four YL countries. I use this information to analyse whether children allocate their time differently in each country due to local institutional settings and social norms. For instance, Ethiopian children typically enrol late into primary school because families expect children to work from young (Tafere and Pankhurst, 2015), younger than in the other three countries. Cross-country comparisons also allows me to analyse whether evidence of the underlying relationship between time allocation and non-cognitive skills are applicable across different settings. For example, more time spent in work in Ethiopia may be more helpful for children's self-esteem because of positive attitudes towards work, but may be the opposite in India.

3.1 YL countries background

To illustrate the country backgrounds, consider some national figures for each of the study countries as reported in Figure 1 below. Data from World Bank (2018) categorise Ethiopia as a low-income country, Vietnam and India as lower middle-income countries, and Peru as an upper middle-income country. While all four economies experienced high economic growth, poverty and income inequalities are still present. Nearly a quarter of the population in Ethiopia are below the poverty line, a fifth in India and Peru and a tenth in Vietnam. Agriculture is an important sector for Ethiopia, India and Vietnam but not the case for Peru, which instead has Mining and Manufacturing as its largest economic sector. The importance of agriculture is reflected in the YL data where most of the children sampled live in rural areas in Ethiopia, India and Vietnam and primarily work on the family farm, while children in Peru are mostly urban.

Table 1: Illustrative national statistics in YL countries

Country	Agriculture as % of GDP	% of population below national poverty line	Primary NER (%)	Secondary NER (%)
Ethiopia	31	24	85	31
India	15	21	92	62
Peru	7	21	96	84
Vietnam	15	10	98	89

NER stands for net enrollment rate. Source for all statistics is World Bank (2018), except secondary NER in Vietnam. Secondary NER for Vietnam refers to *lower* secondary education (grades 6 to 9) in 2014, and upper secondary NER in Vietnam (grades 10 to 12) is 63.1% in 2014 (OECD, 2017).

The official age for starting primary schooling is 7 years old in Ethiopia and 6 in the other three countries. Compulsory education from primary school to the end of secondary school lasts for 8 years in Ethiopia and India, and 10 years in Peru and Vietnam. Primary net enrollment rates (NER) – the percentage of students in the appropriate age group enrolled in primary education of the total population of children of that age group – are highest in Peru and Vietnam and lowest in Ethiopia. These percentages corroborate with YL research which show that primary enrollment rates are high in India, Peru and Vietnam but most Ethiopian children enrol in primary school late, at age 12 despite the entry age at 7, reflecting poor access and attendance at primary schools. While all secondary NER is lower, the rank is still the same; lowest in Ethiopia, followed by India, Vietnam and Peru.

All YL countries have ratified international policy conventions such as the Minimum Age Convention, 1973 (No. 138) and Worst Forms of Child Labour Convention, 1999 (No. 182).[2] However, child labour is still a high-profile issue in each of these countries, and estimates from ILO

[2] India did not ratify the convention on the worst forms of child labour until 18 June 2018, but the states of Telangana and Andhra Pradesh in particular have had a very striking campaign against child labour.

(2018) report that the highest estimates of child labour incidences are in these four continents; Africa, the Americas, Asia, and the Pacific.

Table 2 describes the children's background in each YL country. There is an even balance of girls and boys across all countries with similar ages. India, Peru and Vietnam have a "majority" ethnicity, i.e. Backward Caste in India, Mestizo in Peru and Kinh in Vietnam which consist of at least half of the sample in each respective country. In Ethiopia, there is an even proportion of children in three majority ethnic groups, Amhara (28%), Omoro (21%), and Tigrian (23%). Of those surveyed, each country has a majority religion with at least 70%.

Caregiver and household characteristics differ across countries. On average, mothers were 27 years old when the YL child was 1 year old, except in India where the average is younger by four years. Family formation may be earlier for Indian women, which may have gendered consequences on how children's time are allocated. Caregiver's education is much lower in Ethiopia and India than in Peru and Vietnam. In Ethiopia and India, about 80% of caregivers did not complete primary education. In Vietnam, the majority of caregivers have completed education up to lower secondary (56%), whilst in Peru about 26% of caregivers completed up to lower secondary and 24% completed up to upper secondary. In Peru and Vietnam, 14% and 10% of caregivers have achieved higher education respectively, double the proportion of that in Ethiopia and India.[3]

Ethiopian children have the most number of siblings on average (4 siblings), followed by Peruvian children (2–3 siblings), and Indian and Vietnamese children (1–2 siblings). Ethiopian households are also the largest with an average of 5–6 people, whereas the other three countries have an average of 4–5 people. While the majority of children in all countries have both parents in the household, this proportion is lower in Ethiopia and Peru (80% and 86% respectively). Most YL households live in rural areas except for Peruvian households which are primarily urban. Location can be an important determinant of the types of work children perform, and access (e.g. distance) to schooling. For instance, YL children in Ethiopia, India and Vietnam typically engage in agricultural work such as farming and herding cattle whereas children in Peru undertake family-led economic activities such as being a cleaning assistant, a nanny, and selling goods (Morrow and Boyden, 2018).

[3] In the full sample, at least 87% of caregivers are the YL children's mother, and at least 90% of caregivers are the child's biological parent.

Table 2: Average background characteristics of 15-year-old children in YL countries

	Ethiopia	India	Peru	Vietnam
Child characteristics				
Female	0.47	0.46	0.49	0.48
Age in months	180.98	179.97	179.22	182.46
Height for age at age 5 (z-score)	-1.46	-1.64	-1.52	-1.35
Majority ethnicity	0.28	0.46	0.92	0.86
Ethnicity 2	0.21	0.18	0.06	0.00
Ethnicity 3	0.23	0.15	0.00	0.00
Other ethnicity	0.29	0.20	0.03	0.14
Majority religion	0.70	0.88	0.81	0.86
Religion 2	0.12	0.07	0.13	0.00
Religion 3	0.17	0.05	0.00	0.00
Other religion	0.01	0.01	0.06	0.14
Caregiver/parental characteristics				
Caregiver's education				
≤ Incomplete primary education	0.80	0.79	0.36	0.32
Up to lower secondary	0.15	0.16	0.26	0.56
Up to upper secondary	0.00	0.00	0.24	0.02
Higher education	0.05	0.04	0.14	0.10
Mother's age when child was age 1	27.46	23.63	26.79	27.13
Household characteristics				
Child is oldest in household	0.23	0.41	0.39	0.46
Number of siblings	4.01	1.62	2.63	1.50
Both parents in household	0.80	0.91	0.86	0.93
Household size	5.80	4.81	5.26	4.35
Household in urban location	0.36	0.29	0.75	0.21
Wealth index	0.42	0.63	0.63	0.71
Observations	1730	1807	1724	1864

Ethnicity and religion groups were labelled generally to concise the table. Ethnicity categories: In Ethiopia, Majority ethnicity=Amhara, ethnicity 2=Oromo, ethnicity 3=Tigrian and ethnicity 4=Other. In India, Majority ethnicity=Backward Caste, ethnicity 2=Scheduled Caste, ethnicity 3 =Scheduled Tribe and ethnicity 4 = Other. In Peru, Majority ethnicity=Mestizo, ethnicity 2=White and ethnicity 4 = other. In Vietnam, Majority ethnicity=Majority Kinh and ethnicity 4 = other. For all religion categories, Religion 4 is "Other" according to the respective country. In Ethiopia, majority religion is Orthodox. Religion 2 = Other Christian Religion 3 = Muslim. In India, majority religion is Hindu. Religion 2 = Muslim. In Peru, majority religion is Catholic. Religion 2 = Evangelist. In Vietnam, majority religion is None. The wealth index is a measure constructed and publicly archived by YL which is a simple average of housing quality, consumer durables, and access to services (more information in Appendix).

3.2 Non-cognitive measures

The two main non-cognitive skills of interest measured in the YL data are the generalised self-esteem and self-efficacy scores. The scores for each non-cognitive skill are made up of several Likert-type questions, ten questions for self-efficacy scores and eight questions for self-esteem scores, as detailed in Table A1 in the Appendix. The child responds to one of the five responses in each question, ranging from "strongly agree", "agree", "more or less", "disagree" and "strongly disagree". These same questions were administered in Rounds 4 and 5, as well as across countries. A higher score thus implies greater generalised self-esteem or self-efficacy.

Self-esteem refers to an individual's judgement of their own self-value and it is measured using the Rosenberg self-esteem scale, measuring positive feelings of oneself (Rosenberg, 1965). Self-efficacy is the measure of one's belief in his/her capabilities to produce given attainments and to cope with adversity. The generalised self-efficacy scale was developed by Schwarzer and Jerusalem (1995) to measure a general sense of perceived self-efficacy on coping with daily adversities and adaptation after experiencing stressful life events. The generalised self-efficacy scale is only administered in Rounds 4 and 5 because it was designed for children above the age of 12.

Both these scores are consistently used in psychology and economic studies in developed countries and are found to be positively associated with future labour, educational and behavioural outcomes in high-income countries (Heckman et al., 2006; Almlund et al., 2011; Brunello and Schlotter, 2011; Heckman and Kautz, 2013). While evidence about the returns to children's non-cognitive skills in developing countries is limited, understanding the formation of these skills are important, especially for children from disadvantaged backgrounds.

Yorke and Portela (2018) demonstrate that both these generalised scales are consistently measured in Round 4 in the four YL countries. Studies by Luszczynska and Gutiérrez-Doña (2005) and Scholz et al. (2002) test the hypothesis whether generalised self-efficacy is a universal construct across 25 and 5 countries respectively. They find that while country-differences exist (higher or lower scores), generalised self-efficacy is a consistent and universal construct, with meaningful associations with other personality constructs such as self-esteem.

In my analysis, I standardise the generalised self-esteem and self-efficacy scores separately by country to measure the changes in scores more intuitively. Standardisation produces a common scale called z-scores for each non-cognitive measure, with an average of zero and standard deviation of one. The z-scores represent the changes in the score in standard deviations above or below the average within each country. While the non-cognitive questions were administered in the same way across all YL countries, I cannot account for different local norms or interpretations to the questions. Therefore, I am interested in comparing like trends across the countries, and not in ranking their scores against each other. For example, if I find that attending school raises children's self-esteem by 0.1 standard deviations in Ethiopia and 0.5 standard deviations in India, I can say that attending school helps raise children's self-esteem in both countries. However, I cannot say that it raises children's self-esteem by five times more in India than in Ethiopia.

