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ECONOMICS OF CHILD LABOUR

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Abstract

The dissertation aims to explore the supply and demand side determinant of child labour at macro, meso and micro level. At macro level it explores the effect of globalization (defined as openness to trade and inflow of foreign direct investment) and credit market imperfections on child labour. At meso level it explores the effect of labour market conditions on child labour. As the above two levels of analysis are mainly concerned with the demand for child labour, the micro level analysis explores the supply side determinant of child labour. At micro level this dissertation explores the effect of intrahousehold distribution of power on child related outcome. Specifically it explores the effect of mother's decision making power on her child's labour and schooling. The macro level analysis is based on cross country regression framework while meso and micro level analysis is based on the data from Pakistan.

At macro level, this dissertation points out that trade openness and FDI inflow raise the standard of living in an economy thereby reducing child labour incidence. As the channel through which trade could affect child labour is by increasing income of the poor, credit market imperfection shows insignificant effect. At meso level, this dissertation points out that high adult wages in an area increase demand for child labour while presence of adult unemployed proportion in an area reduces demand for child labour. However, presence of unemployed adult in a house increases supply of child labour. Exports, on one hand, reduce supply of child labour by affecting the income of poor at macro level while on the other hand at meso level, subcontracting of production process to small informal sector increases demand for child labour. The informal sector being unprotected by law employs a high proportion of child labour. At micro level mother's decision making power significantly decreases child labour supply and increases child schooling. The effect is significant in case of girls but not in case of boys. This study also shows that whether children work for generating income or as family helpers, mothers are equally concerned for their welfare. Their decision making power significantly reduces labour among children.

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Acronyms

AIC	Akaike Information Criteria
BIC	Bayesian Information Criterion
CPI	Consumer Price Index
DG	Dehejia and Gatti Model
EAPEP	Economically Active Population Estimates & Projections
EHII	Estimated Household Income Inequality
ESDS	Economic and Social Data Service
FBS	Federal Bureau of Statistics
FDI	Foreign Direct Investment
FE	Fixed Effect
GMM	Generalized Method of Moments
ILO	International Labour Organization
IPEC	International Programme on the Elimination of Child Labour
IV	Instrumental Variable
LFS	Labour Force Survey
MDM	Mother's Decision Making Index
NWFP	North West Frontier Province
OID	Over Identification Test
PCA	Principal Component Analysis
PSLM	Pakistan Standard of Living Measurement Survey
PWT	Penn World Table
Q1	Income Share of Bottom Quintile Population
RE	Random Effect
SD	Standard Deviation
SIMPOC	Statistical Information and Monitoring Programme on Child Labour
UN	United Nation
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development
UN-WIDER	United Nations World Institute for Development Economics Research
UTIP	University of Texas Inequality Project
WDI	World Development Indicator

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"Safety and security don't just happen; they are the result of collective consensus and public investment. We owe our children, the most vulnerable citizens in our society, a life free of violence and fear." (Nelson Mandela, former president of South Africa)

1. Introduction

This dissertation aims to explore the supply and demand side determinants of child labour at macro, meso and micro level. This study acknowledges that the issue of child labour is not new. It has always remained in debate both in developed countries and in developing countries, as every country has passed through a stage of development where child labour has persisted. However, the last decade has seen an enormous growth in the literature on economics of child labour. This growth in the literature is attributed to globalization and international economy. Interest of the economists on the effect of globalization is often attributed to the US Child Deterrence Act of 1997, which seeks to ban the import of those goods that use child labour as input. The aim of trade sanction is to force the countries to implement 'international labour standards' and 'social clauses' which are prerequisites for trade. But the implementation of the ban has opened a new debate among the economists. There exist arguments against and in favour of the trade ban. Those in favour of trade ban argue that developing countries have a trade advantage in labour-intensive goods as they rely on child labour although child labour is illegal. Opponents of the trade ban on the other hand argue that trade sanctions encourage protectionism, which will hurt not only the workers in developing countries but also consumers in the developed countries[1]. No matter what the reasons are, these arguments have opened a debate among the economists especially among those related to trade and development; and as said above, the growth in the literature is extensive and provides mixed evidence.

Motivation of the first part of the dissertation therefore is based on the current on-going debate. First part of the dissertation is mainly concerned with evaluating the impact of trade on child labour across developing countries. Specifically, the purpose of the first part is to

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[1] See Gupta (2002) for detail

investigate the link between globalization, defined as an increase in trade openness and penetration of FDI, and the incidence of child labour while taking into account the role of credit market imperfections. The empirical assessment of the first part is based on the panel data comprising of 129 developing countries for four decades beginning from 1970 to 2010. The basic hypothesis tested is that trade sanctions may reduce the demand for unskilled worker and lower their wages. Poor families in such conditions when unable to borrow may have no alternative but to send their children to work. In addition to this, the first part has also tested the hypothesis that trade sanctions only affect exporting sector therefore the effect of trade openness may differ from the effect of export. The first part has also explored the effect of income on child labour using three alternative measures.

The second part explores the effect of labour market conditions on child labour by arguing that the economic value of children may not be assessed properly without reference to the structure of labour market[2]. The second part is based on the Labour Force Survey data of Pakistan. A high proportion of literature on child labour in Pakistan only focuses on poverty, schooling, household and child's own characteristics as major determinants – mainly emphasizing on the supply side while ignoring the demand side. The demand for child labour usually arises due to labour market conditions. Specifically the second chapter explores the effects of segmentation of economy between formal and informal sector, degree of substitution between adult and child labour (generating adult unemployment) and the wage structure on the incidence of child labour.

As mentioned earlier, the above two parts are mainly concerned with the demand side of child labour. These issues do not address the phenomenon why households supply child labour. Literature on the supply side determinant is extensive in Pakistan. But these studies only focused on poverty, household and child characteristics as major determinants. Recently there is a growing debate on the intrahousehold distribution of power and its effect on household expenditure including expenditure on education. The on-going debate on intrahousehold balance of power has raised an argument i.e. is the identification of the person who holds the money important for the welfare of the household, especially for the child related outcome (health and education)? In keeping with the argument raised in the

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[2] See Cain and Mozumder (1980) in Grootaert and Kanbur (1995) for more detail.

literature, the third part of the dissertation focuses on the effect of the mother's bargaining power and its effect on her child's schooling and labour decision. The issue is probed further by using the Pakistan Standard of Living Measurement Survey of Pakistan.

The final part of the dissertation summarizes the overall findings and recommends some policy implications. The final part also addresses the shortcoming of this dissertation and provides some future research agenda. As far as the organization of this chapter is concerned, the next section will provide a complete conceptual framework for analysing the supply and demand side determinant at macro, meso and micro level, and then proceed to outline the basic objectives explored in each part and finally discuss how the dissertation contributes to the existing literature on economics of child labour.

1.1 Conceptual Framework

A conceptual framework for the study on child labour is provided by Lim (2002). The framework defines three levels, as summarized in Figure 1.1. First and the most basic is the micro or household/firm level, wherein decisions that affect whether a child goes to school, participates in economic or market activities or in housework, are made. This level identifies that children participate in labour market mainly due to the economic condition of the household. Poverty, unemployment among adults, lower returns to education, high dependency ratio and lack of credit in case of sudden income shocks force households to send their children to the labour market. Here at this level on one hand if households supply child labour then on the other hand employers demand child labour. Their demand is based on the unavailability of skilled labour in abundance, use of under-developed technology, dependence on family and low cost unskilled labour and short supply of capital. Under the short term horizon these small firms cannot invest in skill and capital development. In under-developed economies, unstable macroeconomic conditions do not encourage employers to invest in skill and capital equipment. These conditions result in low productivity leading to child labour.

The second level is the meso level, wherein the direct economic, social and institutional environment that affects the child and her/his family, as well as the employers of child labour, is situated. This is an important setting where on one hand relevant actors and

institutions interact on the promotion and practice of child labour, and on the other hand national and local governments and civil society organizations undertake prevention, identification, detection, rescue and rehabilitation of child labour. Here at this level weak labour market conditions, human capital development, extent of informal and self-employment sector determines the demand for child labour. Demand for child labour usually arises due to family-based activities. Households themselves are the biggest employers of children. These households sell their products and services through sub-contracting mechanism. These activities (especially in agriculture) are often informal in nature. A large number of children are engaged in these informal activities. The sub-contracting of labour may also arise as part of the cost coping mechanism of uncompetitive firms. These uncompetitive firms try to lower their costs or try to avoid labour standards by sub-contracting to the informal sector, all having a significant influence on child labour demand.

The last level is the macro level wherein national and international conditions determine both the constraints and the possibilities of economic and social advancement of the poor and the disadvantaged people. It is at this level where the socio-economic, legal and political conditions determine whether employers will have incentives to use child labour or not. It is also at this level where we find economic and social programs (such as development plans, poverty alleviation programs, and social welfare programs, formal and non-formal educational and vocational programs) that have direct impact on child labour. At this level governance structures and the political will of the state and civil society ultimately shape and form an entire society's response to the child labour problem. More specifically, here at this level the socio-economic policies, infrastructure development, governance situation and global and macro volatilities determine child labour demand and supply in an economy.

Lim (2002) emphasizing on linkages argues that, economically depressed and volatile conditions i.e. weak and unstable economy, high unemployment rates and inflation results in families entering poverty which eventually leads to child labour. Furthermore poverty with weak labour markets also brings with it unemployment and migration. This situation is further aggravated by the lack of social insurance leading more people and families

ending into poverty. The lack of social assistance and welfare services provided by the government results in extreme anxiety for the families –i.e. health, education and social services are either deficient or of very low quality. All these, coupled with inadequate population policies and lack of economic development, disseminate high dependency burdens and add more to child labour. Moreover, poor, inadequate and unsubsidized education systems (especially lack of non-formal and vocational training programme at schools) with undeveloped transportation system reduce the incentive for the children to be in school.

Following figure 1.1, the study determines to explore the effect of globalization while taking into account credit market imperfections at macro level, the effect of labour market conditions at meso level and the effect of household decision making process at micro level (as discussed earlier). The basic framework therefore covers the issues related to all three levels: macro, meso and micro. For example, figure 1.1 points out that primary decision makers deciding about the supply of child labour is household. Third part of the dissertation exploring the household decision making process will show how, at micro level, mothers decision making power influence her child's labour supply and schooling. The main hypothesis is that household will supply less child labour if the prevailing cultural, social and family values give autonomy to mothers as mothers are more concerned about child welfare. As shown in figure 1.1, social policies at macro level effect cast, ethnicity and socio-cultural practice at meso level which in turn determine household value and affect autonomy of women. The issue is based on the literature on intrahousehold distribution of power and its effect on child welfare.

The second part of the study, at the meso level, explores how labour market conditions influence the employer's decision to demand child labour. As discussed earlier here, at meso level weak labour market and extent of informal sector determines the child labour demand. In addition to the size of informal sector, adult unemployment rate and wages are used to explore the labour market conditions. Labour market indicators at meso level assume to have demand side effect on child labour. For example increase in the adult unemployed proportion in a district will reduce the demand for child labour as adults are actively searching for jobs and will be willing to work at low wages. Low adult wages at

district level therefore reduces the demand for child labour. As far as the size of the informal sector is concerned, as said earlier, this sector is the biggest employer of child labour generating the demand for child labour in an economy. Furthermore, study has also explored the effect of size of export related industries as well. This is to evaluate the condition that uncompetitive firms in order to remain cost competitive at the world market, use sub-contracting mechanism for production process. Children work for the large scale manufacturing sector by producing input in the informal sector. These informal activities further create demand for child labour.

The first part of the study concerned with the macro level analysis explores how globalization and macro-economic conditions influence child labour incidence. Globalization is defined as expansion in trade and inflow of foreign direct investment. Expansion in trade and inflow of foreign direct investment generates employment and earning opportunities (leads to increase in labour demand and high wages in the labour market) for the poor household, thereby increasing their income. Increase in income will reduce supply of child labour if one assumes that child labour arises due to poverty. Globalization therefore reduces child labour incidence by increasing the income of the poor. But income is one channel through which globalisation can affect child labour, the other channel stresses that expansion in the earning opportunities may create the demand for child labour as well. Increase in the demand for exports may either increase the demand for child labour directly if children can be used as input in the sector, or it may increase the demand for child labour as a result of the switching of the job by adults while children take their place. For example, increased earning opportunities available to adults change the types of work performed by them and children may be forced to take over the activities performed by adults. However, there is no concrete evidence that shows globalisation increases child labour demand at macro level.

Note that all the three levels are interlinked. Macro level factors such as expansion in trade, FDI and growth, influence both labour market conditions and household decision regarding child labour supply while household labour supply decision affect labour market conditions which in turn has an effect on macroeconomic environment. The labour market conditions may also influence household decision as well. For example, high adult unemployed

proportion in a household lower the household income which may influence the decision of household to supply more child labour. In sum the three levels are inter-linked and the dissertation tries to explore some of the issues that have been over-looked in the present literature at micro, meso or macro level.