3.3 Children's time allocation on a typical day

To elicit information about how children allocated their time on a typical day, the children were first asked to think of the most recent typical week (i.e. excluding festivities), and then to think of a typical day. A typical day is defined as a weekday or a normal school day that excludes days of rests, such as holidays, festivals and the weekend. The children are then provided 24 pebbles/beans which represent 24 hours in a day, and asked to allocate them into eight cups/circles that illustrate eight different activities on a typical day in the past week. The children are first required to allocate hours into sleep, and then asked to distribute the pebbles/beans among the remaining seven activities; leisure, time spent in school, time spent studying outside school, domestic chores, care work, work for the household, and paid work outside the household. My analysis uses time use information when the child was age 12 and 15.

While there are distinctions between the different types of work, less than 10% of YL children actually perform paid work outside the household. Disaggregating these forms of work provide similar estimates in my analysis but with a lower power in each activity. Therefore, I group household tasks and paid work outside the household broadly as 'economic work' and care work and household chores as 'domestic work'. Although household tasks done for the family is not remunerated, these tasks are more similar to paid work outside the household compared to domestic chores or care work. In my analysis, I use five activity categories as described in Table 3 below.

Table 3: Time use description in the Young Lives data

Activity	Description
Economic work	*Household tasks:* Work inside the household which generates income; this includes farming, cattle herding, shepherding, piecework or handicrafts done at home and other family businesses *Paid work outside household:* Paid (remunerated) work or activities outside of the household or for someone not in the household including (if applicable) travel time to and from work
Domestic work	*Care work:* Taking care of other household members, such as younger siblings, elderly, or members with disabilities within the household *Household chores:* Work or task done to help at home e.g. fetching water, firewood, cleaning, cooking, washing, shopping and so on; excludes caring for others
At school	Time spent at school including time used to get from home to school and from school to home
Studying outside school	Time child spends studying at home and doing homework or attending classes or tutorials outside school class hours
Playing/leisure time	Time child spends playing or having fun, having meals, bathing and so on
Sleeping	Includes when child takes a nap

Note: Definitions are taken from YL Briones (2018), complemented with further information on each activity from the YL fieldworker manuals.

4 How YL children spend time on a typical day

Table 4 reports the percentage of children at age 15 engaged in each of the different daily activities, and the average hours spent in each activity, if performed. Nearly all children in the four countries are engaged in some form of educational activity and domestic work. Clearly, children typically combine some form of work, school or studying outside school.

Table 4: Prevalence of children engaged in activity and hours spent on a typical day, age 15

	Ethiopia	India	Peru	Vietnam
Percentage of children in activity (%)				
In school	91.5	88.7	95.6	80.3
Studying outside school	87.9	86.2	95.5	77.6
Any form of work	97.6	78.2	89.1	90.5
Domestic work	91.0	76.6	87.3	86.3
Economic work	49.8	14.1	18.3	37.5
Play/leisure	98.5	99.6	99.8	100.0
Average hours spent on a typical day, if performing activity				
In school	5.8	8.9	7.2	6.3
Studying outside school	2.1	2.4	2.2	3.3
Any form of work	4.7	2.8	2.8	3.5
Domestic work	3.0	1.8	2.3	2.0
Economic work	3.8	5.8	2.9	3.9
Play/leisure	3.4	3.6	3.5	4.7
Total observations	1699	1792	1719	1858

Participation in any form of work refers to children's involvement for at least one hour in either household chores, care work, household tasks or paid work outside the household. Domestic work includes household chores and care work. Economic work includes work for pay outside the household and household tasks. Sleep is excluded.

School attendance is high in all countries, but lowest in Vietnam. Lower school enrollment rates in Vietnam may be due to boys leaving school at 15 to dedicate time to work or from failing to pass qualifying exams (Dang and Glewwe, 2017; Espinoza-Revollo and Porter, 2018). Although many children attend school in Ethiopia (91.5%), this may reflect children starting school late and repeating grades. According to Woldehanna and Araya (2016), 54.3% of YL Ethiopian children at age 12 were behind their expected grade. Children in Ethiopia also spend the lowest hours in school on average, suggesting inconsistent attendance. Children in India on the other hand spend the most hours in school, nearly double that of children in Ethiopia.

The majority of children also study outside school, with the highest prevalence in Peru (96%), but Vietnamese children spend an hour more on average in studying outside school compared to the other countries. This is in line with prior research that Vietnamese children typically attend extra classes outside school (Duc and Baulch, 2005). Almost all children engage in play/leisure, spending an average of 3–4 hours, but with Vietnamese children spending the most hours in play/leisure at nearly 5 hours.

The percentage of children in domestic work is nearly double that of children in economic work in all four countries. However, children involved in economic work spend more hours in it compared to domestic work, primarily from helping in their family household tasks. According to Morrow and Boyden (2018), most of children's economic work in rural areas is related to agriculture such as herding livestock, harvesting, and stone crushing. Recall however, that the majority of YL children live in rural areas except Peru. According to qualitative YL work in Peru, A. and Rojas (2014) describe urban children's work as mirroring their parents' economic activity, usually in informal trade such as selling flowers or food on the street or as a vendor.

Ethiopia has the highest percentage of children involved in any form of work i.e. at least an hour in any of the work activities. The percentage of children in economic work in Ethiopia and Vietnam is nearly double that to the percentage of children in India and Peru. Children in Ethiopia also spend the most hours in any form of work (4.7 hours on average) and in domestic work (3 hours on average) but not in economic work. Since Ethiopian children's time are more evenly spread between each activity, they may be combining attending school, studying outside school and performing both types of work. In the other three countries, fewer children are involved in economic work, meaning that children are most likely performing domestic work while attending school and study, on a typical day.

Despite children in India having the lowest engagement in economic work, they spend an average of 5.8 hours in economic work if they are involved in it, the highest of all four YL countries. These high hours suggest a large trade-off between economic work and school in India, and that the few children who work outside the household in India may be from very poor backgrounds. Morrow and Boyden (2018) describe how in times of difficulty, boys in India were expected to work on the family farm or work for pay to contribute to family finances.

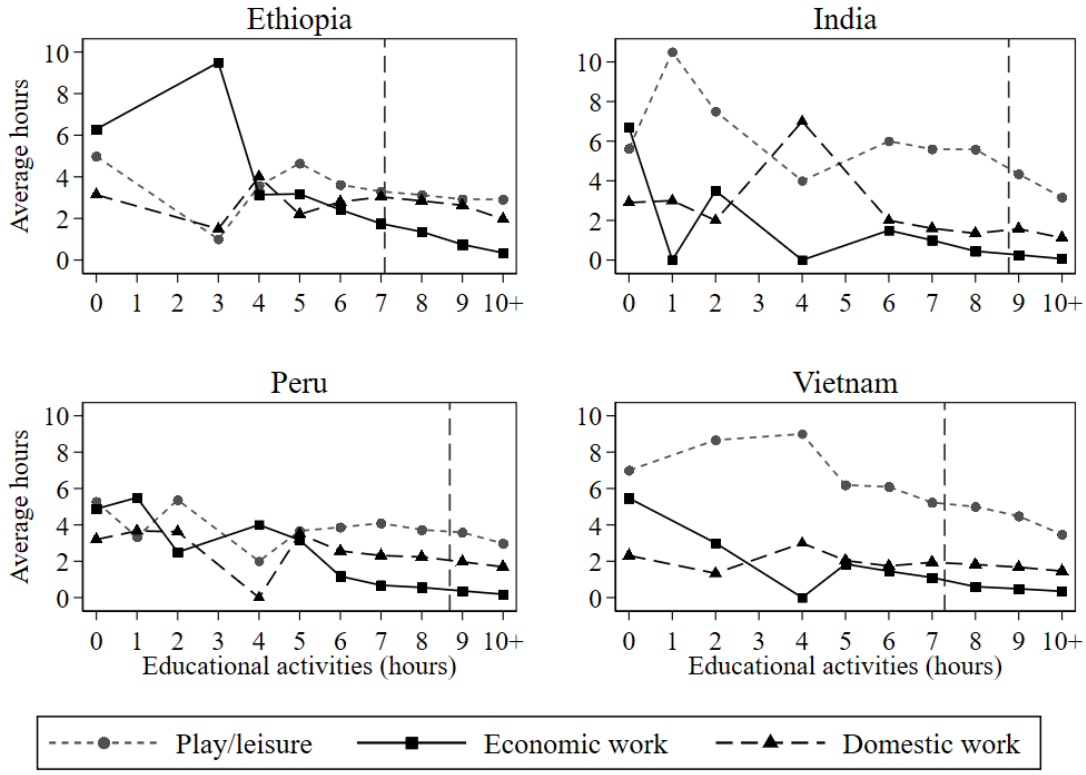
4.1 Interactions between activities on a typical day

Since there are only 24 hours in a day, investing more hours in one activity means less for another. To illustrate how these activities may interact with each other, Figures 1 to 3 plot the average hours spent in an activity on the y-axis against hourly increases of a base activity across the x-axis. For example, Figure 1 uses educational activities (grouping time spent in school and studying outside school) as the base category. The average time in the base category is reflected by the vertical dotted line. The top left chart shows that children in Ethiopia who spend 7 hours in educational activities (base category) spend on average 3 hours in domestic work and leisure and 2 hours in economic work. These figures show suggestive interactions between domestic work, economic work, leisure and educational activities across the four YL countries. Note however in some

instances, the number of children are few. For example, there are only two children in Ethiopia that spend 3 hours in educational activities.

Changing the base category in these figures show us different snapshots of how children's time are divided on a typical day. Figure 1 shows that in all countries, children substitute away from economic work and leisure for increasing hours in educational activities. At zero hours of educational activities, children in all four countries spend on average between 5 and 7 hours in economic work and leisure respectively, and about half that in domestic work. As time spent in educational activities increase, less time is spent in economic work and leisure but time devoted to domestic chores remains similar at 2–3 hours. At 5 hours or more of educational activities, children instead spend more time in domestic work than economic work on average. At 10 or more hours of educational activities, children do not participate in economic work, but still spend an average of 1–2 hours in domestic work, indicating that domestic work is a persistent work activity even at high hours of educational activities.