Figure 1.1: Factors Contributing to Child Labour
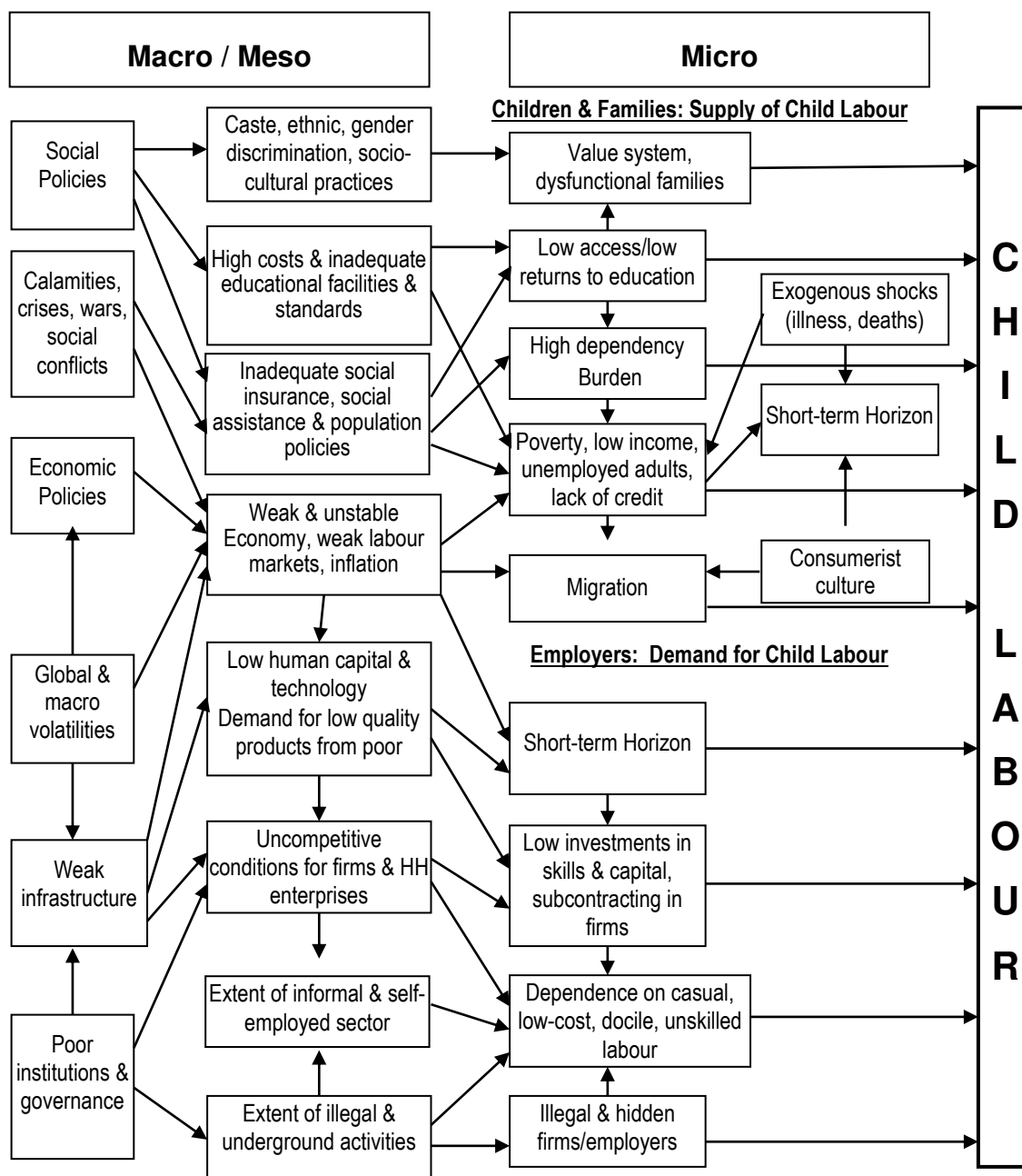
Source: Lim (2002).

1.2   Objectives and Organization of the study

There is an extensive literature available on the subject and the growth in the literature in the last decade is enormous. The large part of the literature is only theoretical, focusing on modelling the demand and supply of child labour and determining its welfare implications. The part that is empirical mainly consists of country specific empirical studies that estimate household choice models using household data. Their findings indicate that child labour is associated with large family size, low levels of parental education, low income levels, higher costs of schooling, geographic distance from school, parent's employment status, the child's gender (boys are more likely to work, while girls usually stay at home to care for younger siblings and conduct household chores), child birth order (younger children are less likely to work if their older siblings are currently working), country's industrial distribution, with greater demand in the agriculture sector, and with the country's income distribution.

Although the literature provides many insights on the determinants of child labour, but still there are some major issues that need to be addressed. For example, the recent literature on globalization and child labour incidence has ignored the effects of exports on child labour incidence. If the trade sanction theories have to be linked with child labour incidence then it is necessary to look for the effect through export rather than simply trade openness. While, at meso or micro level, in case of Pakistan, studies have ignored the effect of labour market conditions and mothers bargaining power on child labour. For example, to explore how the demand for child labour arises in an economy; the role of segmentation of the economy into formal and informal sectors, the degree of substitution between adult and child labour and wage structure prevailing in the economy, are in need of examination with respect to regions and time. Furthermore, literature in Pakistan exploring the supply side determinant of child labour does not address the intra-household decision-making process affecting child labour supply decision. Based on the conceptual framework, theories of demand and supply (see section 2.1 for a detailed review) and the gap present at macro, meso and micro level, this study tries to fill the gaps that are evident in the literature. At the macro level, this study has conducted a cross country analysis comprising of four decades,

from 1970 to 2010, and at the meso and micro level the estimation is based on Labour Force Survey and Social and Living Standard Measurement Survey (PSLM) of Pakistan.

Firstly, chapter 3, at the macro level, explores the effects of income, trade openness and credit market imperfections on the incidence of child labour in a cross country setting. The following questions are specifically addressed;

1.   Does income remain a significant determinant of the child labour participation rate– Is the effect sensitive to different measures of the income?

2.   Do credit markets or financial development matter for the child labour incidence rate with particular reference to trade sanctions?

3.   What role does globalization (captured via trade volume and penetration of FDI in the economy) play? Does it lead to more child employment? – Is the effect channelled through income? Does the effect of trade differ from the effect of exports?

Secondly, chapter 4, at the meso level, explores the effect of labour market conditions on the incidence of child labour by evaluating the following key points;

1. Higher adult wage rate will either reduce child labour incidence by increasing income of the household or it would attract more children to work if employers substitute adult labour with cheap child labour.

2. Adult unemployment rate may have two types of effects; the higher the adult unemployed proportion in a division/district/city, the lower will be the probability for a child to find employment. While the higher the adult unemployed proportion in a house the lower will be the income of the household and the higher will be supply of child labour.

3. Informal sector being disorganized in nature with low skilled requirement accommodates most of the child labour in an economy. Therefore, the higher the degree of in-formalization the higher will be the demand for child labour.

4. In relation to above, in Pakistan, like in other developing countries, to remain cost competitive, employers in exporting industries often rely on child labour. Although due to world pressure on the exports, employers have started substituting children with adult unskilled labour but still, in order to remain competitive, employers are now using a contract system approach. Children work for the exporting sector through contract system by engaging themselves in the informal sector or in the subsidiary sectors which provides raw material to the exporting sectors. This increases the demand for child labour in the informal sector.

Finally, to analyse the effect of intrahousehold distribution of power on child's labour and schooling, chapter 5 explores the role of the mother's decision making power. More specifically, the following questions are analysed;

1. What is an appropriate way to measure decision making power?

2. How does this decision making power of mothers in the household affects child welfare?

3. Is the effect of the mother's power on her child's labour and schooling non-linear and non-monotonic as predicted by all the recent literature?

To summarize the organization of the study: chapter 2 provides the review of theoretical models, empirical literature worldwide and a separate section for literature on Pakistan; chapter 3 assesses the effects of Globalization and Credit Market Imperfections on the incidence of child labour; chapter 4 assesses the effect of labour market conditions on the incidence of child labour in case of Pakistan, chapter 5 assesses the effect of Mother's Bargaining Power on her child's labour and schooling; chapter 6 concludes and provides policy implications. It also identifies some limitations and future scope of the study as well.

Lastly, the three issues addressed in the dissertation (globalization under imperfect credit market, labour market conditions and intrahousehold decision making process) are interlinked. However, the individual empirical chapters may stand unrelated. The reason behind this is the non-availability of comprehensive data set at cross country level. Each

issue is therefore addressed by employing separate datasets and thus provide comprehensive assessment of that issue only. Nevertheless the individual chapters are helpful in understanding the issues that are not yet addressed, especially in case of Pakistan.

1.3 Data and Methodology

Each empirical chapter, as said earlier, differs from others in terms of data sets employed and the methodology followed. Chapter 3 is based on cross country data of 129 developing countries for five periods, chapter 4 focuses on Labour Force Survey (LFS) data of Pakistan form 1990-91 onwards, while chapter 5 takes into consideration the Pakistan Living Standard Measurement (PSLM) Survey data for the period 2007-8. Compilation of the data for cross-country analysis and formation of pseudo panel to analyse the labour market conditions of Pakistan is the most difficult task of the study.

As chapter 3 is based on the secondary data, the data set is compiled across 129 developing countries using different sources. Most of the data is from World Bank Development Indicator (WDI) and Penn World Table (PWT) version 6.3. Compiling data using WDI and PWT is relatively easy, but these datasets do not contain information on the economically active children aged 10-14. Although earlier versions of WDI does contain some information on child labour but it has missing values. The main source as indicated by WDI is International Labour Organization (ILO) for child labour data. However, data set compiled by ILO reports percentage of economically active children aged 10-14 with 10-year gaps. The data is downloaded by using UN common database. The two data sets (one from the World Bank and the other from the ILO) are merged by using the 3 digit country code (known as ISO code). Furthermore in chapter 3, in order to come up with the instrument for trade openness, gravity model approach is used. For this purpose bilateral trade data and gravity model indicators such as distance between the two countries, common languages, population between the two, common borders between the two etc. are compiled from different sources. The main data source to estimate the gravity model is from Direction of Trade Statistics UN Comtrade, CPII and Rose 2004. The data set is once again merged using the 3-digit country code. Getting the information on Gini coefficient

and income share held by bottom quintile population (Q1) to compute the income of the bottom quintile population is another major difficulty that this study has faced. Information on Gini coefficient and Q1 is compiled by using UN-Wider database. Although this is the major database that has cross country information on Gini coefficients and Q1, but it still has missing information. Some of the missing information is then taken from EHII (Estimated Household Income Inequality Dataset). Overall for chapter 3 we acknowledge that the major task is compilation of the dataset. Once the dataset is compiled the methodology followed is straightforward; instrumental variable regression based on time and country fixed effect.

As far as chapter 4 is concerned, the major difficulty this study faced is that Labour Force Survey (LFS) data is only cross-sectional. These datasets do not follow the same individuals every year. Hence, true panel does not exist. In the absence of the true panel, a pseudo panel is formed. The main objective of making the pseudo panel is to evaluate the effects of labour market conditions from 1990-91 to 2007-08 (last available LFS with the author). However, due to the unavailability of the division/district/city codes (used as cohorts to merge the datasets) and changes in the sampling methodology after 1995-96, all the available datasets cannot be merged together. Therefore, two different pseudo panels are formed; one for the period before 1995-96, and the other for the period after 1995-96. The comparison of the two pseudo panels also gives us an opportunity to track changes in the labour market indicator after the US Child Deterrence Act of 1997 as well. Fixed effect within estimator is used to analyse the effect of labour market indicators on child labour across divisions/districts/cities and time.

Finally, estimation of chapter 5 is based on Pakistan Standard of Living Measurement Survey data of 2007-08. Although some recent datasets are also available but as these datasets do not contain information on decision- making power of mothers (the variable of interest), the survey data of 2007-08 is used for estimating the effect of mother's power on her child's labour and schooling. PSLM datasets contain information about individual's education, employment, health, housing conditions, household income and expenditure in different files. These files are then merged together using the individual and household identity. First, females who are currently married and having children aged 10-14 are

selected. Second, information on their decision- making power and household characteristics are merged to the main file. Finally, after computing the decision- making index, all the relevant information is then merged with the children's file using mother's code as an identity. As our dependent variable is binary in nature, one if child is economically active, zero otherwise, therefore, the estimation technique followed is probit model.

1.4   Contribution of the study

The dissertation contributes in the empirical literature by filling gaps in the existing empirical literature at the macro level by using cross country data at meso and micro levels by using data on Pakistan. First at the macro level it incorporates the credit market imperfections in a trade model after correcting for endogeneity. Credit market imperfection is taken into account because if poor household are credit constrained then any income shock may lead to increase in child labour supply. For example if a trade sanction reduces wages and income of the poor household by lowering the production of unskilled goods. This income shock may increase child labour supply. However, our result shows that effect of credit on child labour incidence is insignificant

Second, at the macro level, the study compares the effect of trade openness and export by arguing that trade sanctions only effects child labour through its effect on exports. Therefore the effect of exports could be different from the effect of trade openness. Literature on globalization and child labour often ignores the effect of exports by stressing that it is hard to find children in exporting sector. Hence, the channel through which trade can affect child labour is by increasing the employment opportunities thereby income in an economy. Considering the two arguments, this study is the first that tries to explore the effects of the two separately. Result indicates that trade increases the employment opportunity therefore raises income and living standard in an economy which in turn reduces the child labour supply. Therefore, income could be considered as the channel through which trade effect child labour.

Furthermore, at the macro level this study has also explored the effect of income on child labour by considering three different measures of income: Real GDP per capita, income of

the bottom quintile of the population and adult wages. Result shows significant effect of the first two measures of income on child labour while adult wages remain insignificant in explaining the child labour incidence. Studies exploring the effect of income on child labour at macro level usually use GDP per-capita to represent income. This study argues that GDP per-capita may not be a good measure of income as in developing countries only a small percentage of the population hold most of the wealth. Hence, GDP per-capita may not exactly represent income of the poor. In order to determine more accurate effect, this study develops a new measure estimated through Gini co-efficient and income share of the bottom quintile of the population. On the basis of the results, the study concludes that income of the bottom quintile of the population rather than GDP per capita is a better proxy of income to use when analysing child labour.

Next at the meso level, it is the first study in Pakistan that has investigated the effect of labour market conditions at division/district/city level and across time, from 1990-91 to 2007-08. Literature in Pakistan either explores the supply side determinant or uses simple descriptive analysis to explore the effect of labour market indicators on child labour. Furthermore, literature incorporating labour market indicators has mainly explored wages, adult unemployment and working hours, and are also based on case studies having small sample size. This is the first study that has used the national level survey to explore labour market conditions in depth. It has not only explored the effect of wages and adult unemployment but has also explored the effect of size of informal, agriculture and exporting sector as well. Our result shows significant effect of all the labour market indicators on child labour incidence.

At the meso level the most important contribution of the study is the construction of pseudo panel using divisions/districts/cities as cohorts. Analysis is done across 114 cohorts, first across six periods and then across four periods, before and after 1995-96. Although the construction of the two pseudo-panels is due to the changes in the sampling methodology but this has also helped in exploring the situation before and after Child Deterrence Act of 1997. Moreover, meso level analysis has also explored the variations of labour market indicators across provinces, regions and time periods affecting child labour.

Furthermore, at meso level, the study will also contribute to the existing literature by exploring the effect of the size of export related industries in a division/district/city. The motivation behind including the size of the export related sector in the model is that in Pakistan, to remain cost competitive in the international market, exporting firms usually use sub-contracting mechanism for production process. Children remain employees of the large-scale manufacturing sector by producing raw material in the informal sector. Hence trade sanctions only shift children to informal sectors. The dissertation therefore not only explores the effect of exports at macro level but also at meso level as well. The analysis at the meso level will be beneficial for designing the policy to combat child labour in Pakistan through labour market indicators.