Figure 1: Average hours in leisure and work against average hours in educational activities

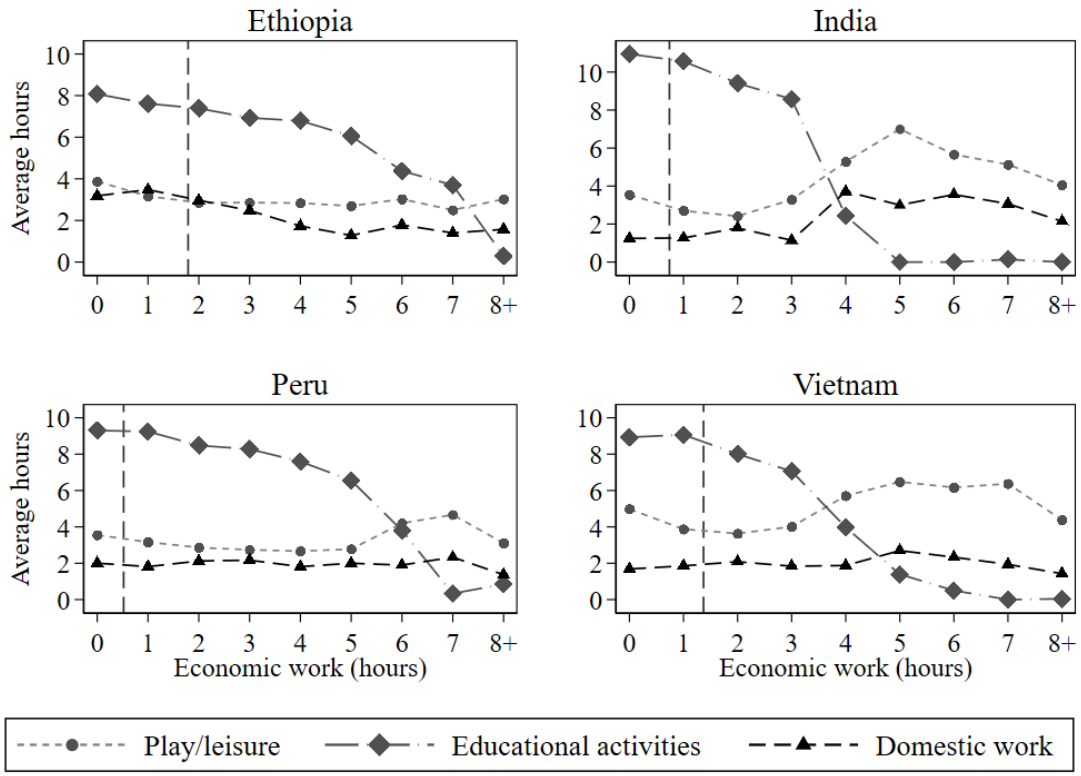


Note: Vertical dashed line indicates average hour spent in school/studying outside school within the country sample. Educational activities group attending school and studying outside school. Domestic work groups together household chores and care work. Economic work groups together household tasks and paid work outside the household. Sleep is excluded.

Figures 2 and 3 instead show us average hours spent in educational activities and leisure conditional on time spent in economic or domestic work. The figures demonstrate that economic or domestic work are substitutes to educational activities in India and Vietnam, but more complementary in Ethiopia and Peru. In Figure 2, Indian children who spend 4 hours in economic work only engage in educational activities at a quarter of the time compared to children who spend 3 hours in economic work. Before 4 hours of economic work, children in India spend more time in educational activities than leisure. From 4 hours or more of economic work, there seems to be a "turning point" where leisure and educational activities diverge. After this point, children seem to prioritise leisure with increasing hours of economic work at the cost of educational activities. This turning point is also at 4 hours of domestic work in India, seen in Figure 3. For children in Vietnam, this divergence can also be observed at 4 hours of economic work and 5 hours of domestic work, but the size of the divergence is less pronounced than in India.

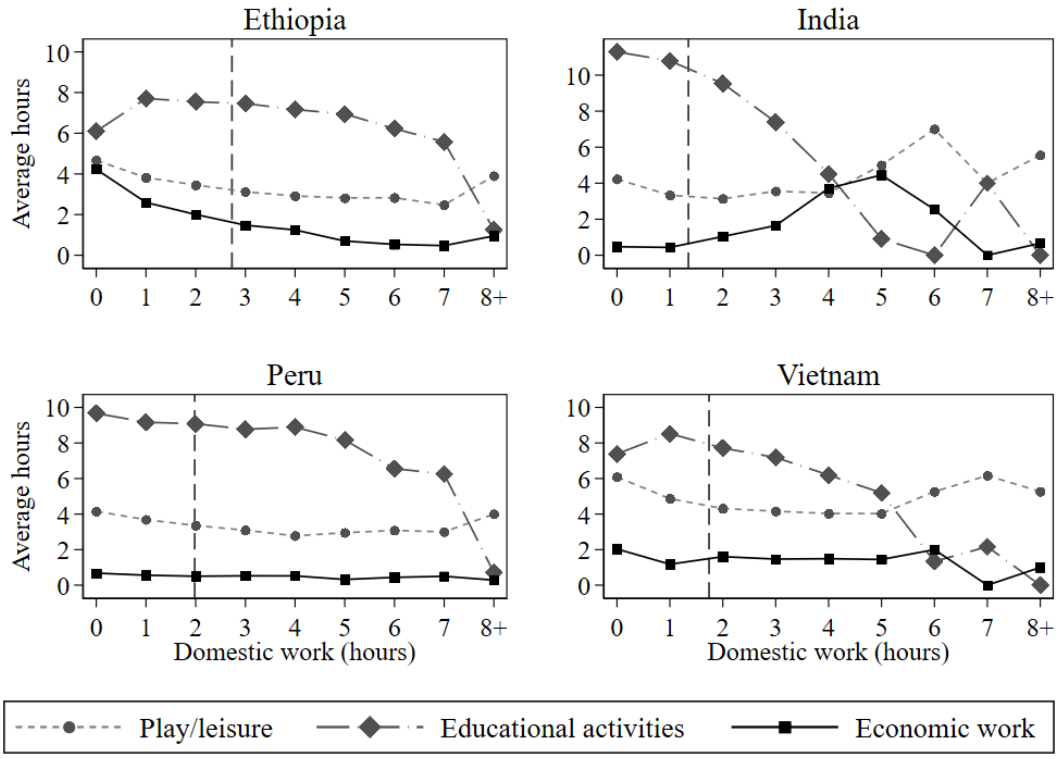
In Ethiopia and Peru, the decline in educational activities against increasing hours of economic work is much flatter than in India and Vietnam. For instance in Figure 2, children in Ethiopia and Peru who spend 4 hours in economic work spend on average 1 hour less in educational activities than children who spend 3 hours in economic work. The divergence between educational activities and leisure is also observed at much higher hours of economic or domestic work (e.g. 8 hours of economic work in Ethiopia and 6 hours in Peru). Up until these turning points, children in Ethiopia and Peru may be more able to balance both forms of work and educational activities, at the expense of leisure.

Figure 2: Average hours in leisure, domestic work and educational activities against hours in economic work



Note: Vertical dashed line indicates average hour spent in economic work within the country sample. Educational activities group attending school and studying outside school. Domestic work groups together household chores and care work. Economic work groups together household tasks and paid work outside the household. Sleep is excluded.

Figure 3: Average hours in leisure, economic work and educational activities against hours in domestic work



Note: Vertical dashed line indicates average hour spent in domestic work within the country sample. Educational activities group attending school and studying outside school. Domestic work groups together household chores and care work. Economic work groups together household tasks and paid work outside the household. Sleep is excluded.

Analysing educational activities and economic work as mutually exclusive categories would miss these substitution and complementary relationships between educational activities, leisure and domestic and economic work. On the one hand, children engaging in economic work may prioritise leisure and substitute away from education, as seen in India and Vietnam. On the other hand, leisure may be sacrificed, as seen in Ethiopia and Peru, in order to maintain similar levels of educational activities and economic and domestic work. These figures highlight two main points. First, how children divide their activities are important and differ according to the activity substituted. Therefore, using different baseline activities matter when estimating the relationship between time allocation and skills development. Secondly, these relationships differ by country, suggesting children may adapt their time allocation differently according to local contexts.

5 Modelling non-cognitive achievement production function

To evaluate how children's time spent in an additional hour of an activity (e.g. economic work) instead of a counterfactual activity (e.g. leisure) can affect their non-cognitive skills, I first frame the child's non-cognitive production function widely used in the literature of skills formation, but using the full set of children's activities as the main determinant of interest (see for example Todd and Wolpin (2007); Cunha and Heckman (2008); Fiorini and Keane (2014)). The model reflects the

child's non-cognitive skill acquisition at age 15 as a cumulative process of current and past time allocation investments made by the child's caregiver up to age 15, combined with the child's socioeconomic environment and endowed ability determined at birth.

The production function for each child in each household in each country is:

$$S_{15} = f(T_{15}, T_{12}, X_{15}, \mu) \quad (1)$$

where S_{15} is the child's measured non-cognitive skill score at age 15 which are the child's generalised self-esteem and self-efficacy scores. T_{15} and T_{12} are the vectors of hours spent in the five different activities described in Table 3 at ages 15 and 12 respectively, relative to a counterfactual activity. X_{15} are measures of observed child, caregiver and socioeconomic contemporaneous background characteristics. The socioeconomic characteristics consist of the household size, whether the child is the oldest sibling, number of siblings, whether both parents live in the same household, the urban/rural location of the household, and whether the household is in the bottom wealth tercile. Child characteristics include the child's age, sex, ethnicity, religion and height-for-age z-score at age 5 that proxies for health. Mother's age and caregiver's education level proxies for socioeconomic status, and the caregiver's pride and agency scores when the child was 8 years old proxies for caregiver's influence on the child's non-cognitive skills through caregiving. μ is the child's unobserved ability. Assuming the production function is linear and

additive, model (1) can be written for each child in each household in each country as:

$$S_{15} = \alpha + \beta T_{15} + \pi T_{12} + \sigma X_{15} + \mu + \epsilon_{15} \quad (2)$$

where ϵ_{15} is the error term. The main challenge in obtaining unbiased estimates from model (2) is that there may be unobservable variables that affect both the child's non-cognitive skill formation and parental investments. For example, the child's true endowed ability (e.g. mental resilience), μ, is unobservable and may be positively correlated with the caregiver's perceived returns to economic work as well as the child's non-cognitive skills. If caregivers of children with high mental ability perceive that it is better to have the child work in the family business than attend school, then ordinary least squares (OLS) estimation of model (2) would overestimate the actual impact of an additional hour in economic work. Conversely, caregivers with high mental ability children may also perceive that it is better have their children attend more hours of school than in economic work, underestimating the effect.

Depending on the correlation between the unobservable characteristics and child's time allocation and non-cognitive scores, OLS estimates of model (2) parameters could be biased upwards or downwards. Not controlling for these unobservable characteristics results in endogeneity from an omitted variable bias problem. A second source of endogeneity is through a reverse causal relationship, that is, the caregiver may observe the child's non-cognitive scores, S_{15} and consequently adjust the child's time spent in work, school or leisure, T_{15}, again leading to inconsistent estimates using OLS. Many empirical studies account for endogeneity by using

instruments that shifts the child's time allocation into economic work but is independent of the child's non-cognitive skills. However, because I am interested in all six activities from the child's full time budget, I would require instruments that affect each activity without affecting the child's non-cognitive skills or unobservable characteristics.[4] Furthermore, even with a valid instrument, IV estimates produce local average treatment effects which may reflect biased, non-representative estimates of the average treatment effect in an already non-nationally representative sample (Card, 2001).

To address the omitted variable bias problem, I include the child's lagged non-cognitive score, S_{12}, along with the extensive set of controls for non-time inputs and family resources, X_{15}, into model (2). S_{12} is a proxy for the child's innate ability and his/her past unobservable historical inputs. This approach estimates what is called the Value-Added (VA) model, and is used widely in the literature to model non-cognitive skill development for children and adolescents (see Todd and Wolpin (2007); Cunha and Heckman (2008); Fiorini and Keane (2014); Bono et al. (2016)). VA models are based on the identifying assumption that S_{12} captures the contribution of all previous observed inputs, unobservable inputs and the child's ability, reflecting decisions made in the child's life by the caregiver up to age 12. S_{12} is a sufficient proxy if the *effects* of all past time-varying inputs (observed, unobserved and innate ability) on children's non-cognitive skills decline at a constant rate across time, from the time the input was applied. For instance, working on the family farm at age 8 has a larger effect on children's non-cognitive scores at age 8 than at age 15. The rate of decline of the effect of each input on non-cognitive scores must also be the same. Since model (2) already controls for the child's time allocation at age 12, T_{12}, the assumption of a decline in the effect of *observed* inputs has been relaxed as I can estimate the coefficient on T_{12}.

Including S_{12} as a proxy for unobservable inputs and ability in model (2) results in the following model for each child in each household in each country, and is the one I fit:

$$S_{15} = \alpha + \beta T_{15} + \pi T_{12} + \gamma S_{12} + \sigma X_{15} + \epsilon \quad (3)$$

Model (3) is the extended VA model, advocated by Todd and Wolpin (2007), Fiorini and Keane (2014) and Keane et al. (2018) as their preferred specification. My coefficient of interest is β that measures the effect of an additional hour spent in an activity of interest compared to a counterfactual activity on the child's generalised self-efficacy or self-esteem score at age 15. Since YL data adopts semi-random sampling of sentinel sites (or clusters), it is likely that children within clusters have similar access to local labour markets, education and health infrastructure. To account for this, I cluster all standard errors at the country-specific sentinel site level at age 15. The model relies on strong assumptions for causal interpretation of the estimates. The lagged

[4] For example, suppose we take unpredictably low rainfall as an exogenous shock that results in lower crop yield. Rainfall which is uncorrelated with the child's ability could increase the child's time spent into economic work, but also decreases both play and school time. However, less crops means less food, which may mean the child feels hungrier than usual (assuming hunger is unobserved), reducing the child's sense of pride. In this example, rainfall would affect both time allocation into and out of more than one activity, as well as the child's self-esteem.

non-cognitive score in my model reduces the bias from unobserved individual-specific differences (such as ability, μ), but may not account fully for omitted variable bias and reverse causality. While not necessarily causal, the aim of my analysis is to understand the direction of the relationships between children's activities and their non-cognitive skills development, rarely studied before.

6 Estimates

6.1 Main specification

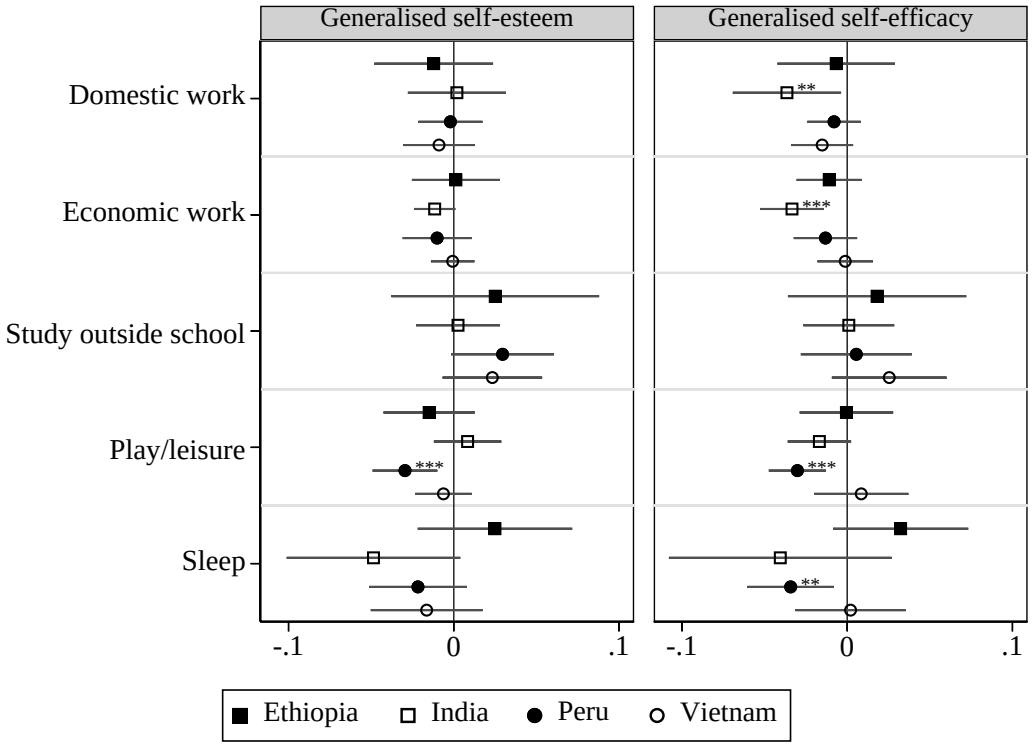
Figures 4 to 6 show how children's time spent relative to a baseline activity is associated to their non-cognitive skills. In each figure, there are a total of six activities, and one is used as a baseline activity. Each figure has a different baseline activity; attending school in Figure 4, studying outside school in Figure 5 and leisure in Figure 6. Omitting different baseline activities shows how each of the five activities are associated to children's non-cognitive skills relative to the omitted activity. For example in Figure 4, an additional hour of domestic work instead of *attending school* reduces Ethiopian children's self-esteem by 0.01 standard deviations. In Figure 5, an additional hour of domestic work instead of *studying outside school* quadruples (is further to the left). The larger estimate implies that domestic work is more detrimental to children's self-esteem if it reduces time for studying outside school compared to if it reduces time attending school.

There are two plots in each figure, one for each non-cognitive measure. The coefficient estimates are interpreted as the association from an additional hour spent in the specified activity on the vertical axis, relative to the baseline activity (e.g. attending school in Figure 4). The horizontal axis is the scale of the coefficient estimate in standard deviations away from zero, and zero is indicated by the vertical line in each plot. Within each of the five activities, each country's estimates are indicated by a marker symbol in this order from top to bottom: Ethiopia in black squares, India in white squares, Peru in black circles and Vietnam in white circles. If the coefficient estimate is on the vertical line, the estimate is zero and the corresponding activity is not an important predictor of YL children's non-cognitive score. Estimates to the left of this vertical line shows that the activity reduces the child's non-cognitive score relative to the baseline activity, and to the right of it indicates an increase. The asterisks show the p-values on whether the estimate is statistically significantly different from zero. The corresponding estimates of the figures are reported in Tables A2 and A3 in the Appendix, where panels (A to C) in the figure titles refer to the baseline category omitted in the tables.

Figure 4 shows that an additional hour of domestic or economic work instead of attending school generally reduces children's non-cognitive skills, holding all else constant (coefficient estimates to the left of the vertical line). The reduction in self-efficacy for Indian children is most pronounced, with a coefficient estimate of -0.04 and -0.03 standard deviations for economic and domestic work respectively. The average change of Indian children's generalised self-efficacy between ages 12 and 15 is 0.45 standard deviations, so a coefficient estimate of -0.04 standard deviations is equivalent to 8.2% of a decrease of Indian children's self-esteem between ages 12 and 15. These estimates confirm the observation in my descriptive analysis that educational activities and economic work are largely substitutes in India. Children in India who are involved in work may be

doing so out of necessity, working in jobs that are counterproductive for their skills. Although statistically insignificant, Figure 4 also demonstrates that studying outside school is more productive than attending school in Ethiopia, Peru and Vietnam. Conversely, an additional hour in play or leisure that crowds out time to attend school reduces children's non-cognitive skills, statistically significant for children in Peru.