Finally, at the micro level, the study will contribute to the existing literature by exploring the effect of mother's decision-making power on her child's labour and schooling. The effect is explored by considering the on-going work on intra-household distribution of power and its effect on household welfare around the world. Recently, in case of Pakistan, literature on intrahousehold distribution of power has often linked the women's decision-making power to changes in the calorie intake and schooling expenditure only. Exploring its effect on child labour supply decision will be fruitful in designing the income support programme that specifically target women for cash transfer. Micro level analysis also outlines the appropriate strategy to measure decision-making power of mothers as well. It also highlights some of the factors influencing intrahousehold distribution of power in Pakistan. This study not only contributes to the literature by exploring the effect of mothers decision-making power on her child's labour and schooling but it also contributes to the literature by exploring its effect on children's paid and unpaid employment separately. Lastly, this study also provides gender sensitive analysis and it also explores the non-linearity and non-monotonic effect of mother's decision-making power as well.

2.   Literature Review

As mentioned earlier the literature available on the topic and its growth in recent years is enormous. Researchers have put forward both theoretical arguments and empirical evidences from across the world on why children work. Literature therefore can be grouped into either having theoretical arguments or providing empirical findings. This chapter first discusses some arguments raised in literature that may or may not be explicitly addressed in this dissertation but nevertheless help in understanding the economics of child labour (demand and supply of child labour) while the second part provides the review of theoretical models that will be followed in the subsequent chapters (chapter 3 to 5).

2.1   Economics of Child Labour

This section will highlight some interesting facts that have remained under discussion in the literature. The review consists of findings both at macro level and micro level. It will also try to give an in-depth review of literature on Pakistan as well. This is because chapter 4 and 5 explore the child labour issues in Pakistan. But before all these; why economists are interested in child labour? The interest of economists starts with the fertility and human capital theories. It dates back to 17th century. With the passage of time the interest turns to globalization and intrahousehold bargaining model. More specifically, economists basically consider the issue of child labour as a complex phenomenon whose supply and demand are affected by conditions in the labour market, education market, financial market (credit constraint) and to some extent by globalization. Recently some empirical works also provide support for the effect of intra-household decision making patterns on child related outcome as well. The purpose of this section therefore is to provide a brief review of the existing literature to predict why children work. The first part will discuss the supply side economics of child labour while the second part discuss the demand driven factors influencing child labour incidence. The sub section is mainly based on the review provided by Brown et.al, (2002) and on the report of ILO/IPEC-SIMPOC (2007).

a) Economics of Supply of child labour

The economic theories related to the supply of child labour have long recognized poverty as the major determinant of child labour. Literature has developed a theoretical model to examine the household behaviour to examine the child labour supply decision. Empirical literature, both at macro level and micro level, has also emphasized on poverty as major determinant of child labour supply. At macro level studies have analysed the effect of GDP per capita on the child labour incidence while at the micro level household income or low parental wages are considered as the major determinant of child labour. The sub- section therefore begins by reviewing what the basic household model is predicting.

(i)   Household Decision Making Model

In general, a unitary model (or common preference model) is used to predict the child labour supply decision. In such model the household maximizes utility, which is considered as a function of children in the house, the schooling per child, the leisure time available to children and parents, and a composite consumption good. Household earned income by selling goods produced in a household enterprise or by working as wage labourer. Father allocates time between market work and leisure; the mother allocates time among market work and child rearing; and children allocate time among market work, education and leisure [Brown et.al, (2002)].

The empirical findings of such model show that: (i) an increase in the father's wage will raise household income and if a child's education is a normal good, then education will also rise, (ii) if the mother work is substitute for the child work then the higher the mother wage the lower will be child leisure and education, (iii) the rise in the mother's wage will also raise the child education as well, considering education as a normal good, (iv) an increase in child wage would reduce the child schooling by affecting its opportunity cost, (v) increase in child wage may raise the demand for children as well therefore, increases the family size. This will again reduce the child's schooling as fewer resources will be available per child – leading to a trade-off between quality and quantity.

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(ii)   Trade-off between Quality and Quantity

In general, utility function of the unitary household model often points out towards the trade-off between Quantity and quality of children. As number of children, schooling per child, consumption of goods and leisure all enters into the utility function of the household together. Thus any changes in the child wages will lead to trade-off between education and labour. The trade-off depends on the household budget constraint, personal ability of the child and on the returns to home production. Poor parents cannot invest equally to all children because of the limited household income. There are empirical evidences that suggest that parents invest differently on the human capital formation of the first and the last born. One theory indicates that as the eldest child enters in the labour force, the household income becomes stabilized and they invest more on the human capital formation of the youngest child. The second theory indicates that the investment in a child depends on the innate ability of the child. Therefore children can be assigned different tasks depending upon their abilities. They could acquire education or acquire skill by doing on- job training.

(iii)   Human Capital theories

The Human Capital Theory is based the on neo-classical theory of endogenous growth. It assumes that people are productive resource. Hence higher education will lead to higher productivity. Basic proposition behind this theory is that parents make trade-off when allocating their children's time, especially for education and labour. Their decision is based on family economic and social conditions. Time spent on accumulating human capital affects child labour. A parent's decision regarding the investment in their child's human capital depends on return to schooling. If the return from schooling is high the number of working children would reduce. According to Schultz, (1961) education increase productivity, labour quality and income at both individual and national level.

(iv)   Parental Education and Schooling Quality

Bonnet (1993) argues that failure of the education system is an important explanation for the prevalence of child labour. When parents do not expect children to learn much in school, they decide to give them informal education in terms of work. Cigno and Rosati (2000) provide an analytical model of non-altruistic parents while Lopez-Calva et.al,

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(1999) consider an infinite-horizon overlapping generations model. Each generation has to choose how much to educate their children, how much to save, and how much to transfer to their parents when they retire. If one generation chooses to educate its children, the children become more productive in the future. However, the parent will only get a pay-off from the investment in their children if the children decide to make a transfer back to the parents at retirement.

Strauss and Thomas (1995) stressing on the parental education argue that parental years of schooling plays a significant role in reducing the child labour incidence. Brown et.al, argue that there is an empirical evidence that suggests that a parent's education affects their future generation. Educated parents value education, and hence invest in the human capital formation of their children while parents who are illiterate themselves do not value education for their children as well. Education affects the future income streams of the household as well. This also motivates parents to invest in the human capital formation. This implies that human capital formation is dependent on the return to schooling which in turn depends on the quality of schooling.

(v) Risk Theory

Poor household faces shocks and risks such as unemployment, natural disasters effecting income like draught and flood, war etc. The income shocks could be severe among the household who do not have enough reserve resources to meet such shocks. These household are more likely to supply child labour if they remain unable to borrow to smooth their present consumption need. Literature often points out that in extreme cases household could sell the future hours of their child work to overcome the present income shocks. At the macro level, Behrman et.al, (1999) found out that macroeconomic instability has played a major role in the low education attainment level in the early 1980s for the Latin American and Caribbean countries. Duryea (1998) concluded that the parent's unemployment reduces the probability of grade advancement among the children. Jacoby and Skoufias (1997) working on the data of rural India provide evidence that parents withdraw children from school during unexpected decline in crop income.

(vi)   Credit Market Failure

Ranjan P. (2001) claims that child labour arises due to imperfections in the credit market. Intuition behind the claim is the belief that if poor household have access to well-functioning credit markets, they would borrow money to smooth their present consumption hence invest in their child human capital by sending them to school. Basu and Chau (2003) identify poverty and the absence of reliable legal and financial systems through which the poor can secure loans to safeguard against hunger or unexpected consumption needs. Consequently, child labour grows out of an institutional arrangement in which labour and credit contracts are inter-linked. Outstanding household debts are sometime paid through the labour services of children [Basu and Chau (2003) as cited in ILO/IPEC-SIMPOC (2007)]. Baland and Robinson (2000) argue that if parents expect that the household income will increase in future they would borrow against that future income. But if the credit market is not well functioning, poor household has to rely on child labour – the internal resource available to them.

(vii)   Parents altruism and Mother's Bargaining Power

Literature on child labour often assumes that parents are altruistic i.e. parent's act is always in the best interest of their children. This means that children would be in school rather than at work under favourable circumstances [ILO/IPEC-SIMPOC (2007)]. But Humphries, (2003) illustrates that even when parents are altruistic, child labour could arise as a result of extreme poverty. According to Bhalotra (2004) Parent's altruism is a critical assumption in many economic models, ranging from models of education and child labour to models of macroeconomic policy. Incrementing the resources available to parents may not improve child welfare if parents are incompetent, myopic or selfish (Mayer, 1997 as explained in Bhalotra, 2004). Basu and Van (1998) argue that the role of parents is to some extent mis-characterized in the literature. They elaborate that when children are working in a society as a mass phenomenon, as in many less developed countries, it is much more likely that this reflects not a difference in the attitude of the parents but the problem of stark poverty. Bhalotra, (2004) in her in-depth analysis on parent's altruism argues that altruism remains a relatively neglected issue in the literature on household decision-making.

Furthermore, according to Patel et.al, (2007) empirical work has refuted with the idea that parents know how to allocate labour and other resources to improve household well-being. Preferences have a large impact on the well-being of children. Resources invested in a child are determined not only by the level of resources available, but also by the parent's preferences. Chiappori (1988) and Manser & Brown (1980) suggest that preferences between parents need not be the same. The outcome of mother and father's actions can differ. Agarwal (1997); Chiappori (1988) and Manser & Brown (1980) suggest that bargaining power over household economic decisions, when held by women, is associated with improved well-being for herself and her children than when the same resources are in the hands of men [see also Haddad & Hoddinott (1994); Rubalcava, Teruel & Thomas (2004); Thomas (1994)]. The existing economic literature provides evidence that women invest more than men in children because they are more altruistic. For example Kanbur and Haddad (1994) show that, men usually spend most of the money on personal consumption while women channelize a large share to their children's education and health. Bargaining power affects the allocation of household resources as well as schooling [Quisumbing and Maluccio, (2000)].

(viii) Poverty and Income Distribution

As discussed earlier that the literature on supply of child labour has long recognized the poverty as the major factor influencing the household decision to supply child labour. There are number of studies available showing the negative effect of GDP per-capita on child labour incidence at cross country level. At the micro level studies have also shown the negative association of child labour with income. However considering the connection among income, child labour and credit market imperfection, Baland and Robinson (2000) has considered child labour as a device which transfers resources from future to present. Thus child labour not necessarily responds to the income today but to the level of income today relative to future income [Brown et.al, (2002)]. Moreover, Blunch et.al, (2002) observing the linkages between child labour and poverty concluded that child labour responds to poverty in the short run, but not in the long run. In the recent literature the much cited work is of Basu and Van (1998). Basu and Van base their model on the basic assumption that parents are altruistic. The other two crucial assumptions of their model are

(i) the 'luxury' and (ii) the 'substitution' axioms. According to the luxury axiom parents will only send their children to work when their income drop from a level to provide the subsistence level of living. While the substitution axiom argues that adult and child labour are substitutes in the labour market, subject to an adult equivalency correction. They drive the supply curve and provide the evidence of the existence of multiple equilibria in the labour market. First where the adult wage rate is low and children work, second in which the adult wage rate is high and children do not work. The multiple equilibrium results in general equilibrium. Their general equilibrium analysis shows that in an economy where child labour is prevalent, there is a need to think of social welfare functions, which attach a positive weight to worker's welfare or a negative weight to child work. However, Basu and Van model is silent on the questions of income distribution and unemployment [ILO/IPEC-SIMPOC (2007)].

As far income inequality or income redistribution is concerned, Swinnerton and Rogers (1999) argued that the Basu and Van (998) model will only hold if the distribution axiom holds. They argue that income from the non labour sources should be concentrated in the hands of few agents. Ranjan R. (1999) provides evidence of the positive relationship between child labour incidence and income distribution. He developed an over-lapping generation general equilibrium model in which child labour arises because parents are unable to borrow to overcome their present needs. His model points out that if parents are unable to borrow against the future earnings of their children then the prevalence of inequality will be associated with the greater incidence of child labour. Grootaert and Kanbur (1995) concluded that equitable income distribution is the most suitable way of reducing child labour incidence. Rogers and Swinnerton (2001) further points out that child labour, in countries having high productivity, can be reduced or eliminated through a more equal income distribution whereas in countries having low productivity a more equal distribution of income will further aggravate the child labour problem.

b) Economics of Demand for Child Labour

Anker et.al, (1998), based on the review of research studies analyses the factors that may affect demand for child labour. According to him demand for child labour arises because

(i) children are submissive and innocent they create less trouble (ii) perform repetitive task more easily, (iii) do not join trade unions (iv) their physical structure makes them appropriate for certain tasks (v) employer hire children in order to ensure the supply of skilled workers in future and (vi) traditional occupations encourage the children to work with parents.

(i)   Nimble Finger Hypothesis

The most common and traditional view about why demand for child labour arises is based on the opinion that children have specific features that make them effective in performing certain tasks such as making rugs, sports goods, mining etc. This theory remains in circulation for a long time, especially during the British industrial revolution. At that time textile mills were powered by water and machinery was wooden hence children were very effective because of their size to operate such machines. Children were also employed in mines because of their small size as well. But the technological advancement of the 19th century substantially reduced the demand for child labour. Edmond (2003) rejected the nimble finger argument by pointing out that children mostly work in the agriculture sector while research on nimble finger argument is based on the children employment in the industrial sector.

(ii)   Technological Progress

If the argument considered above is true then technological advancement should reduce the demand for child labour. There is impulsive evidence available for the technological advancement of 19th century that has reduced the demand for child labour. As the demand for child labour was concentrated in the unskilled sector therefore it could be easily controlled by adopting skilled based technological advancement. For example the mechanization of Egyptian farms during 1970 lowered the demand for child labour considerably. Hence skilled based advancement is always documented in the literature as reducing the child labour demand.