Figure 4: Coefficient estimates of time use on non-cognitive skills age 15, *attending school* omitted (panel A)

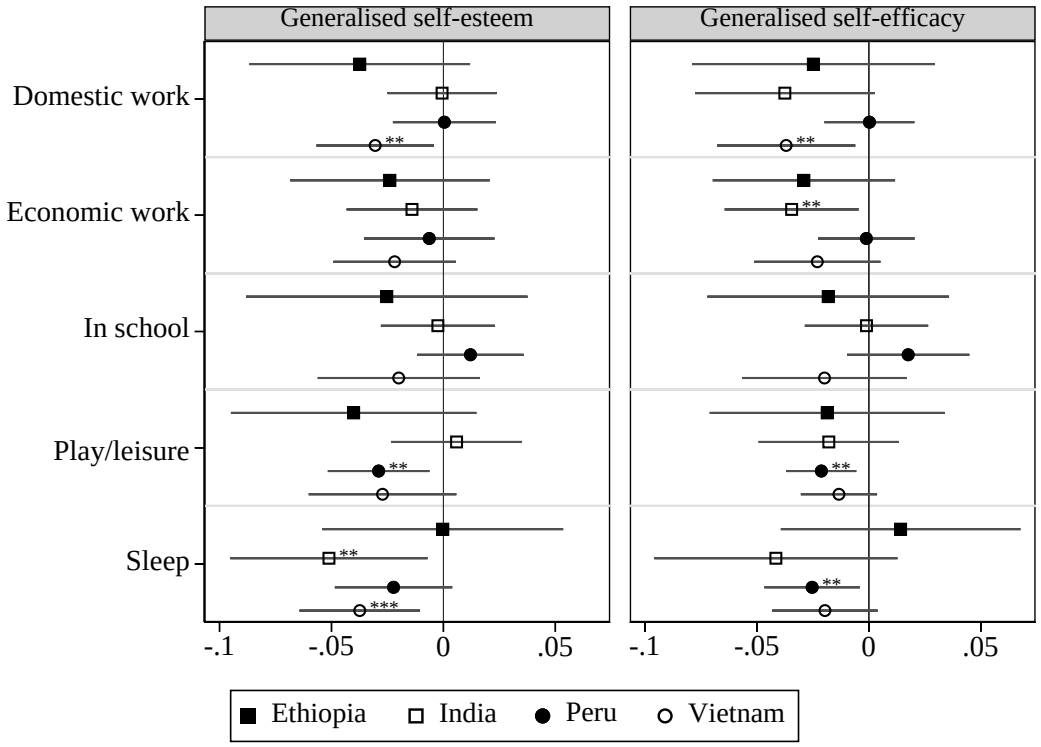


Note: The coefficient plots show the coefficient estimates for generalised self-esteem in the left chart and for generalised self-efficacy in the right. Estimates for each YL country are plotted from model (3), controlling for child, household and parental controls, generalised self-esteem or self-efficacy scores at age 12, and time use activities at age 12. The vertical line in each chart indicates an estimate of zero. The estimates are interpreted as an additional hour in each of the activity categories; domestic work, economic work, studying outside school, leisure and sleep; instead of attending school. To the left of the vertical line, an additional hour in the activity of interest instead of attending school reduces the respective non-cognitive skill, while to the right indicates an increase in the respective non-cognitive skill. Standard errors are clustered at the cluster-level. P-values are indicated by ** p<0.05, *** p<0.01.

When studying outside school is omitted instead – as seen in Figure 5 below – the coefficient estimates from an additional hour of domestic or economic work reduces children's non-cognitive skills in Vietnam and Ethiopia by a larger magnitude (further to the left). Domestic work reduces children's non-cognitive skills in Ethiopia and Vietnam by nearly three times more than the estimate when attending school was omitted. Larger confidence intervals indicate greater variability in the measure of studying outside school, especially for children in Ethiopia. Studying outside school

may be more productive for children's non-cognitive skills development than attending school. Recall that children in Ethiopia tend to enroll late into primary school, suggesting that school quality may be low. Studying outside school may be a better way for children to socialise and learn with peers outside the formal schooling system. On the other hand, study groups in countries like Vietnam may be of particular high quality. Duc and Baulch (2005) show that extra classes in Vietnam are common, often used as a private supplement to public schooling and high in demand because of competition in enrolling into lower and upper secondary school.

Figure 5: Coefficient estimates of time use on non-cognitive skills age 15, *studying outside school* omitted (panel B)



Note: See Figure 4, but estimates are interpreted as an additional hour in each activity instead of studying outside school.

The fall in non-cognitive skills from domestic work is also consistently larger than from economic work for Vietnamese children, regardless of the omitted activity. In Vietnam, domestic work may be worse for children's non-cognitive skills because of fewer interactions with others, hindering the scope to learn skills or feel proud of this sort of work.

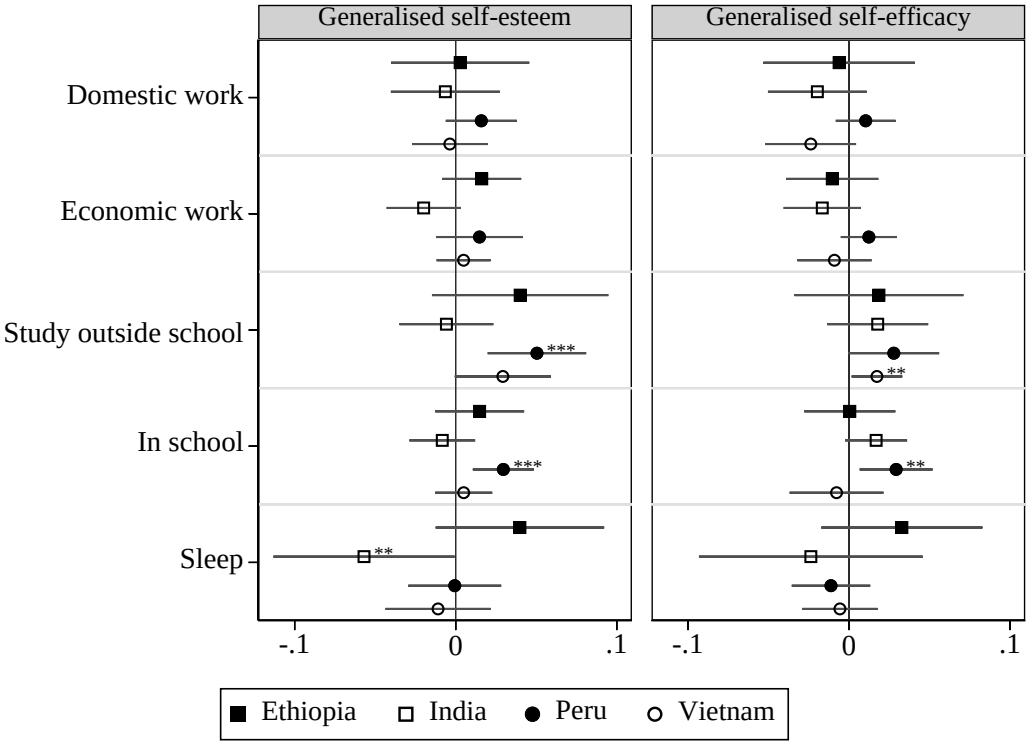
Figure 6 which uses leisure as the omitted category shows that leisure is the least productive activity (most coefficient estimates are to the right). Corroborating with the previous two figures, time spent attending school or studying outside school that crowds out time in leisure provides gains to children's non-cognitive skills in all four YL countries. However, an additional hour in either domestic or economic work that reduces time in leisure is less harmful to children's non- cognitive

skills compared to if it reduces time in school or study. In Ethiopia and Peru, domestic and economic work that reduces time in leisure may even be slightly productive, or have near zero associations with children's non-cognitive skills.

Comparing the coefficient estimates from all three figures show that in Ethiopia, India and Vietnam, domestic and economic work are most harmful to children's non-cognitive skills if it reduces time studying outside school, but to a much lesser extent if it reduces time in leisure. In contrast to Borga (2018), I find that not just economic work, but both economic and domestic work are detrimental to children's non-cognitive skills, especially if they reduce time in educational activities. Using different omitted baseline activities matter in interpreting the extent an activity helps or hinders children's non-cognitive skills. This provides more evidence to work by Keane et al. (2018) and Edmonds (2007) who argue the importance in using children's full time budget.

In addition, I find that children in Peru may be able to balance work, school and study without compromising their non-cognitive skills. An additional hour in either types of work that reduces time from school or study produces zero or close to zero estimates. Estimates omitting leisure in Figure 6 even suggest small gains in non-cognitive skills from both forms of work in Peru. An additional hour of domestic or economic work instead of leisure in Peru raises children's generalised self-efficacy and self-esteem by 0.01 and 0.02 standard deviations respectively. Qualitative YL evidence by A. and Rojas (2014) showed that young Peruvians viewed unpaid family work in both urban and rural environments as a valuable source of learning, with none of the respondents reporting that their support of family activities competed with their school. Furthermore, the authors also report that the vast majority of young people in their study, both from rural and urban areas, said that they put the money they earned towards school expenses such as supplies, uniforms, shoes, or photocopying. In Peru, the most beneficial activity for their non-cognitive skills development are studying outside school while the least beneficial activity is leisure.

Figure 6: Coefficient estimates of time use on non-cognitive skills, age 15, *leisure* omitted (panel C)



Note: See Figure 4, but estimates are interpreted as an additional hour in each activity instead of leisure.

Finally, it is possible that leisure measured in the YL data captures 'unstructured' leisure time or 'idle' time. The YL data technically considers a variety of activities under leisure, including playing, personal hygiene and eating. Relying on children's self-reports, coupled with a broad definition could mean that leisure activities may be measured differently in the four YL countries. Dedicated, structured play time could instead be captured by time spent in other activities such as domestic work and/or studying outside school. If leisure in the YL data captures unstructured leisure time, then these estimates support evidence by Hsin and Felfe (2014) that unstructured leisure time are unproductive for children's skills development in these YL countries.

6.2 Linearity in the relationship

It is possible for the detrimental associations of work and leisure to children's non-cognitive skills to increase or decrease with increasing hours of work or leisure (i.e. in a non-linear way). For example, an increase from 5 to 6 hours of domestic work may be more detrimental to children's non-cognitive skills than an increase from 2 to 3 hours. High hours of work may altogether reduce time for school or study, or result in fatigue if children continue to work and study at the expense of leisure. Similarly, high hours of leisure may result in too much unstructured 'idle' time that takes time away from productive activities.

I run regressions of my baseline model with the squared terms of hours spent in domestic work, economic work and leisure separately. I do not find any statistically significant increases in detrimental associations between children's non-cognitive skills and increasing hours of leisure, suggesting a linear relationship between the two. I also do not find any statistically significant non-linear associations between work hours and non-cognitive skills in the YL countries except for in Vietnam.

To illustrate the relationship for Vietnam, Table A4 reports the estimates for children's generalised self-efficacy with study as the omitted activity, including squared terms for domestic and economic work.[5] From zero hours of domestic work, an additional hour of domestic work instead of study reduces Vietnamese children's generalised self-efficacy by 0.06 standard deviations, holding all else constant. Each additional hour of domestic work increases the slope of this association by 0.003 standard deviations up to a turning point (about 9 hours for domestic work and 7 hours for economic work), as seen in Figures A1 and A2. The figures plot the predicted margins for self-efficacy with increasing hours of domestic and economic work respectively. A2 shows that the marginal effect of 2 hours of economic work is -0.01 standard deviations, but is nearly six times the size at 3 hours of economic work (-0.07 standard deviations). However, the non-linear association is small and only present in one of the four YL countries.

6.3 Estimates by sex

Children's time may be allocated differently according to their sex. Girls might be expected to do more domestic work such as cooking and cleaning while boys may be expected to do physically demanding work such as ploughing the fields. If boys are expected to be future 'breadwinners' of the family, caregivers may allocate more of their time into economic work and less time in school. To test this difference, I re-run my baseline estimates using a sample of boys and girls separately, as reported in Tables A5 and A6. To concise my findings, I present estimates only omitting study and leisure.

In Ethiopia, Peru and Vietnam, both economic and domestic work are more harmful for girls' non-cognitive skills than boys, regardless of the omitted category. There is also some suggestive evidence that work can improve boys' self-esteem in Ethiopia and Peru if it reduces time in leisure. Perhaps certain kinds of job for boys in Peru and Ethiopia are considered respectable or a path to adulthood in the community. In Peru, an additional hour of domestic work instead of leisure raises boys' self-esteem and self-efficacy by 0.02 standard deviations respectively. In Ethiopia, an additional hour in economic work that reduces time in leisure increases boys' generalised self-esteem by 0.02 standard deviations, statistically significant at the 5%, but not if it crowds out time in educational activities.

Children in India show evidence of division of labour. An additional hour of domestic work that reduces time studying reduces girls' self-esteem by more than double that of boys in India, while

[5] Estimates for self-esteem are not reported in the paper, and the squared terms are also only statistically significant estimates for Vietnam.

economic work reduces boys' non-cognitive skills by more than double that of girls. Gender norms in India may drive how caregivers' allocate children's work. Morrow and Boyden (2018) show through qualitative work that girls are confined to domestic tasks mainly because of safety concerns and reputation, and preparation for gendered adult roles.

Girls in Peru have higher non-cognitive skills from attending school or studying outside school compared to boys. The size of the association is higher for self-esteem than self-efficacy. An additional hour attending school or studying outside school that reduces time in leisure increases girls' self-esteem by 0.04 and 0.07 standard deviations respectively, significant at the 1% level, and about double the magnitude to boys. Gendered perceptions may exist in Peru where it is more socially acceptable for boys to engage in both work and school, so girls that spend more time in education may feel more proud of themselves.

7 Summary and Discussion

This paper set out to answer whether different activities typically performed by children in developing countries help develop or reduce their non-cognitive skills. Using extended value-added models, I find that in three of the four countries, educational activities i.e. attending school and studying outside school help improve children's generalised self-esteem and self-efficacy. On the other hand, economic work, domestic work and leisure reduce children's non-cognitive skills in all countries except Peru. I also find that in these three countries, both forms of work reduce girls' non-cognitive skills more than for boys. The counterfactual activity also matters in determining the extent work is harmful to children's non-cognitive skills. Both forms of work reduce children's non-cognitive skills the most if it reduces time in studying outside school, but to a much lesser extent if it reduces time in leisure.

My study combined with findings by Keane et al. (2018) provides evidence that there are gains to both children's non-cognitive and cognitive skills from attending school and studying outside school in the YL countries. Economic and domestic work that reduce time in educational activities are also counterproductive to both cognitive and non-cognitive skills development, but not necessarily if they reduce time in leisure. In addition, I find that leisure is no more or less productive than both forms of work. Leisure in this data may be capturing idle time, which may mean that beneficial play time children engage in could be part of study, attending school or work. Children in Peru is the exception to the three countries, who are able to balance domestic work, economic work and educational activities without compromising their non-cognitive skills development. One possibility is that more 'urban' work activities may have better socialisation opportunities. Another possibility is that since the positive estimates are driven by boys, balancing work and education may be seen as a 'socially accepted' learning opportunity for boys, but not for girls. My findings are limited, however, by the small sample sizes. My estimates may not have similar interpretations if applied to the national population. YL data also does not collect enough information about passive and active leisure to fully understand why leisure is not productive for children's non-cognitive skills.

My findings relate to several policy suggestions. First, policies concerned with reducing child

labour should consider ways to reduce the burden of domestic work which is more prevalent than economic work, and disproportionately harms girls skills development. Second, policies that reduce children's time in work should incorporate how the spare time is then used i.e. whether less time in work translates to more time in education or leisure. Future interventions should be tailored in understanding the constraints and opportunities children face from engaging in different activities locally. For example, the strong substitution between school attendance and economic work in India may mean that policies that encourage school participation may be successful in reducing time in economic work. However, the same policy may not be effective if used in other countries such as Ethiopia or Peru, where these activities may be more complementary. In such cases, there should be greater consideration to consider more flexible options for children and families to choose their activities that do not impede learning.

Future studies for developing countries may be interested in analysing whether there are productive differences between out-of-school activities compared to in-school activities. In developing countries, out-of-school activities may informally play a stronger role in children's skills development. Additionally, future data collection in developing countries should attempt to strengthen data collected on children's time budget, especially activities that constitute 'leisure'. Greater detail on children's time use could broaden empirical research on child development in developing countries in a more holistic way rather than the sole focus on child labour in economic work.

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Appendix A: Definition, Tables and Figures

Table A1: List of questions for non-cognitive measures in the YL data

Generalised self-efficacy scale
1. I can always manage to solve difficult problems if I try hard enough
2. If someone opposes me, I can find the means and ways to get what I want
3. It is easy for me to stick to my aims and accomplish my goals
4. I am confident that I could deal efficiently with unexpected events
5. Thanks to my resourcefulness, I know how to hand unforeseen situations
6. I can solve most problems if I invest the necessary effort
7. I can remain calm when facing difficulties because I can rely on my coping abilities
8. When I am confronted with a problem, I can usually find several solutions
9. If I am in trouble, I can usually think of a solution
10. I can usually handle whatever comes my way
Generalised self-esteem scale
1. I do lots of important things
2. In general, I like being the way I am
3. Overall, I have a lot to be proud of
4. I can do things as well as most people
5. Other people think I am a good person
6. A lot of things about me are good
7. I'm as good as most other people
8. When I do something I do it well

The generalised self-esteem scale in the YL data is a subset of the scale in Rosenberg (1965), which consists of 10 items.

Table A2: Generalised self-esteem on time use, with different counterfactual activities

	Panel A: School omitted				Panel B: Study omitted				Panel C: Play/leisure omitted			
	Ethiopia	India	Peru	Vietnam	Ethiopia	India	Peru	Vietnam	Ethiopia	India	Peru	Vietnam
Domestic work	-0.012	0.003	-0.002	-0.010	-0.037	-0.000	0.000	-0.031**	0.003	-0.005	0.016	-0.003
	(0.017)	(0.014)	(0.009)	(0.011)	(0.024)	(0.011)	(0.011)	(0.012)	(0.021)	(0.016)	(0.011)	(0.011)
Economic work	0.001	-0.012*	-0.010	-0.002	-0.024	-0.015	-0.006	-0.022*	0.016	-0.020*	0.015	0.005
	(0.013)	(0.006)	(0.010)	(0.007)	(0.021)	(0.014)	(0.014)	(0.013)	(0.012)	(0.011)	(0.013)	(0.008)
In school					-0.025	-0.003	0.012	-0.021	0.015	-0.008	0.030***	0.006
					(0.030)	(0.012)	(0.011)	(0.017)	(0.013)	(0.010)	(0.009)	(0.009)
Studying outside school	0.025	0.003	0.030*	0.021					0.040	-0.005	0.050***	0.028*
	(0.030)	(0.012)	(0.015)	(0.015)					(0.026)	(0.014)	(0.015)	(0.015)
Play/leisure	-0.015	0.008	-0.030***	-0.008	-0.040	0.005	-0.029**	-0.029*				
	(0.013)	(0.010)	(0.009)	(0.008)	(0.026)	(0.014)	(0.011)	(0.016)				
Sleep	0.025	-0.049*	-0.022	-0.017	-0.000	-0.052**	-0.022*	-0.038***	0.040	-0.057**	-0.001	-0.010
	(0.022)	(0.026)	(0.014)	(0.017)	(0.026)	(0.022)	(0.013)	(0.012)	(0.025)	(0.027)	(0.014)	(0.016)
Observations	1,697	1,792	1,719	1,853	1,697	1,792	1,719	1,853	1,697	1,792	1,719	1,853
R-squared	0.112	0.033	0.077	0.079	0.130	0.033	0.072	0.080	0.130	0.081	0.106	0.092

*** p<0.01, ** p<0.05, * p<0.1. All estimates control for child, caregiver and household characteristics and time allocation at age 12. Standard errors are reported in parentheses, clustered at each country's cluster level in Round 5 (age 15).