(iii)   Structure of the Labour Market

Among the demand-side determinant of child labour an important factor is structure of the labour market especially level of market wages - both the wages of children and those of adults. Cain and Mozumder (1980) have argued that the economic value of children may not properly be assessed without reference to structure of the labour market. Structure of the labour market determines the level of wages, which in turn determines the contribution of child labour to household income. Moreover the relative importance of the formal sector in the economy and the degree of segmentation between formal and the informal sector and its effect on child labour cannot be ignored as well. In general, the evidence suggests that the extent of child labour in the formal economy is small. In many countries there is a tendency towards in-formalization of production methods, with formal enterprises either breaking up into smaller units or subcontracting to households or informal enterprises (mainly to try to escape social legislation and charges which add to the cost of labour). In such conditions the demand for child labour may increase. Another important factor pushing children to participate in the labour market is the economic condition of the household due to prevailing unemployment among the adults. Child labour is often viewed as a cause and a contributor to adult unemployment rate and low wages.

(iv)   Trade and Comparative Advantage

According to Basu and Van (1998), whenever people are informed about the child labour their first reaction is to ban it. But banning may worsen the situation rather than solving the problem. The argument has started a new debate among the scholars, is 'ban' the only solution? Will it work? As indicated in section 1.1 the growing literature on the topic is after the United States; Harkin's bill (Child Labour Deterrence Act of 1997). The model presented by Basu and Van clearly indicates that ban will not work. In the developing countries children mostly work in the unskilled sectors. Any trade sanction will lower the price of the unskilled products thereby lowering the unskilled labour wages. This if on one hand increases the returns to schooling, on the other hand low unskilled wages would decrease the household income. The overall effect of trade sanction therefore may not be in favour of the children.

Ensing (2010) has evaluated the working condition of boys in the leather sector and the condition of working girls in garment industry of Bangladesh. Her study revealed that the presence of children in the export-oriented factories of Bangladesh has been seriously reduced, but it is extremely impossible to differentiate between the products from these factories and those from the informal workshops and home-based production, where child labour remains in abundant. Girls are still working in informal industries at home, on the streets and in informal industries related to garments. Ensing (2010) argues that, after the outcry about child labour in the garments industry, and the resulting trade boycott, girls below the age of 14 are no longer found in the export-oriented factories, but the adolescent girls still working there, under harsh circumstances, which nevertheless classify them as child labourers under ILO norms [Ensing (2010)]

2.2 Review of Selected Theoretical Model

In the recent literature the most cited work is the theoretical model put forward by Basu and Van (1998). Many researchers have based their empirical findings on the theoretical arguments placed by Basu and Van. Basu and Van model has criticized trade sanctions. They argue that these trade sanctions will only create poverty and will worsen the situation of child labour instead of reducing it. As in past literature much discussion has already been done on the model therefore here it is not discussed at length. This section will first provide the review of Jafarey and Lahiri (2002) theoretical model on which chapter 3 is based. It then proceeds to Dwibedi and Chaudhuri (2010) and Chaudhuri (2009) models on which chapter 4 is based. Finally, the theoretical model of Basu (2006) will be discussed on which chapter 5 is based.

a) Trade sanctions, Child Labour and Role of Credit by Jafarey and Lahiri (2002)

Jafarey and Lahiri (2002) consider a small open economy case of two period $(t = 1, 2)$ producing two goods per period (good labelled $i = 1, 2 \dots 4$). They assume that the economy is a net exporter of unskilled goods. Goods 1 and 2 are produced during period 1 while 3 and 4 are produced during period 2. Pi presents the world price of good i. Labour is considered as the only input and could be skilled or unskilled. Jafarey and Lahiri consider that labour cannot be substituted and one unit of each good is produced by using

one unit of labour. Assuming that good 1 and 3 are produced by skilled labour and 2 and 4 are produced by unskilled labour; the wage rate paid to skill worker is thus defined as equal to P_1 in period 1 and P_3 in period 2. While for unskilled labour the wage is defined as P_2 in period 1 and P_4 in period 2 such that $P_1 > P_2 \text{ and } P_3 > P_4$. Households in Jafarey and Lahiri model are headed by the single parents either skilled or unskilled (exogenous in the model).

Households headed by skilled parents are considered rich 's' while households headed by unskilled parents are assumed to be poor 'u'. It is also assumed that there are 'N' identical numbers of children in each household. Each child is born without skill but can acquire skill by taking training in period 1 thus he could earn skilled wages P_3 in period 2. If they don't receive training then they would earn unskilled wages P_2 in period 1 and P_4 in period 2 . The training decision is characterized by a function (e) and is assumed to be solely taken by the parents with Ne children receiving training while $N(1-e)$ ending up as child labour. Jafarey and Lahiri household utility function 'v' is based on the consumption (c) of 4 goods and a measure of educational level:

$$v = w(c_1, c_2, c_3, c_4) + g(Ne) \qquad (2.1)$$

While the budget constraint is:

$$Y + N(1-e)P_2 + Z/r + Ne\,P_3/r + N(1-e)\,P_4/r$$
$$= E(P_1, P_2, P_3/r, P_4/r, v - g(Ne) \qquad (2.2)$$

Further, assuming the non-increasing marginal utility of income and normality in all the goods Jafarey and Lahiri evaluated the household education decision as a function of price and a given interest rate 'r'.

$$Eg'(Ne) + (P_3 - P_4)/r \geq P_2 \qquad (2.3)$$

According to Jafarey and Lahiri an increase in training decision 'e' means gaining income and it also increases the income of the second period by skill premium $(P_3 - P_4)$ which will be discounted back in period 1. This will also result in the loss of first period income. Such a result is interpreted by Jafarey and Lahiri as the interior solution and is basically because of the negative discounted economic returns to education. As training decision and

utility function are jointly determined in their model, they study the dependence of training decision and interest rate. They show that with the increase in interest rate, welfare of the lender rises while welfare of the borrowers falls. According to them an increase in interest rate reduces the economic returns to education. It reduces the marginal benefits of education and induces a lower choice of training decision. But for lenders, the welfare effect is positive and works against the effect of a decline in returns to education. This makes training decision to increase with interest rate for household that lends.

Furthermore in order to evaluate the dependence of borrowing 'b' on interest rate Jafarey and Lahiri conclude that an increase in interest rate reduces the training decision and demand for loans by borrowers as training decision has decreased. After establishing the relationship among borrowing, interest rate and training decision Jafarey and Lahiri precede the analysis by considering three scenarios in credit market:

In scenario 1 it was assumed that all the households can borrow and lend freely in the perfectly competitive credit market that link to international market. In this case interest rate is exogenously given and equal to world interest rate while the decision of rich and poor are entirely independent.

Under Scenario 2 Jafarey and Lahiri assume that borrowing is subject to a quantitative constraint, i.e. interest rate faced by the poor household is influenced by some subjective factors and quantitative constraint ($b=\bar{b}$). It is again independent of rich household.

In scenario 3 households borrow from the domestic credit market. According to Jafarey and Lahiri in this case rich and poor household exchange loan and each household discount rate is equal to the equilibrium interest rate. Jafarey and Lahiri have used a combination of different equations to determine training decision, utility function and borrowing decision of poor household and utility function and supply of loan for rich household along with the condition that training decision for rich household is equal to 1. The equilibrium interest rate is therefore determined by the interaction of demand and supply of borrowing. This case is viewed by Jafarey and Lahiri as having an interesting policy implication. According

to them rich households increase their savings entirely through lending in the credit market, since the children's education is equal to 1, that is cannot be increased further.

Considering scenario 2, Jafarey and Lahiri stress that borrowing constraint is small relative to the unconstrained or equilibrium level borrowing. Hence given that the constraint binds, interest rate will be higher than the equilibrium interest rate. Opening a domestic credit market according to them will result in a fall in the discount rate for poor households which leads to higher educational choice and if there is an international credit market in which all households could participate, it is reasonable to assume that for a developing country equilibrium interest rate will be higher or equal to world interest rate and one shall have world education outcome higher or equal to equilibrium level education outcome. After analysing the equilibrium in the credit market, Jafarey and Lahiri introduce the effect of trade sanction on the incidence of child labour. Keeping in mind the assumption that the country is a net exporter of unskilled goods now trade sanctions will result in a fall in price of unskilled good in period 1 (i.e. P_2).

$$E_5 dv = [\{1 + N(1 - e)\} - E_2]dP_2 - (b/r)dr \qquad (2.4)$$

Because of the assumption that the economy is a net exporter of unskilled good, a reduction in price of unskilled good will reduce the welfare of the unskilled families. Turning to the effect on training decision and borrowing, Jafarey and Lahiri have shown that a decrease in the price of the exportable, for a given level of real income, would reduce the opportunity cost of education (a substitution effect) and therefore might increase training decision. The same will be true for the increase in real income. On the other hand a decrease in price of unskilled good would also decrease real income and thus encourage a decrease in training (the income effect). Hence the two effects are opposite while changes in training decision via interest rate means an increase in interest rate reduces training decision.

Overall Jafarey and Lahiri suggest that a decrease in price of unskilled good has the potential to decrease training decision (increase child labour) if the income effect dominates the substitution effect. Their results hold even for the internationally perfect credit markets as well. On the other hand, a decrease in price increases the demand for

consumption in period 1 relative to period 2. But it also reduces the income of unskilled families in period 1. Similarly, any increase in the level of schooling will also increases future income and therefore the demand for loans. This indirectly raises the interest rate. What happens to the supply of loans? Supply comes from the rich households and Jafarey and Lahiri show that a decrease in price of unskilled good increases the supply of loans.

According to them, a decrease in price of unskilled good will increase the income of the rich household as they do not participate in the production of unskilled good. This will increase the supply of loan because education cannot be further increased. Jafarey and Lahiri compare the effects of a trade sanction under two scenarios: in the first case the borrowing constraint is assumed to be preventing loans from adjustment in response of changes in demand or supply of funds; in the second case Jafarey and Lahiri assume that market freely adjusts to a new equilibrium. According to Jafarey and Lahiri in the first case, when a decrease in P_2 raises the demand for loans, for a given interest rate, training decision increases. Jafarey and Lahiri have proved that a low value of training decision is associated with a high marginal utility of both income and education. As low initial value of training decision is associated with low parental income in their model therefore a trade sanction could cause a decline in children's education at least for households that are poor. Jafarey and Lahiri stress that only those families that suffer large income effects as a result of trade sanctions send a large proportion of children to work. Summarizing the result for case 1 Jafarey and Lahiri conclude that: "In the presence of a borrowing constraint, a trade sanction increases a poor household's discount rate, which negatively affects its children's education".

Turning to the second case where supply of funds adjust in response to changes in demand, new equilibrium will arise where interest rate increases, still having negative effect on child labour. However, a comparison of both cases shows that the trade sanction is less likely to lead to perverse effects on child labour if the supply of loans can adjust in a competitive domestic credit market than if it cannot. To summarize, the analysis of Jafarey and Lahiri suggested that: "The discount rate of poor households rises more strongly under borrowing constraints and rises less strongly or even falls under a domestic credit market. This implies

that a perverse effect from trade sanctions to child labour in poor households is less likely if credit is available at the margin".

b) Foreign capital, Returns to education & child labour by Dwibedi and Chaudhuri (2010)

Recently Dwibedi and Chaudhuri (2010) using a three sector general equilibrium framework has shown that reduction in poverty does not necessarily transfer in the reduction of child labour. They argue that economic reforms like inflow of capital can affect the incidence of child labour by lowering the opportunities of child work. Although main analysis of their study revolves around the effect of foreign capital inflow on child labour but nevertheless they provide extensive detail on the relationship between child labour, wages and skilled composition. Dwibedi and Chaudhuri (2010) are the first to derive the supply function of child labour using inter temporal utility maximization behaviour. They consider a two period optimizing problem. Working family in their model consists of one adult and a child. They assume two different types of families; one with skill (S) and other without skill (L). In the first period adult wage is W_0, which is the sum of unskilled wage (W) and skilled wage (W_s). Child schooling decision is assumed to be taken by adult in period 1 and the total time available to child is assumed to be 1. Out of the total time available, child used l_c time in work and receive wage W_c. Thus time spent in schooling is equal to $1 - l_c$ and if child is in school in the first period he/she won't receive wage, W_c but earn skilled wage, W_s in period 2. Such that skilled wages is greater than unskilled wages, $W_s > W$ due to positive returns to schooling. In period 2, adults do not work and lives on child income.

Assuming that the parents only care about life time consumption and do not care for the child leisure, they derive the utility function based on two period (1, 2) consumption levels. They assumed logarithmic utility function with unitary inter temporal elasticity of substitution:

$$U = log C_1 + \beta log C_2 \qquad (2.5)$$

Where β is the time discounted factor. The first period consumption C_1 depends on the adult income and child wage:

$$C_1 = (W_0 + l_c W_c) \qquad (2.6)$$

Consumption in period 2 (C_2) is the sum of the skilled wage of educated (skilled) adult labour (that went to school in the first period) and unskilled wage of uneducated (unskilled) adult labour (that went to work in period 1).

$$C_2 = (l_c W + (1 - l_c) W_S) \qquad (2.7)$$

It was assumed that cost of education is the only opportunity cost in terms of forgone earning of the children. Adult maximize the life time utility with respect to children time in labour, l_c and subject to equation 2.6 and 2.7. First order condition thus can be written as:

$$\frac{(l_c W + (1 - l_c) W_S)}{W_0 + l_c W_c} = \frac{\beta (W_S - W)}{W_c} \qquad (2.8)$$

By solving the above equation, child labour function for each working family is obtained as:

$$l_c = \frac{W_S}{(1 + \beta)(W_S - W)} - \frac{\beta (W_0)}{(1 + \beta) W_c} \qquad (2.9)$$

and for the two families (skilled and unskilled) the supply functions can be written as:

$$l_{cs} = \frac{W_S}{(1 + \beta)(W_S - W)} - \frac{\beta (W_S)}{(1 + \beta) W_c} \qquad (2.10)$$

$$l_{cu} = \frac{W_S}{(1 + \beta)(W_S - W)} - \frac{\beta (W)}{(1 + \beta) W_c} \qquad (2.11)$$

As both skilled and unskilled families supply child labour the following can be concluded:

$$l_{cs} > 0 \ if \ and \ only \ if \ W_c > \beta (W_S - W); and$$

$$l_{cu} > 0 \ if \ W_c \geq \beta (W_S - W)$$

Child labour supply function shows that any increase in the current income, will raise current consumption, and hence lower child time at work. It will also have positive income effect and consumption in period 2, will increase. However, any increase in the child wage rate will increase the opportunity cost of schooling and hence will lead to more child labour supply. Moreover, any changes in the skilled and unskilled wages will influence the returns to education and hence influence the decision made by adult in the period 1 about the child's schooling. If skilled wages increase or unskilled wages decrease it will make education more attractive and hence child schooling will increase.. This will lower child labour supply.