Table A3: Generalised self-efficacy on time use, with different counterfactual activities

	Panel A: School omitted				Panel B: Study omitted				Panel C: Leisure omitted			
	Ethiopia	India	Peru	Vietnam	Ethiopia	India	Peru	Vietnam	Ethiopia	India	Peru	Vietnam
Domestic work	-0.007	-0.037**	-0.008	-0.016*	-0.025	-0.039*	0.000	-0.039**	-0.006	-0.021	0.010	-0.024*
	(0.017)	(0.016)	(0.008)	(0.009)	(0.026)	(0.019)	(0.010)	(0.015)	(0.023)	(0.015)	(0.009)	(0.013)
Economic work	-0.011	-0.033***	-0.013	-0.002	-0.029	-0.035**	-0.001	-0.024*	-0.010	-0.017	0.012	-0.010
	(0.009)	(0.009)	(0.009)	(0.008)	(0.020)	(0.015)	(0.010)	(0.013)	(0.014)	(0.011)	(0.008)	(0.011)
In school					-0.018	-0.001	0.018	-0.022	0.000	0.017*	0.029**	-0.008
					(0.026)	(0.014)	(0.013)	(0.017)	(0.014)	(0.009)	(0.011)	(0.014)
Studying outside school	0.018	0.001	0.005	0.023					0.019	0.018	0.028*	0.016**
	(0.026)	(0.013)	(0.016)	(0.017)					(0.025)	(0.015)	(0.013)	(0.007)
Play/leisure	-0.001	-0.017*	-0.030***	0.007	-0.019	-0.018	-0.021**	-0.015*				
	(0.014)	(0.009)	(0.009)	(0.014)	(0.025)	(0.015)	(0.007)	(0.008)				
Sleep	0.032	-0.038	-0.034**	0.000	0.014	-0.040	-0.025**	-0.022*	0.033	-0.022	-0.011	-0.007
	(0.020)	(0.033)	(0.013)	(0.016)	(0.026)	(0.026)	(0.010)	(0.012)	(0.024)	(0.033)	(0.012)	(0.011)
Observations	1,697	1,792	1,719	1,853	1,697	1,792	1,719	1,853	1,697	1,792	1,719	1,853
R-squared	0.103	0.105	0.101	0.095	0.103	0.105	0.101	0.095	0.103	0.105	0.102	0.095

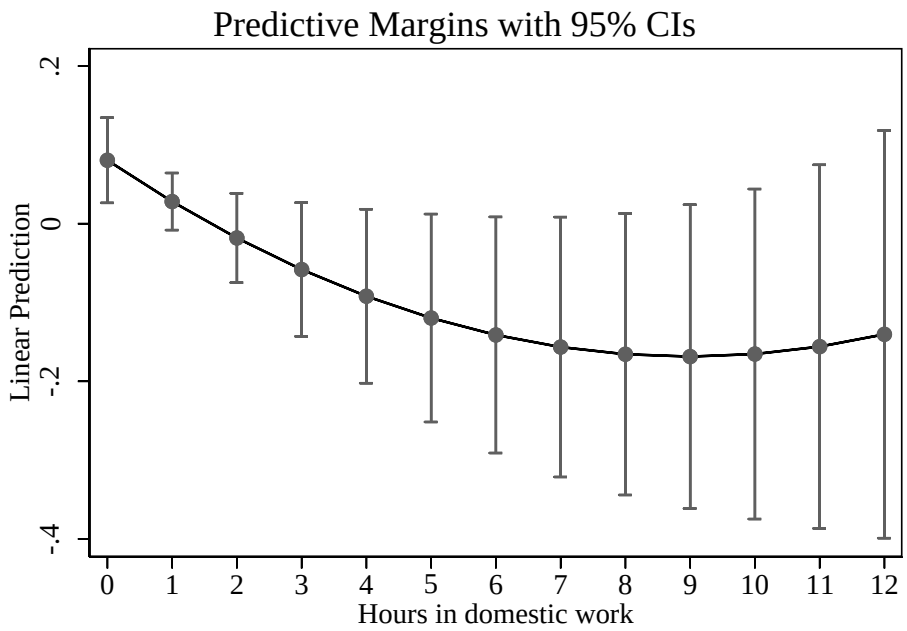
*** p<0.01, ** p<0.05, * p<0.1. All estimates control for child, caregiver and household characteristics and time allocation at age 12. Standard errors are reported in parentheses, clustered at each country's cluster level in Round 5 (age 15).

Table A4: Estimates for generalised self-efficacy, using squared hours in domestic or economic work (study omitted)

	Ethiopia		India		Peru		Vietnam	
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Domestic work	-0.052	-0.026	-0.031	-0.037*	-0.007	0.000	-0.057**	-0.033**
	(0.035)	(0.026)	(0.033)	(0.019)	(0.014)	(0.010)	(0.023)	(0.013)
Economic work	-0.031	-0.017	-0.036**	-0.058*	-0.001	-0.003	-0.024*	-0.072**
	(0.020)	(0.030)	(0.013)	(0.030)	(0.010)	(0.023)	(0.013)	(0.029)
Attending school	-0.018	-0.022	-0.003	-0.001	0.018	0.018	-0.022	-0.020
	(0.026)	(0.027)	(0.013)	(0.013)	(0.013)	(0.013)	(0.017)	(0.016)
Play/leisure	-0.022	-0.019	-0.018	-0.018	-0.021***	-0.021**	-0.016*	-0.013*
	(0.026)	(0.025)	(0.015)	(0.015)	(0.007)	(0.008)	(0.008)	(0.008)
Sleep	0.014	0.014	-0.041	-0.039	-0.025**	-0.025**	-0.022*	-0.020
	(0.026)	(0.026)	(0.026)	(0.026)	(0.010)	(0.010)	(0.012)	(0.012)
Domestic work (squared)	0.004		-0.002		0.001		0.003*	
	(0.003)		(0.005)		(0.001)		(0.002)	
Economic work (squared)		-0.002		0.002		0.000		0.005**
		(0.002)		(0.003)		(0.003)		(0.002)
R-squared	0.104	0.104	0.105	0.105	0.101	0.101	0.095	0.101
Observations	1,697	1,697	1,792	1,792	1,719	1,719	1,853	1,853

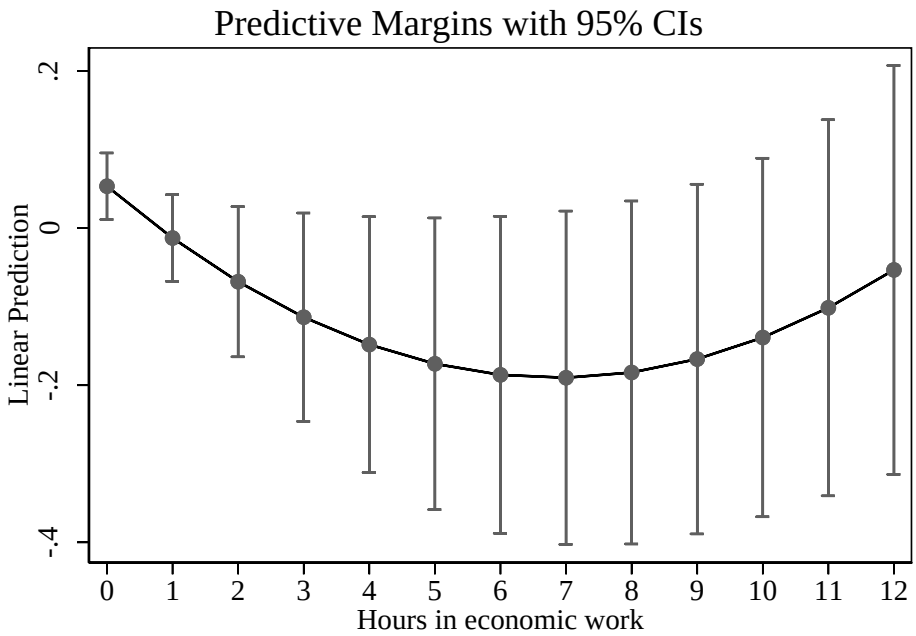
*** p<0.01, ** p<0.05, * p<0.1. For each YL country, column (1) reports the estimates when the square of hours in domestic work is included while column (2) reports the estimates when the square of hours in eco- nomic work is included. All estimates control for child, caregiver and household characteristics, lagged time allocation, as well as lagged self-esteem or self-efficacy score as per the extended VA model. Standard errors are reported in parentheses, clustered at each country's cluster level.

Figure A1: Predicted margins on generalised self-efficacy in Vietnam with increasing hours of domestic work



Note: Plotted predicted margins for generalised self-efficacy with increasing hours of domestic work in Vietnam. This figure plots column (1) in Table A4 for Vietnam. The turning point is 9.34.

Figure A2: Predicted margins on generalised self-efficacy in Vietnam with increasing hours of economic work



Note: Same as Figure A1 but for economic work. The turning point is at 7 hours

Table A5: Estimates for generalised self-esteem by sex

	Ethiopia		India		Peru		Vietnam	
	Male	Female	Male	Female	Male	Female	Male	Female
				Leisure omitted				
Attending school	0.034**	-0.010	0.012	-0.026**	0.023*	0.041***	0.001	0.012
	(0.016)	(0.023)	(0.013)	(0.011)	(0.013)	(0.011)	(0.008)	(0.013)
Studying outside school	0.032	0.043	0.017	-0.024	0.030	0.070***	0.028*	0.029
	(0.031)	(0.036)	(0.023)	(0.021)	(0.026)	(0.021)	(0.014)	(0.019)
Domestic work	0.012	-0.002	0.021	-0.035*	0.021	0.014	-0.006	-0.004
	(0.018)	(0.033)	(0.021)	(0.020)	(0.015)	(0.013)	(0.014)	(0.015)
Economic work	0.024**	-0.001	-0.000	-0.031**	0.012	0.018	0.001	0.011
	(0.011)	(0.023)	(0.018)	(0.014)	(0.020)	(0.018)	(0.009)	(0.014)
Sleep	0.058**	0.016	-0.045	-0.062	-0.013	0.018	0.003	-0.035
	(0.024)	(0.036)	(0.030)	(0.038)	(0.022)	(0.021)	(0.016)	(0.021)
				Study omitted				
Attending school	0.002	-0.053	-0.005	-0.001	0.016	0.014	-0.020	-0.023
	(0.037)	(0.034)	(0.019)	(0.021)	(0.017)	(0.016)	(0.015)	(0.023)
Play/leisure	-0.032	-0.044	-0.017	0.024	-0.010	-0.042**	-0.023	-0.037*
	(0.031)	(0.034)	(0.024)	(0.019)	(0.017)	(0.018)	(0.014)	(0.021)
Domestic work	-0.020	-0.045	0.004	-0.011	0.016	-0.010	-0.030**	-0.037*
	(0.033)	(0.027)	(0.024)	(0.021)	(0.016)	(0.014)	(0.013)	(0.020)
Economic work	-0.008	-0.045*	-0.017	-0.007	0.002	-0.008	-0.022*	-0.022
	(0.026)	(0.022)	(0.024)	(0.020)	(0.021)	(0.017)	(0.012)	(0.016)
Sleep	0.026	-0.028	-0.062**	-0.037	-0.024	-0.014	-0.021	-0.066***
	(0.030)	(0.035)	(0.025)	(0.029)	(0.018)	(0.022)	(0.016)	(0.018)
Observations	901	798	974	818	870	849	958	900
R-squared	0.139	0.139	0.050	0.052	0.073	0.105	0.087	0.095

*** p<0.01, ** p<0.05, * p<0.1. All estimates control for child, caregiver and household characteristics, lagged time allocation, as well as lagged self-esteem or self-efficacy score as per the extended VA model. Standard errors are reported in parentheses, clustered at each country's cluster level.