As explained earlier, Dwibedi and Chaudhuri (2010) consider a small open economy case with three sectors. The first sector is assumed to be employing adult unskilled labour (L), child labour (L_C) and capital (K). This sector produces X_1 commodity. Second sector is assumed to use adult unskilled labour and capital only to produce low skilled commodity X_2. Although this sector can also employ children but Dwibedi and Chaudhuri (2010) justify their assumption on the ground that 70% of the economically active children in the developing countries are engaged in the agriculture sector and only less than 9% is employed in the manufacturing sector (low skilled sector). Finally sector 3 is assumed to produce high skilled commodity X_3 using skilled labour (S) and capital only. Products are assumed to be final commodities and their prices $P_i's$, are given by small open economy assumption. They also assumed competitive markets, CRS technologies with diminishing marginal productivities and full-employment of all resources. Price unit costs for the three sectors are given by:

$$Wa_{L1} + W_c a_{C1} + Ra_{K1} = P_1 \qquad (2.12)$$

$$Wa_{L2} + Ra_{K2} = P_2 \qquad (2.13)$$

$$W_s a_{S3} + Ra_{K3} = P_3 \qquad (2.14)$$

Where, a_{ji}'s are input output ratios and R is the return to capital.

Full employment conditions are given by:

$$a_{L1}X_1 + a_{L2}X_2 = L \qquad (2.15)$$

$$a_{C1}X_1 = L_c \qquad (2.16)$$

$$a_{K1}X_1 + a_{K2}X_2 + a_{K3}X_3 = K \qquad (2.17)$$

$$a_{S3}X_3 = S \qquad (2.18)$$

As there are L and S numbers of unskilled and skilled families supplying child labour in the economy the aggregate child labour supply function is written as:

$$L_c = \left(\frac{1}{1+\beta}\right)\left[L\left\{\frac{W_S+R_H}{(W_S-W)} - \frac{\beta.(W+R_H)}{W_C}\right\} + S\left\{\frac{W_S+R_H}{W_S-W} - \frac{\beta.(W_S+R_H)}{W_C}\right\}\right] \quad (2.19)$$

The above general equilibrium system consists of 8 equations and the same number of variables. This system shows that factor prices depend on both commodity prices and factor endowment. By totally differentiating the above system of equation they obtained the distributive share of jth input in the ith sector and the degree of substitution between factor j and i in the Kth sector.

On the basis of the theoretical findings they made some final conclusion. According to their proposition any increase in the inflow of capital lowers the returns to capital leading to expansion in sector 2 and 3, and contraction in sector 1, as sector 1 is more labour intensive then sector 2 and 3. Under this condition demand for child labour falls in sector 1 and demand for skilled labour increases in sector 3. This will result in a decrease in the child wage and a rise in the skilled wage. A decrease in child wage rate means a decrease in the opportunity cost of schooling. In sector 2, demand for unskilled labour also increases leading to an increase in unskilled wages. As sector 3 is more capital intensive then sector 2, saving on capital input is more in sector 3 then in sector 2. This in turn increases the relative wage inequalities. On the other hand, returns to education rise as wage inequality rises, thereby reducing the incidence of child labour.

c) Labour Market Reform and Incidence of Child Labour in a Developing Economy by Chaudhuri (2009)

Similar to the above, in an earlier study, Chaudhuri (2009) considers a small open economy case to generalize the effect of changes in wage policy on child labour. The main difference between Dwibedi and Chaudhuri (2010) and Chaudhuri (2009) is that Chaudhuri (2009) emphasize on formal and informal sector while Dwibedi and Chaudhuri (2010) put emphasis on skilled and unskilled composition. Chaudhuri (2009) considers a case of two sectors, formal and informal (sector 1 is informal and sector 2 is formal) and three factors of production, adult labour (L), child labour (L_C) and capital (K). The informal sector employs both adult labour and child labour apart from capital and produces commodity, X_1. The formal sector produces commodity, X_2 by means of capital and adult labour only. Adult labour in his model is imperfectly mobile while capital is completely mobile and market for adult labour has imperfection. In the formal sector workers receive high wages, W*, while workers in informal sector earn only a competitive wage, W, such that wages in the formal sector is greater than the wages in the informal sector, W* >W.

Following Basu and Van's (1998) 'Luxury Axiom', he assumed that there exists a critical level of family income $\overline{W}$, such that the families will send their children to work if and only if adult wage rate is less than critical level. It was further assumed that adult worker in the formal sector earns wage income greater than this critical level. Hence, workers working in the formal sector will not send their children to work. On the other hand, adult workers employed in the informal sector earn less than critical level of wage income and are therefore compelled to send their children to work in order to supplement family income. The supply function of child labour determined by Chaudhuri (2009) again shows the same properties as given in Dwibedi and Chaudhuri (2010). They assume that wages in the formal sector are higher than the informal sector because of the existence of well-organized trade unions to bargain with employers in respect of working conditions, benefits and wages.

Like Dwibedi and Chaudhuri (2010) using a general equilibrium system, comes up with the following proposition; whenever wages in the formal sector fall[3], return to capital must rise in order to satisfy the zero profit condition. This will result in the less use of capital by the producers and the capital output ratio in the two sectors decreases. There would be an excess supply of capital which according to Chaudhuri (2009) will create a Rybczynski-type effect and as a result formal sector will expand while informal sector will contract. This will result in the fall in the production in informal sector. The fall in the production and rise in the return to capital would have two opposite effects on the informal sector. First, demand for adult labour and child labour falls, which exerts a downward pressure on wages, and second as return to capital rises producers substitute capital by labour. This will raise the labour output ratio which increases the demand for labour; both adult and child labour. The net effect on adult wages and child wages in the informal sector is ambiguous. According to Chaudhuri (2009) the child wages decline only if elasticity of substitution between adult labours to capital is greater than the elasticity of substitution between child labours to capital. While adult wages fall only if elasticity of substitution between adult labours to capital is less than the elasticity of substitution between child labours to capital. However, if the two elasticities of substitution are equal the proportionate fall in adult wages will be less than that in child wages. Hence, ratio of adult wages over child wages rises and the supply of child labour falls.

d) Gender and Say: A Model of Household Behaviour with Endogenously Determined Balance of Power by Basu (2006)

Basu (2006) presented a model for intra-household bargaining power. He suggests that the understanding of the relationship between household balance of power and household decision making is necessary to develop a policy design affecting household welfare. According to him all the recent literature modelling the impact of household bargaining power on household decision-making ignores the opposite relationship between the two i.e.

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[3] Adult wages can change directly because of some policy measures such as minimum wage law or because of the economic development or may be because of the changes in the trade policy. Here Chaudhuri (2009) assumes that wages falls because of the policy reform.

the effect of decisions on bargaining power. His study provides some theoretical initiative to model both of these relations simultaneously.

Basu (2006) assumed a household with two adults, male (1) and female (2) having distinct utility function. Household may be with and without children. Household maximizes the weighted average of these two distinct utility functions. The weight captures the bargaining power between the two. Let:

$$\mu_i: \mathfrak{R}_+^n \rightarrow \mathfrak{R} \qquad (2.20)$$

Where, $\mathfrak{R}$ is a real number, n is the number of goods consumed by household i is individual. A good could be anything consumed by the individual for example it may represent the leisure of the two. The argument $x \in \mathfrak{R}_+^n$ of the utility function is a vector of goods consumed by the households. The household maximand function is given by:

$$\Omega \equiv \theta \mu_1(x) + (1 - \theta)\mu_2(x) \qquad (2.21)$$

Where, $\theta \in [1\ 0]$ that captures the balance of power in the house. According to Basu, θ depends on other variables like wages, inherited wealth and cultural factors. Assuming that there are z numbers of variables that determine balance of power $'\theta'$ the bargaining power function can be written as a function of $'z'$ number of variables $'\theta(z)'$. Where z is assumed to be exogenous under the collective household model. The household maximization function can be written as follow:

$$Max\ \theta(z)\mu_1(x) + (1 - \theta(z))\mu_2(x) \qquad (2.22)$$

Subject to: $x \in \mathfrak{R}_+^n$ and $px \leq Y$

Where p is the vector of prices and Y the total income of the household. The budget set T hence given as:

$$T = \{x \in \mathfrak{R}_+^n | px \leq Y\} \qquad (2.23)$$

Here if income and prices remain constant than household expenditure pattern can change with the changes in the exogenous variables $'z'$. This will shift the balance of power. Although the model is very simple but one short coming of this model according to Basu is

that here variables that determine balance of power are considered as exogenous. This may not be necessary in every situation. It is reasonable to believe that balance of power changes with the choice of x. For example balance of power increases when the woman's earning power increases. Her earning power not only depends on the prevailing market wages but also on the hours of work. The hours of work in turn are determined by the household. Hence, balance of power can be influenced by the household decision, a point which was usually ignored by other studies. The problem therefore needs to be addressed. In order to keep the model simple Basu assumes that balance of power depends not only on exogenous factors but also on x i.e $\theta = \theta(z, x)$. Now for a given balance of power the household maximize utility by choosing x which in-turn effect balance of power. Therefore household further adjust x. To come up with the solution Basu first describes the maximization problem as:

$$x = \eta(p, Y, \theta) \qquad\qquad (2.24)$$

Given prices, income and balance of power (p, Y, θ), a household equilibrium is therefore an index of bargaining power θ^* and a vector of goods x^*, such that $\theta^* = \theta(z, x^*)$, and $x^* = \eta(p, Y, \theta^*)$. According to Basu, there may exist more than one equilibrium.

Basu argues that equilibrium must exist. He proves that household maximand function Ω is concave and continuous. Therefore, Ω must reach to a maximum point to some unique value of x in the domain T. This shows that $\eta(p, Y, \theta)$ is a function and as prices and income are fixed it becomes the function on the domain [1, 0]. After fixing the value of exogenous variables, income and prices $(z, Y$ and $p)$ he define: $\varphi: T \, X \, [0,1] \to T \, X \, [0,1]$ is a response function if for all $(x, \theta) \epsilon \, T \, X \, [0,1]$, $\varphi(x, \theta) \equiv (x', \theta')$ such that $x' = \eta(p, Y, \theta)$ and $\theta' = \theta(z, x)$. Given condition T is non empty hence $T \, X \, [0,1]$ is also non empty and because of condition θ is continuous hence φ is a continuous function. Using Brouwer's fixed point theorem, he concluded that there exist (x^*, θ^*) such that $\varphi(x^*, \theta^*) = (x^*, \theta^*)$.

The above household bargaining power was then applied to explain the child work status. But before explaining the effect he made further assumptions. First he assumed that both

mother and father feel bad about child labour. Secondly, although they feel bad about child labour but they have their differences about how and on what to spend the additional income that the child brings. The cost of child labour thus:

$$c_i = c(h), \qquad c' > 0 \ and \ c'' > 0 \qquad (2.25)$$

Where, h is the work done by child. Assume that women like to spend the additional income on good 1 while husband want to spend the additional income on good $2 -$ good x_i. The utility function would now be:

$$\mu_i = \varphi x_i - c(h), \text{ where, } \varphi' > 0, \ \varphi' \leq 0 \qquad (2.26)$$

Assuming the amount of work done by adult is fixed the household maximand can be written as:

$$\Omega \equiv \theta \mu_1(x) + (1 - \theta)\mu_2(x) - c(h) \qquad (2.27)$$

Taking the price of a good as 1 and wage of child as w the budget constraint can be written as:

$$x_1 + x_2 = hw + w_1 + w_2 \qquad (2.28)$$

Solving the maximization problem subject to budget constraint shows a special case where:

$$\varphi(x_i) = x_i^{\alpha}, \quad where \ 0 \ \alpha \ \leq 1 \qquad (2.29)$$

This is a concave function having a linear special case when $\alpha = 1$. This shows that as the bargaining power, θ increases (starting from 0), child labour first declines; but as θ continues to rise (beyond 1/2), child labour again rises [see Basu (2006) for prove].

The theorem implies that the relation between a woman's power and the amount of child labour is U-shaped. The intuition given by Basu is straight forward. According to him child labour is painful for both parents. The difference between the two is only on the spending of the additional income. When the bargaining power of the two fairly matched, that is balance of power is 1/2, $(\theta = \frac{1}{2})$ changes in balance of power will have little effect on the cost of child labour. The benefits of the additional income generated by sending the child to

work will not be fully reaped by any of the two, as θ is close to half, creating a tussle between good 1 and 2. But neither of the two gets the full benefit of the additional income. The net result is that the child will be less likely to work. On the other hand, if balance of power goes to 1 or to 0, only one parent becomes powerful and so he/she will gain the full benefits of child labour therefore child work will increase.

According to Basu the above result (U-shape) would only be violated if one assumed that women are more inclined towards the welfare of her child, then the amount of child labour will be less when balance of power is equal to 1 $(\theta = 1)$ than when balance of power is equal to 0 $(\theta = 0)$. In that case the child labour curve, instead of being U-shaped, would be tau-shaped.

2.3   Literature on Pakistan

As far as the literature on Pakistan is concerned table 2.1 summarises the findings of few of the recent studies on Pakistan in detail. Findings indicate that the literature on child labour is usually approached by economists in Pakistan from supply side. There is small literature available that explores the demand side of child labour. In Pakistan poverty, low literacy level and household composition/demography are often considered as the most important determinants of child labour, when the problem is addressed at micro level. At micro level as said above poverty is considered as the main cause of child labour. Altruistic parents take the decision to send their children to labour because of poverty. A look on the table 2.1 suggests that literature exploring the determinants of child labour has explored either poverty and child labour nexus or human capital and child labour nexus. The Cultural norms are also considered as an important factor affecting incidence of child labour significantly. Recently household decision making models, bargaining models, have also been used to explain the decisions about household consumption expenditure and expenditure on child schooling.

As far as demand side studies are concerned these are either case studies or based on cross tabulation of Labour Force Survey of Pakistan. The demand side literature based on simple crosstabs has highlighted some of the features of labour market like employment status,

working hour, child wages, sectoral compositions, unemployment and wage rate. However, the literature fails to provide an in-depth analysis of effect of labour market conditions on child labour incidence. Furthermore, at macro level the effect of growth, trade openness and FDI has also been explored. But overall literature in Pakistan emphasizes more on supply side determinant rather than demand side. The supply side determinant is usually explored using micro data. A very less emphasis is place on the macro data as well.

Table2.1: Literature on Pakistan

Authors	Variables Used	Estimation Techniques & Data	Objectives	Major Findings
Shahnaz Hamid (1994)	child labour (5-14), in school or out of school, child characteristic, household characteristics, Household head employment status.	None Cross tabs Using IFPRI (1986)	1. Estimate urban child Labour supply 2. Evaluate working condition.	1. Out of the total working children 5% are private regular employee, 1% are self-employee, 2% involved in joint work. 2. Dropout rates are not important as 91% children never went to school. 3. Out of the total working children 37% earn Rs. 200 per month. 4. Other important factors that influence child labour includes household income, gender, educational level and occupational status of the household head.
Mahmood Moazam, Tariq Javed and Ajmal Baig (1994)	Children not in school	Theoretical framework	1. Study explores the effect of poverty 2. Demographic implication of child labour and 3. implication for labour market	1. Child labour can proliferate by the dominion across sectors. This dominion is composed of both supplementary and substitution effect. 2. Child labour will have a higher incidence in the labour intensive exporting sector. 3. Child labour has significant effect on fertility rate. 4. Child labour can enforce constraint on adult female labour force participation rate.
Younous Jafri and Raishad (1997)	Participation rate of (10-14), Child characteristics across industries, employment status, household income and periodicity of earning	None Cross tabs Using LFS- (1990-1) (1991-2) (1992-3)	Analysing child labour phenomenon across different time period	1. Child labour grew up from 1.8 million in 1990-91 to 2.0 million in 1992-93 2. The growth of girl workers is higher as compared to boys. 3. Gender differential in participation is more pronounced in urban areas than in rural areas 4. In rural areas agriculture has engaged the maximum number of children 5. In urban areas, the services sector has played the dominant role because service sector in urban areas is still largely dominated by the informal sector 6. Employment status indicates that children mostly work as unpaid family helpers, 70% worked 35 hours per week.

Authors	Variables Used	Estimation Techniques & Data	Objectives	Major Findings
Sabur Ghayur (1996)	Child labour, Labour Market conditions such as unemployment, sectoral composition, informal sector, poverty, working conditions, hours of work, wages and income	None cross tabs Using Secondary data and personal observation	To explore the labour market conditions, in the context of prevailing child labour.	1. Labour market is mainly informal in nature 2. Self-employed and unpaid family helpers account for about two-thirds of the total employed. 3. Highly skewed land ownership pattern generate extremely low income for the large proportion of the workers engaged in agriculture 4. Labour force survey of 1993-94 indicate that 42.13% employed labour force were drawing a monthly income less than Rs 1500 5. One-third of the employed in Pakistan found to be working 56 hours a week 6. The industrial classification of child labour is such that two-thirds of them work in the agricultural sector. Further three fourths of them were in rural areas and are unpaid family helpers, while a three-fifths of those working in urban areas are employees, mainly engaged in the informal sector
Akmal Hussain (1998)	Working children, Work environment and Index of work hazards	Cross tabs Using 400 worker in 200 small scale establishment of 7 industries in Lahore (1990)	To explore the nature and extent of hazards faced by child workers in the construction related industries, keeping in mind that the number of children in the large-scale formal sector may have declined but child work persists to a significant extent by means of the "Contract System".	1. In Urban and semi-urban areas, most of the working children are employed in small scale unregistered establishments, in the informal sector. 2. Children remain employee of a contractor in the informal sector while actually working for the larger industries 3. Children earn an average monthly income of Rs. 200. 4. child workers in the construction related industries are facing at least 16 different hazards

Authors	Variables Used	Estimation Techniques & Data	Objectives	Major Findings
Rana Ejaz Ali Khan (2001)	Working children, child characteristic, parent characteristics, Employment situation.	None Cross tabs Using Sample survey of children working in Auto workshop	a) explore socio-economic background b) reasons for leaving schools c) extent of exploitation	1. Child labour in auto workshops is 30%. 2. Child labour exists equally in heavy as well as light vehicle workshops. 3. There is no bonded child labour in auto workshops. 4. The daily working hours are 11.45 on average. 5. Majority of the children have not completed the primary level 6. 31% of children, belongs to households where heads are in private employment
Ranjan Ray (2001)	Age specific participation rate below 17, Child Characteristics, Household Characteristics, Cluster/community characteristics	two-step procedure after correcting for sample selectivity Using PIHS, Pakistan (1991) PLSS, Peru (1995)	To explore the Key determinants of Child Labour hours in Pakistan and Peru	1. There is a negative association between years of schooling and household poverty. 2. income from child labour pulls more households out of poverty in Pakistan than in Peru 3. When a Pakistani household falls into poverty, it increases child's involvement outside. 4. In contrast, the Peruvian data fail to detect any significant association between household poverty and child labour or between household poverty & schooling.
M. Aslam Choudhary and Farzana Naheed Khan (2002)	age (5-14), child characteristic Household characteristics employment condition	None Cross tabs Using 125 working children In Dera ismail Khan City of Pakistan	To identify relationship between child labour and variables such as poverty, fertility and adult literacy rate etc. Consequences of child labour on working children, considering working hours, behaviour of bosses and health status of children	1. Poverty is the main cause of child labour in the city. 2. Fertility, family size, adult illiteracy and schooling system also contribute to the supply of child labour. 3. Situation is comparatively less serious for female child labour. 4. Parents think that poor quality of education does not add to the children's ability to improve productivity. 5. Working conditions were poor and dangerous and harmed children by ruining their eyesight, bone deformations, chronic lung diseases, and sometimes resulted in the death of children.
Gautandr Hazarika and Arjun S. Bedi (2003)	weekly work hours, Child characteristics, Educational profile, Community and regional controls	Tobit, Heckman Two steps, Probit model Using Pakistan Integrated Household Survey (1991)	Explore Schooling as policy variable using the concept of intra household (with in) child labour supply and extra household (outside) child labour supply	1. Schooling cost is positively related to extra household child labour supply. 2. Intra household child labour supply is unresponsive to schooling cost. 3. Parents consider extra household labour and schooling as substitute.
Rana Ijaz Ali Khan (2003)	Child in school, Child school + work, Child Work only, Neither in school nor work,	Sequential probit model Using Sample survey of two districts	whether and to what extent changes in the education, household income, education level of	1. Birth order has negative effect on schooling only decision. 2. The male children are more likely to go to school as compared to female children. 3. The head of the households are critical in determining the child's

Authors	Variables Used	Estimation Techniques & Data	Objectives	Major Findings
	child characteristic Household characteristics		parents, unemployment level of parents and the demographic factor could effectively reduce child labour	schooling and labour decision. 4. Younger children are less likely to combine schooling with work. 5. Mother's education is negatively related to the decision of combining school and work. 6. Mother's income has a positive relation with the probability of the child combining school and work and has negative relation to no-school, no work decision. 7. The birth order of the child is negatively related to work only. 8. Education of the head of the household has significant and negative impact on child's work. 9. The higher the birth orders the more likely him /her to be in the state of no school no work. 10. Mother's income and employment both have a negative impact on no-school no-work activity
Umer Khalid and Lubna Shahnaz (2004)	Participation rate 10-14, child characteristic, Household characteristics	None Cross tabs Using LFS-(1996-7)	Explore Socio-economic background	1. A higher proportion of children between the age cohorts of 12-14 years are involved in work and the majority of them are male. 2. Working children are found uneducated and working without any technical training. 3. Majority work in the elementary (unskilled) occupations. 4. 58 per cent of working children earn monthly wages up to 1000 rupees. 5. Majority work nearly 40-50 hours per week. 6. Parent's occupational status and educational level are together linked to child labour.
Imran Ashraf Toor (2005)	Child Labour rate (10-14), Per capita income, literacy rate, deprivation index, household size	Multiple Linear Regression Using Pakistan Population Census (1998)	Exploring hypothesis that child labour incidence is high among less deprived district	1. Multiple Deprivation index composed of a) Out of school children (b) Inadequate Housing structure (c) Residential housing services and (d) Unemployment rate, shows negative association with child labour incidence. 2. Result shows that child labour has a negative relationship with the literacy rate and per capita income as well
Rafia Kulsoom (2009)	Working Children age (11-17),Child income, Work experience, age, working hours, household per capita income, age of parents& # earners	Maximum Likelihood Estimates Using Sample Survey of 150 male Children from Rawalpindi	study assessed several demographic characteristics as basic determinant of the incidence of child labour in Rawalpindi city	1. The major determinant of child labour is poverty. 2. Age of the child has a positive impact on participation decisions. 3. The ownership of asset has shown a negative impact on participation decisions. 4. weekly working hours is also statistically significant

Authors	Variables Used	Estimation Techniques & Data	Objectives	Major Findings
Xiaohui Hou (World Bank Economic Policy and Poverty Unit) (2009)	Children going to school only, Children working only And neither in school nor working, Household Demographic Variables, Household Expenditure/Income, Productive assets held, Community Characteristics	Multinomial Logit model, Fixed Effect Test Using Data from 1998-2006, time series and cross Sectional data. Pakistan Integrated Household Survey (1998-9); (2001-2) and (2005-6)	Explore the relationship for wealth, child labour and Schooling	1. When per capita log expenditures increases, rural boys are less likely to work. 2. Wealth plays an insignificant role in determining rural girls' activity decisions. 3. Study does not find the inverted U-relationship between agricultural land and propensity of child work. 4. Children in households with agricultural land are less likely to be Inactive. 5. Children in households with land are more likely to go to school. 6. Children in households with any farm animals are more likely to work. 7. Rural boys are more likely to work and less likely to be inactive when they get older
Akhtar A. Hai, Ambreen Fatima and Mahpara sadaqat (2010)	Child labour percentage, Child characteristic, Household and household head characteristics	Cross tabs and correlations and Simple OLS Using 217 household with 1,639 individuals	Paper explore the extent and the effect of socio-economic and demographic factors that lead to the phenomenon of child labour in the fishing sector of Balochistan (province of Pakistan)	The findings of the paper show that in the coastal areas about 30 percent of the children are involved in fishing. It is observed that the main cause of child labour is not poverty it comes out to be low quality of education, lack of job opportunity, and lack of development.
Uzma Iram and Ambreen Ftaima (2008)	Percentage of child labour (10-14), FDI, trade openness, GDP per capita, value added of agriculture sector in GDP and urban population	Multivariate vector autoregressive (VAR) model Using Annual data 1970-2003	Paper investigates the causal links between FDI, openness and child labour.	1. Study rejects the null hypothesis of no-co integration at 1 percent significant level. 2. Cointegration coefficients normalized on child labour shows that openness and the percent of urban population have a positive and significant impact on child labour, while the agriculture share in GDP and FDI have significant negative effect on child labour.

Authors	Variables Used	Estimation Techniques & Data	Objectives	Major Findings
Sonia Bhalotra (2004)	Expenditure on child clothing, expenditure on adult clothing tea, coffee and tobacco, Wages, Proportion of children (10-14), proportion of adult male and female, Land size, tenancy, occupational status and schooling variables.	Two-step generalized method of moment's estimator (GMM) Using Pakistan Integrated Household Survey (1991); Using 2,400 rural households containing 18,382 individuals	Investigate the relative weight on child consumption in the parents' utility function; i.e. whether child consumption exhibits a positive co-variation with adult consumption.	1. The null of egoistic parents is rejected. For every additional rupee spent on adult clothing, expenditure on child clothing increases by 0.52 of a rupee. 2. The weight that parents attach to child consumption is positive but smaller than the weight they attach to their own consumption. 3. The results are robust for alternative specification used with one exception when tobacco expenditure increases, there is no increase in expenditure on child clothing. A possible interpretation is therefore that there are deviations from altruism amongst those households that contain a smoker. 4. The main result is robust to a number of alternative specifications such as allowing for non-separability of child consumption and adult leisure, and allowing for the presence of child labour.
Sonia Bhalotra (2007)	Hours of wage work, Non labour income, age, household size, proportion of male/female in different age group, Parents age and Education, household Head age and gender, land size, religion and Province	OLS, 2SLS, GMM and Probit model Using Pakistan Integrated Household Survey (1991)	Test the hypothesis that child labour is compelled by poverty	1. The wage elasticity is significantly negative for boys. The hypothesis that boys work on account of poverty compulsions cannot be rejected. The estimates suggest that if wage rate of boys drops, he works longer hours to make up the loss in earnings. 2. Household income has a negative impact on boys' work elasticity (0.63). 3. Substitution effects associated with land ownership dominate wealth effects for girls, but not for boys. Girls in households that own relatively large plots of land are more likely to work. 4. Girls' work is not compelled by poverty. 5. Household income had a large and negative effect on boy labour, but no significant effect on girl labour. 6. parents in this sample being more altruistic towards boys than girls 7. Land ownership reduces the hours of work for boys but not girls.
Sonia Bhalotra and Christopher Heady (2003)	Hours of child work, school attendance, land ownership, land size, food per capita expenditure, agriculture wage rate in a community, education attainment of adults, unemployment rate at community level, level of infrastructure in the	Tobit and probit model using Ghana Living Standard Survey 1991/2 and Pakistan Integrated Household Survey (1991)	Explains the phenomenon of wealth paradox by testing: (1) A zero coefficient on land size means either all markets are perfect or the credit market is perfect and either of the other two is perfect. (2) Positive coefficient on	1. The wealth paradox can be explained in terms of imperfections in land and labour markets. This effect appears to dominate on effect of credit market imperfections 2. Farm size has highly significant positive effect on both boys & girls. 3. Household per capita consumption has negative effect on child work, even after correcting for its endogeneity. An increase in the consumption of 10% is associated with a reduction in the probability of boys' work about 5 percentage points. 4. Girl's hours of work increase with the farm size. This point out

Authors	Variables Used	Estimation Techniques & Data	Objectives	Major Findings
	community, schooling cost at community level, household size, female head, child age, relationship with head and birth order of the child.		land means either all three markets are imperfect or the credit market is perfect but other two are imperfect. (3) Negative coefficient on land means either all three markets are imperfect, or credit markets are imperfect and one of the land or the labour market is perfect.	towards the imperfections in the land and labour markets. This effect is consistent with the imperfect credit market. 5. Children from larger households are not more likely to work. 6. Land tenancy significantly affects child labour. 7. The re-estimation of model using school attendance shows that In Ghana, there is no wealth paradox exist as acreage of farm land is insignificant in the equations for both boys and girls. In Pakistan, the wealth paradox is evident in farm labour case, for the girls and not for the boys

3. The Effect of Globalization and credit Market Imperfections on the Incidence of Child Labour

3.1 Introduction

The purpose of this chapter is to investigate the link between globalization, defined as an increase in trade openness and penetration of FDI, and the incidence of child labour while taking into account the role of credit market imperfections. The empirical assessment is based on the panel data comprising of 129 developing countries for four decades from 1970 to 2010. The basic proposition is that trade sanctions may reduce the demand for unskilled workers and minimize their wages; poor families when unable to borrow may have no alternative but to send their children to work. The chapter contributes to the existing literature of globalization and child labour not only by exploring the role of credit market imperfections but also by highlighting the changes in exports, incorporating the Jafarey and Lahiri (2002) model of trade sanction and credit market imperfections. It further critically examines Edmond (2009)'s argument that the channel through which trade could affect child labour is income because the proportion of child labour in the exporting sector is negligible. Another major contribution of the article is related to analysing the gender differences which previous cross country studies have mainly overlooked.