Table A6: Estimates for generalised self-efficacy by sex

	Ethiopia		India		Peru		Vietnam	
	Male	Female	Male	Female	Male	Female	Male	Female
				Leisure omitted				
In school	0.005	-0.006	0.019	0.013	0.025**	0.035*	-0.014	0.000
	(0.017)	(0.022)	(0.012)	(0.012)	(0.009)	(0.018)	(0.013)	(0.015)
Studying outside school	0.017	0.022	0.035	0.008	0.008	0.045*	0.017	0.010
	(0.029)	(0.034)	(0.023)	(0.016)	(0.020)	(0.022)	(0.013)	(0.013)
Domestic work	-0.001	-0.008	-0.003	-0.031*	0.020	0.006	-0.017	-0.029**
	(0.024)	(0.030)	(0.028)	(0.017)	(0.013)	(0.013)	(0.018)	(0.014)
Economic work	-0.004	-0.036	-0.017	-0.011	0.009	0.004	-0.004	-0.015
	(0.013)	(0.026)	(0.017)	(0.013)	(0.012)	(0.016)	(0.011)	(0.014)
Sleep	0.068***	-0.002	-0.002	-0.031	-0.014	-0.006	0.011	-0.035*
	(0.024)	(0.036)	(0.035)	(0.034)	(0.018)	(0.021)	(0.015)	(0.018)
				Study omitted				
Attending school	-0.012	-0.028	-0.016	0.005	0.024*	0.013	-0.030	-0.009
	(0.036)	(0.028)	(0.023)	(0.021)	(0.012)	(0.020)	(0.018)	(0.021)
Play/leisure	-0.018	-0.022	-0.035	-0.008	-0.004	-0.036**	-0.016	-0.011
	(0.029)	(0.032)	(0.024)	(0.015)	(0.014)	(0.015)	(0.011)	(0.010)
Domestic work	-0.019	-0.030	-0.038	-0.039*	0.019	-0.013	-0.033	-0.038**
	(0.033)	(0.025)	(0.034)	(0.023)	(0.013)	(0.014)	(0.019)	(0.016)
Economic work	-0.021	-0.057**	-0.052*	-0.019	0.006	-0.016	-0.020	-0.026
	(0.026)	(0.026)	(0.025)	(0.017)	(0.012)	(0.017)	(0.014)	(0.016)
Sleep	0.051*	-0.024	-0.037	-0.039	-0.018	-0.030	-0.006	-0.045***
	(0.029)	(0.031)	(0.031)	(0.034)	(0.019)	(0.020)	(0.017)	(0.014)
Observations	901	798	974	818	870	849	958	900
R-squared	0.117	0.136	0.135	0.113	0.089	0.136	0.080	0.137

*** p<0.01, ** p<0.05, * p<0.1. All estimates control for child, caregiver and household characteristics, lagged time allocation, as well as lagged self-esteem or self-efficacy score as per the extended VA model. Standard errors are reported in parentheses, clustered at each country's cluster level.

Appendix B: Measurement of time use

To check if there are measurement issues in recording children's time allocation in the YL data, I re-run my baseline estimates using the percentage share of time spent in each activity to total hours reported on a typical day. These estimates are reported in Tables A7 and A8 in the Appendix. My main concern is how Peruvian children's time use data was recorded, since the module was administered differently in Peru compared to the other three YL countries. In Peru, 41% of the children report using less than 24 hours in a day because they were given the option to allocate the hours they think are appropriate to the activity, even if it does not sum up to 24 hours. The argument for this administration is to allow children to report the hours they thought were most 'true' to their typical day, without forcibly using all 24 pebbles/beans to redistribute their residual time randomly. However, this way of measurement is clearly different to the other three countries where all 24 pebbles are allocated to represent 24 hours in a day.

Using the percentage share better measures the proportion of time spent in the activity relative to the total hours reported in a day, even if the total hours do not sum up to 24 hours. Reassuringly, the signs and statistical significance of the coefficient estimates are largely in line with my baseline estimates from Tables A2 and A3 for all YL countries. The main difference in Peru is that a 1 percentage point increase in time spent in domestic work instead of study (Panel B) reduces children's generalised self-esteem and self-efficacy by 0.004 and 0.007 standard deviations respectively, compared to my baseline estimates of zero. However, these estimates are still close to zero. Espinoza-Revollo and Porter (2018) using YL data also demonstrate that the child's time use only differ slightly when reported by the caregiver, reflecting consistency in the reported hours.

Table A7: Generalised self-esteem using ratio of time spent in each activity to total hours reported in a day

	A: School omitted				B: Study omitted				C: Play/leisure omitted			
	Ethiopia	India	Peru	Vietnam	Ethiopia	India	Peru	Vietnam	Ethiopia	India	Peru	Vietnam
Domestic work	-0.003	0.001	-0.003	-0.002	-0.009	-0.000	-0.007*	-0.007**	0.001	-0.001	0.006*	-0.001
	(0.004)	(0.003)	(0.002)	(0.003)	(0.006)	(0.003)	(0.004)	(0.003)	(0.005)	(0.004)	(0.003)	(0.003)
Economic work	0.000	-0.003*	-0.003	-0.000	-0.006	-0.004	-0.008*	-0.006*	0.004	-0.005*	0.005*	0.001
	(0.003)	(0.001)	(0.002)	(0.002)	(0.005)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)
In school					-0.006	-0.001	-0.004	-0.005	0.004	-0.002	0.009***	0.002
					(0.007)	(0.003)	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)
Studying outside school	0.006	0.001	0.004	0.005					0.010	-0.001	0.013***	0.007*
	(0.007)	(0.003)	(0.004)	(0.004)					(0.006)	(0.003)	(0.004)	(0.004)
Play/leisure	-0.004	0.002	-0.009***	-0.002	-0.010	0.001	-0.013***	-0.007*				
	(0.003)	(0.002)	(0.002)	(0.002)	(0.006)	(0.003)	(0.004)	(0.004)				
Sleep	0.006	-0.012*	-0.008*	-0.004	-0.000	-0.013**	-0.012**	-0.009***	0.010	-0.014**	0.001	-0.002
	(0.005)	(0.006)	(0.004)	(0.004)	(0.006)	(0.005)	(0.004)	(0.003)	(0.006)	(0.007)	(0.004)	(0.004)
Observations	1,697	1,792	1,719	1,853	1,697	1,792	1,719	1,853	1,697	1,792	1,719	1,853
R-squared	0.112	0.033	0.077	0.079	0.112	0.033	0.077	0.079	0.112	0.033	0.077	0.079

*** p <0.01, ** p<0.05, * p<0.1. All estimates control for child, caregiver and household characteristics and time allocation at age 12. Standard errors are reported in parentheses, clustered at each country's cluster level in Round 5 (age 15).

Table A8: Generalised self-efficacy using ratio of time spent in each activity to total hours reported in a day

	A: School omitted				B: Study omitted				C: Play/leisure omitted			
	Ethiopia	India	Peru	Vietnam	Ethiopia	India	Peru	Vietnam	Ethiopia	India	Peru	Vietnam
Domestic work	-0.002	-0.009**	-0.004*	-0.004	-0.006	-0.009*	-0.004	-0.009**	-0.001	-0.005	0.004*	-0.006
	(0.004)	(0.004)	(0.002)	(0.002)	(0.006)	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.002)	(0.003)
Economic work	-0.003	-0.008***	-0.004	-0.000	-0.007	-0.008**	-0.003	-0.006*	-0.002	-0.004	0.005**	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)
In school					-0.004	-0.000	0.001	-0.006	0.000	0.004*	0.009***	-0.002
					(0.006)	(0.003)	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)	(0.003)
Studying outside school	0.004	0.000	-0.001	0.006					0.004	0.004	0.008**	0.004**
	(0.006)	(0.003)	(0.004)	(0.004)					(0.006)	(0.004)	(0.003)	(0.002)
Play/leisure	-0.000	-0.004*	-0.009***	0.002	-0.004	-0.004	-0.008**	-0.004**				
	(0.003)	(0.002)	(0.002)	(0.003)	(0.006)	(0.004)	(0.003)	(0.002)				
Sleep	0.008	-0.009	-0.009**	0.000	0.003	-0.010	-0.008**	-0.005*	0.008	-0.005	-0.000	-0.002
	(0.005)	(0.008)	(0.003)	(0.004)	(0.006)	(0.006)	(0.003)	(0.003)	(0.006)	(0.008)	(0.003)	(0.003)
R-squared	1,697	1,792	1,719	1,853	1,697	1,792	1,719	1,853	1,697	1,792	1,719	1,853
Observations	0.103	0.105	0.099	0.095	0.103	0.105	0.099	0.095	0.103	0.105	0.099	0.095

*** p<0.01, ** p<0.05, * p<0.1. All estimates control for child, caregiver and household characteristics and time allocation at age 12. Standard errors are reported in parentheses, clustered at each country's cluster level in Round 5 (age 15).