There already exists an extensive amount of literature on the factors explaining incidence of child labour but it primarily focuses on modelling the demand and supply of child labour and determining its welfare implications (as evident from chapter 2). Very few studies have empirically tested the effect of globalization and credit market imperfection on the incidence of child labour. According to Edmonds and Pavcnik (2006) the interaction of trade and child labour has received considerable theoretical attention but empirical evidence on the topic is very scarce.

On the theoretical sides Maskus (1997) developed a two-sector model, wherein child labour is viewed as a specific factor employed in the exportable sector and adult labour is viewed as a mobile factor. Maskus (1997) showed that opening up to trade raises the output of the exportable sector and thus increases the demand for child labour and child wages both. Working on a two sector general equilibrium model Chaudhuri and Gupta (2004) pointed out that the effect of trade on incidence of child labour crucially depends

on the relative factor intensities within the sectors. According to them if the import competing sector is capital intensive and receives tariff protection, then a reduction in import tariffs may lower the supply of child labour. On the other hand, if the import-competing sector is more labour-intensive it may increase the incidence of child labour.

Jafarey and Lahiri (2002) (as explained in section 2.2) presented a two-period two-good model to demonstrate that trade can increase child labour among poor households; a possibility that decreases as their access to credit improves. They argue that trade sanctions reduce the price of exportable goods thereby reducing the demand for unskilled labour, including child labour (it is assumed in their model country is a net exporter of unskilled good). At the same time it also decreases the income of the unskilled family and increases the opportunity cost of schooling which leads to a higher supply of child labour. Hence trade sanctions end up with two opposing effects which they call substitution and income effect; the net effect depends on the respective magnitude of the two. More recently Dwibedi and Chaudhuri (2010) using three sector[4] general equilibrium model, demonstrate that an in-flow of foreign capital leads to (i) an increase in both adult unskilled wages and skilled wages; and, (ii) a decrease in child wage rate and (iii) a fall in the return to capital. The skilled–unskilled wage inequality worsens if the high-skill sector is capital intensive relative to the low-skill sector. An in-flow of foreign capital lowers the incidence of child labour in the economy if the high-skill sector is capital-intensive. This could be because saving on capital input in the high skilled sector is more than that in low skilled sector which increases the relative wage inequality. A fall in child wage implies a decrease in the opportunity cost of education. The wage inequality also raises return to education and incomes from the non-child source of both unskilled and skilled working families. This will lower the supply of child labour via positive income effect. Hence, if high-skill sector is capital intensive all these three effects work in the same direction and lower the incidence of child labour.

While on the empirical sides, Cigno et al., (2002), using the non-attendance rate in primary schooling and child labour force participation rate, found out that trade openness[5] is negatively associated with the child labour force participation rate, but not

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[4] Sector 1 produces agriculture goods, sector 2 produces low skilled commodity while sector 3 produces high skilled good.
[5] using Sachs and Warner's index of openness

with the primary school non-attendance rate. Using a panel of Vietnamese households' living standard measurement survey, Edmonds and Pavcnik (2002) found that greater market integration is associated with less child labour. Considering the possible endogeneity in trade, Edmonds and Pavcnik, (2006) analyse the effect of trade ratio on child labour for the year 1995. They address the endogeneity in openness by using trade based on geography as an instrument for openness. They assume that trade instrumented by geographical indicators has no relationship to child labour except through its effect on total trade flows. Their result shows that openness is negatively associated with child labour if income is excluded from the regression model, concluding that trade lowered child labour, but via its positive effect on per capita income.

After rejecting the presence of possible endogeneity in their model, Neumayer and De Soysa (2005) examined the relationship between trade openness, FDI, and child labour in a cross-sectional setting using the data of 1995. From their findings it is quite evident that countries more open to trade and having a higher stock of FDI have a lower incidence of child labour. Davies and Voy, (2009) exploring the role of financial development (FDI) and trade, after correcting the endogeneity in both trade and FDI, concluded that FDI and Trade openness results in reducing the incidence of child labour by increasing the income.

The extent that child labour is caused by capital market imperfections is studied in great detail by Ranjan P. (2001), Beegle, Dehejia and Gatti (2005 and 2006). According to these studies, capital market imperfections interfere with the parents' ability to make inter-temporal trade-offs. Child labour can arise due to credit constraints such as the absence of well-functioning capital markets. Ranjan P. (2001) presents a positive relationship among the inequality in income distribution, capital market imperfections, and the incidence of child labour. Beegle et al. (2006) examine the relationship between household income shocks and child labour. They observe how a transitory income shock (measured by accidental crop loss) leads to an increase in child labour and how household access to credit moderates the effects of these shocks [Beegle et al. (2006)]. Dehejia and Gatti (2005) look at the role of financial development and income variability across countries and their impact on child labour in a panel data setting. Their findings indicate that child labour is significantly and negatively related to

financial development. Their result also proves that income variability has a greater effect on child labour in countries where financial markets are under-developed [Dehejia and Gatti (2005)].

The above mentioned studies can easily be sub-divided into two broad groups: one that incorporates the effect of trade (a few also include FDI as well) on child labour, while the second investigates the effect of income inequality and credit market imperfections on child labour. The end result is that studies have either looked into the effect of trade only, or the effect of credit only. For example, the three most recent studies on globalization which addressed the issue of endogeneity first time i.e. Edmonds and Pavcnik, (2006), Neumayer and De Soysa (2005) and Davies and Voy (2009) do not take into account the role of credit market. Although (as mentioned earlier) Jafarey and Lahiri (2002) theoretically demonstrate that countries more open to trade are more likely to have lower interest rates and a developed credit market which lowers the opportunity cost of schooling and thereby reduces child labour. Further to this, another neglected issue is the presence of possible endogeneity in the credit variable, and although the issue is not explicitly raised in any of the studies, Dehejia and Gatti (2005) split the countries in their sample into low and high credit groups to control for the presence of endogeneity.

Moreover all of the above-cited studies have either explored the role of international trade, FDI or credit market imperfections on the incidence of child labour, overlooking the effect of changes in export due to trade sanctions. The effect was first discussed by Maskus (1997) and is taken up more recently by Jafarey and Lahiri (2002). According to these two studies overall incidence of child labour may decline due to income effect of the trade but in export related industries child labour incidence could increase due to the result of an increase in demand for cheap labour. Hence it may be argued that the effect of trade could be different than the effect of export only.

Keeping all these arguments into consideration the following chapter evaluates the effects of international trade, FDI and credit market imperfections on the incidence of child labour. It also tests empirically the model presented by Jafarey and Lahiri (2002) by taking into account the effect of changes in export on child labour. Particularly, the study addresses the following three sets of questions:

- After controlling for endogeneity does income remains a significant determinant of the child labour participation rate– Is the effect sensitive to different measures of income? What role does inequality in income play?

- Do credit markets or financial development matter for the child labour incidence rate with particular reference to trade sanctions? Does the endogeneity in credit market matter?

- What role does globalization (captured via trade volume and penetration of FDI in the economy) play? Does it lead to more child employment? – Is the effect channelled through income? Does the effect of trade differ from the effect for exports?

The rest of the chapter is organized into following sub-sections: section 3.2 discusses theoretical foundation for the study, section 3.3 explores the trends in the child labour data, section 3.4 sheds light on the estimation technique and data employed, section 3.5 discusses the results and final section concludes.

3.2   Theoretical Foundation

Empirical analysis of this chapter is based on the theoretical model which was proposed by Jafarey and Lahiri (2002) and on arguments put forth by Edmonds (2009). The theoretical model of Jafarey and Lahiri is extensively elaborated upon in section 2.2 part (a). Here, theoretical predictions of their model are summarised[6]. Jafarey and Lahiri (2002) considered a case of small open economy, net exporter of unskilled goods, having two periods and producing two goods per period. Assuming the normality in all goods, Jafarey and Lahiri evaluated the household education decision as a function of price and a given interest rate. They came up with the conclusion that with the increase in interest rate, the welfare of the lender rises while that of the borrower falls. Thus it may be argued that it tends to reduce the marginal benefits of education and induces a lower choice of schooling decision. For the lender, the welfare effect of an increase in interest rate is positive and works against the effect of a decline in pecuniary returns to education. This makes education increase with the interest rate for

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[6] The one who has already gone through the detail model in chapter 2 could skip para 1 to 6 of section 3.2. Although summary may repeat the points already discussed in chapter 2 but here in order to avoid the breaking up of the argument a brief summary is provided.

a household that lends. Jafarey and Lahiri precede their analysis by considering three scenarios in credit market.

In scenario 1 all the households can borrow and lend freely in a perfectly competitive credit market that links to the international market. In this case the interest rate is exogenously given and is equal to world interest rate. Under Scenario 2 Jafarey and Lahiri assume that borrowing is subject to a quantitative constraint. In scenario 3 households borrow from the domestic credit market. In this case rich and poor household exchange loan and discount rate for each household is equal to the equilibrium interest rate. Jafarey and Lahiri use the condition that education for rich household is equal to one. Therefore, rich households can increase their savings only through lending in the credit market, as children's education cannot be increased.

After analysing the equilibrium in the credit market, Jafarey and Lahiri introduce the effect of trade sanction on the incidence of child labour. As country is a net exporter of unskilled goods, trade sanctions will result in a fall in the price of unskilled goods in period 1. A reduction in price reduces the welfare of the unskilled families. Jafarey and Lahiri have shown that a decrease in the price of the exportable, for a given level of real income, would reduce the opportunity cost of education (a substitution effect) and therefore might result in an increase in education. On the other hand a decrease in the price would also decrease real income thus encouraging a decrease in education (the income effect). Hence the two effects are opposite while changes in education out come via interest rate means an increase in interest rate reduces education outcome.

Overall Jafarey and Lahiri suggest that a decrease in the price of unskilled goods has the potential to decrease education (increase child labour) if the income effect dominates the substitution effect. Their results hold even for the internationally perfect credit market as well. On the other hand, a decrease in the price increases the demand for consumption in period 1 relative to period 2. But it also reduces the income of unskilled families at period 1. Similarly, any increase in the level of schooling will also raise future income and therefore the demand for loans will also arise. This indirectly raises the interest rate. Jafarey and Lahiri demonstrate that a decrease in the price increases the supply of loans. According to them, a decrease in the price will result in a rise in the income of the rich household as they do not participate in the production of unskilled goods. This will increase the supply of loan because education cannot be

further increased. Jafarey and Lahiri compare the effects of a trade sanction using two scenarios: in the first case the borrowing constraint is assumed to be preventing loans from adjustment in response to changes in demand or supply of funds; in the second case, Jafarey and Lahiri assume that the market freely adjusts to a new equilibrium.

According to Jafarey and Lahiri, in the first case, when a decrease in price raises the demand for loans for a given interest rate, education increases. As low initial value of education is associated with low parental income in their model therefore a trade sanction could possibly cause a decline in children's education (at given values of interest rate) at least for those households that are poor. Summarizing the result for case 1, Jafarey and Lahiri conclude that: "In the presence of a borrowing constraint, trade sanction increases poor household's discount rate, which negatively affects its children's education".

Turning to the second case where supply of funds is adjusted in response to changes in demand, new equilibrium will arise where interest rate increases, thus still having negative effect on child labour. However, a comparison of both cases clearly exhibits that the trade sanction is less likely to lead to perverse effects on child labour if the supply of loans can adjust in a competitive domestic credit market than if it cannot. To summarize, the analysis of Jafarey and Lahiri suggested that: "The discount rate of poor households rises more strongly under borrowing constraints and rises less strongly or even falls under a domestic credit market. This implies that a perverse effect from trade sanctions to child labour in poor households is less likely if credit is available at the margin".

However, Edmonds (2009) is of the view that trade affects children in developing countries by changing relative prices and altering living standards. Edmonds supports his proposition on the basis of two reasons. First, for the poor, the standard of living is the single most important determinants of child labour. Second, children are rarely engaged in work that is connected to trade. In poor developing countries, agriculture is the largest sector employing children. Outside agriculture, children are not that much intensively involved especially those related to trade sectors. While within manufacturing sectors, firms that trade usually hire skilled labour. Hence, the direct effects of trade on child labour through wages paid in the trade sector will be minimal. According to Edmonds (2009), trade raises the income and in turn reduces child labour

while opponents of globalization are mostly concerned about the fact that trade increases the product demand and thus increases child labour. According to him this is unlikely to happen as proportion of children employed in trade sectors are negligible.

Although the theoretical foundation and the argument placed by Edmonds (2009) sheds light on the relationship among trade, credit and child labour, but before preceding to the analysis it is considered necessary to summarize or provide an overview of the possible channels through which trade, FDI and credit may affect child labour.

There are two possible channels through which trade can affect child labour: first, trade openings raise the price of unskilled (labour intensive) goods, thereby raising the wages of unskilled workers and also the wages of child labour. This may increase the opportunity cost of education and increases child labour incidence (substitution effect). On the other hand, trade also increases income of poorer families, thereby increasing child education and reducing incidence of child labour (income effect). Two effects are with opposite sign, hence, the net impact of trade on child labour is ambiguous.

There is again ambiguity in determining the effect of FDI on child labour. Neumayer and De Soysa (2005) have presented two types of arguments. Firstly they explain that developing countries usually have low labour standards, low wages and an abundant supply of unskilled labour, including child labourers, and therefore are regarded as being a heaven for foreign investors. A higher extent of child labour could cut the cost of production which results in a competitive advantage. Hence, increases in FDI raises the relative wage of unskilled workers, including children, leading to an increase in child labour supply by increasing the opportunity cost of schooling. Secondly, they argue that the above case may not necessarily be realized, as foreign investors might not be enthusiastic in exploiting cheap labour than is assumed. Other factors such as market size, economic growth, political stability, infrastructure and abundance of skilled labourers are often as important as low wages. Evidence also indicates that foreign investors are on the lookout for relatively skilled workers rather than unskilled ones. If this is the case, then increased FDI would lower the relative wage of unskilled workers thereby reducing the demand of child labour [Neumayer and De Soysa (2005)].

Furthermore, as is evident from the Jafarey and Lahiri (2002) model, educating a child means a loss in present income and a gain in future consumption so at the margin, the

economic returns to education are negative and poor parents choose less education for their children. In such a case a reduction in the interest rate may raise the present discounted value of education. Hence, to the extent that openness implies access to credit at a rate below that prevailing on the domestic market, child labour will reduce and educational attainment will increase [Jafarey and Lahiri (2002)].

Finally, as child labour is a poverty driven phenomenon, any increase in income beyond the subsistence level of living will reduce child labour. Trade may increase the income of the poor families, this may help parents to reduce the work load of the children and send them to schools. Therefore there may exist a straight-forward negative relationship between income and child labour. However, Edmonds and Pavcnik (2006) and Dagemir and Acaroglu (2010) rejected the linearity in the effect. Both authors found a U-shaped relationship between income and child labour supply. This article also assumes the same.

3.3   Trends in Child Labour

The new estimates from the World Bank, predict that current economic and financial crises surrounding the world will result in a slower economic growth and will trap more people than expected living on less than 1.25 US$ a day (World Bank, 2009). Bearing in mind the previous experience of the East Asian Economic crisis that occurred during 1998s this down turn is also expected to affect children. According to Mosel and Sarkar (2009), during the Asian financial crisis of 1998 many developing economies of Asia have already witnessed rising unemployment and growing share of workers in informal employment, reflecting the significant impact of declining growth. The recent crisis would also result in the closure of many formal sector businesses. One of the impacts of the crisis could be the workers being forced to seek alternative employment in informal activities leading to the growth in the informal economy. Child labour is often found in informal economy, in hidden and most hazardous forms of work, including forced labour and slavery [see Mosel and Sarkar (2009) for more detail].

It is expected that the recent down turn in the economies, with rising food and fuel prices in the world market, will give rise to unemployment and poverty pushing more children towards employment. South Asian and Sub-Saharan African countries are the largest example of nations that are still plagued by the problem of child labour (ILO,

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2010) and the burden of recent crises will be expected to worsen the situation further in these regions. However, these effects are yet to be analysed.

Table 3.1: Regional estimates of children's work (5-14)

	Population (000)			Children at work (000)			Incidence Rate (%)			Change in Incidence Rate (%)		
	2000	2004	2008	2000	2004	2008	2000	2004	2008	2000-04	2004-08	2000-08
World	1199	1207	1217	211	196	176	17.6	16.2	14.5	-1.4	-1.7	-3.1
Asia & Pacific	655	650	652	127	122	96	19.4	18.8	14.8	-0.6	-4.0	-4.6
Latin America & Caribbean	108	111	111	17	11	10	16.1	10	9	-6.1	-1.0	-7.1
Sub-Saharan Africa	167	187	205	48	49	58	28.8	26.4	28.4	-2.4	2.0	-0.4
Other Regions	269	259	249	18	13	11	6.8	5.2	4.3	-1.6	-0.9	-2.5

Source: Global child labour developments: Measuring trends from 2004 to 2008 (IPEC, 2010) and Global trend in Child labour 2000-04 (IPEC, 2006)

International evidence indicates that child labour participation rate was almost 14.5% for children aged 5 to 14 in 2008. Table 3.1 provides an evidence of incidence of child labour across regions. Table 3.1 clearly indicates that during the era 2000-08, the world experienced a change of almost 3 percentage point in the incidence. Overall the rate of decline is highest in Latin America and Caribbean countries and lowest for Sub Saharan African countries. In Sub-Saharan African region the incidence rate declined during 2000-04 but rose again in 2008 showing an increase of 2 percentage points. For Asia and Pacific region, where in absolute terms most of the child labour is found, the incidence rate declined during 2000-08. Asian and Pacific region is the only region where the rate of decline increased when one considers the two periods separately i.e. 2000-04 and 2004-08. The situation is reversed for the rest of the regions. All the other regions experienced a slowdown in the rate of decline during the period 2004-08. Moreover, Sub-Saharan Africa experienced an increase in the rate of incidence during 2004-08. Although the above situation clearly indicates the recent situation (2004-08) requires a detailed analysis of the situation but the effects of the recent downturn are yet to be analysed.

For the purpose of empirical assessment, this study employs the data of economically active children aged 10-14[7]. Here characteristics of the data set employed are also

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[7] Although economically active children age 5-14 seems to be the interesting category but the country specific data provided by ILO is only for the age category 10-14. Hence the econometric analysis is based on the age category 10-14.

explored and incorporated to show the magnitude and spread of child labour. Figure 3.1 illustrates average percentage of child labour across regions by gender. South Asia and Sub-Saharan Africa regions exhibit the highest concentration of child labour both for boys and girls. The magnitude of the problem in this region seems more than double than the rest of the world. North America, Europe and Central Asia regions exhibit much lower (almost negligible) incidence rate but still, whatever the magnitude is, it requires immediate corrective measures.

Figure 3.1: Average % child Labour across Regions & Gender
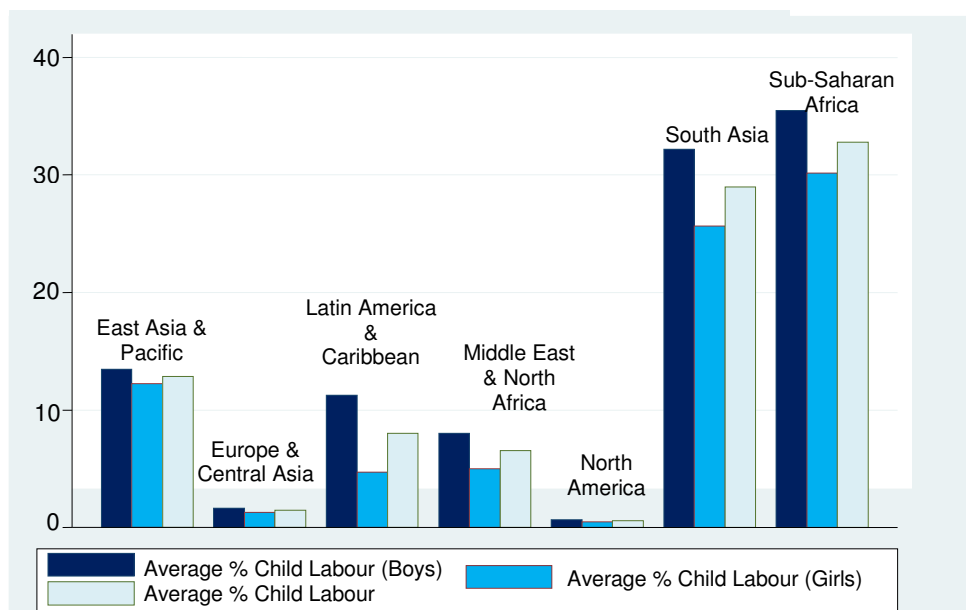
Figure 3.2: Average % child Labour Across Decades & Gender
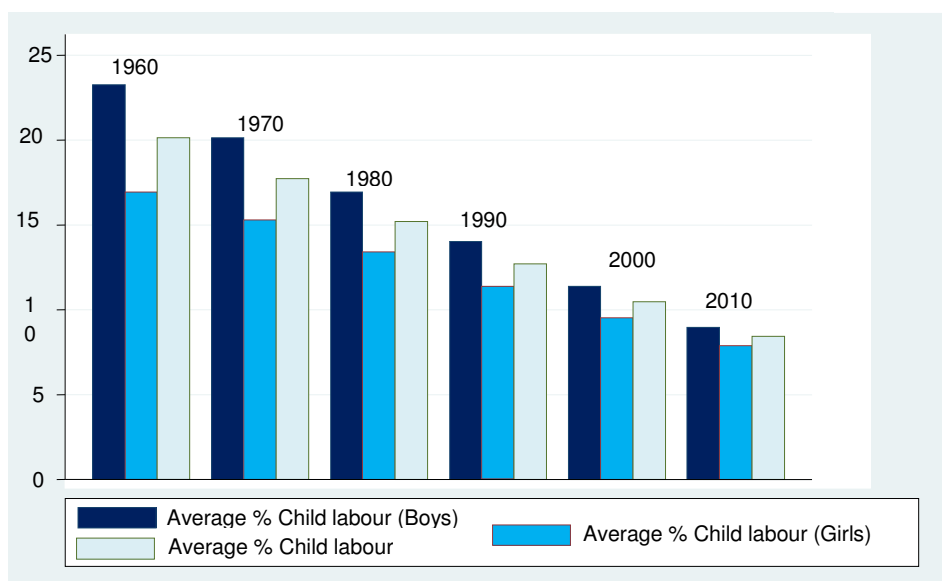
Having explored the magnitude across regions, it is interesting to analyse the changes in the magnitude over time. Figure 3.2 provides average percentage of child labour across different time periods from 1960 to 2010 by gender while table 3.2 provides the detail of average percentage of child labour across regions and time periods. Although figure 3.2 clearly indicates that the incidence rate declines over time, it is worth-while to note that the decline in the incidence rate for boys (from almost 23.5% to 9%) is much lower than for girls (from 17% to 8%). This suggests that any empirical analysis should be gender sensitive. Furthermore, table 3.2 again clearly indicates that the incidence rate declined in the entire region from 1960 to 2010 but the rate of decline differs considerably across regions. The change is large for the countries in South Asia and Sub Saharan Africa where originally most of child labour was found and lowest for the region of North America.

Table 3.2: Average % Child Labour across Region & Time (10-14)

Region	1960	1970	1980	1990	2000	2010	Change (1960-10)
East Asia & Pacific	20.52	17.72	14.34	10.83	8.19	5.56	-14.96
Europe & Central Asia	4.41	2.53	1.06	0.47	0.21	0.06	-4.35
Latin America & Caribbean	13.12	11.11	8.78	7.06	4.96	3.11	-10.01
Middle East & North Africa	13.60	11.29	7.67	3.75	1.88	1.08	-12.52
North America	1.81	1.69	-	-	-	-	-1.81
South Asia	39.97	35.66	31.52	26.69	22.29	17.83	-22.14
Sub-Saharan Africa	40.56	37.86	35.19	31.72	27.71	23.79	-16.77
Table Total	20.13	17.75	15.20	12.71	10.47	8.44	-11.69

Source: ILO data – UN common Database.

This trend in the data raises certain questions such as in the era of globalization what are the general and specific causes of child labour? What role does income play in eliminating child labour? If income is the main determinant then what role does the credit market play in lowering the incidence of child labour? And what would be the magnitude of the effect of changes in trade related variable? These questions could only be answered through a deep analysis of the problem.

3.4 Methodology

Child labour has always been considered as a phenomenon which is poverty driven but as mentioned earlier this study specifically explores the link between globalization,

income and credit with child labour. In order to do so the following simple model is estimated:

$$Cl_{it} = \beta_0 + \beta_1 Trd_{it} + \beta_2 FDI_{it} + \beta_3 Crdt_{it} + \beta_4 Incm_{it} + \beta_5 Incm_{it}^2 + \beta_6 X_{it} + \mu_i + \varepsilon_{it} \qquad i = 1 \dots \dots N \text{ and } t = 1 \text{ to } T \qquad (3.1)$$

Where, Cl_{it} is the percentage of economically active children[8] in the age group of 10 to 14. Trd_{it} is a measure of trade openness which in the latter case was replaced by export (% GDP), FDI_{it} is the inflow of foreign direct investment, $Incm_{it}$ and $Incm_{it}^2$ are the real GDP per capita and its square representing income which again in latter stages replaced by the income of the bottom quintile population (see section 3.4.2 for detail), $Crdt_{it}$ is the Domestic credit provided by the banking sector as a percentage of GDP[9]. All the variables of interest are in the log form. The log independent variables are used after checking AIC and BIC statistics and after running the Davidson and Mackinnon (1985) test for model specification[10]. X_{it} is a set of control variables since in order to determine the strength of the relation one must control for other potentially important variables. The existing literature provides extensive guidance in this regard. This study includes share of agriculture sector in GDP (AGR_{it}), share of mining and manufacturing sector in GDP ($MANF_{it}$), average year of adult schooling ($YRSCH_{it}$), pupil teacher ratio (primary) ($PUPTECH_{it}$), female labour force participation rate ($FLFPR_{it}$) and aid (% GNI) as control variables in the model. μ_i represent country specific effect, 'i' represent country and 't' represent time.

Average year of adult schooling and pupil teacher ratio are included in the model in order to predict the effect of schooling on child labour. More explicitly pupil teacher ratio at primary level is included in the model to show the effect of quality of schooling,

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[8] The definition of Economically Active children includes all forms of work in both the formal and informal economy; inside and outside family settings; work for pay or profit (in cash or in kind, part-time or full-time), or as a domestic worker outside the child's own household for an employer (with or without pay). The terms "working children", "children in economic activity", and "children in employment" are used interchangeably by ILO (ILO, 2010). As it is the only comparable data available at the cross country level, the macro analysis is based on this definition.

[9] Domestic credit to private sector refers to financial resources provided to the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment (World Bank Development Indicator-WDI).

[10] Davidson-MacKinnon test indicate that both model with and without log form are equally important in explaining the relationship as neither of the two hypotheses rejected while AIC and BIC values with log independent variables (1424.6 and 1784.9 respectively) work out to be lower than without log (1535.5and 1907.2 respectively).

as most of the children drop out before completing the primary schooling. The pupil teacher ratio, although not a good measure for evaluating quality of schooling, but in the absence of any other suitable variable capturing the effect of school quality, used here. The study hypothesizes the positive effect of this variable on child labour. Secondly, average year of adult schooling is included in order to evaluate the effect of skill attainment on child labour (number of years of schooling is often considered as a proxy for country's skill level). The reason behind this is that children often drop out from school to get involved into paid work. Therefore any increase in the educational attainment will increase the human capital formation and thereby skilled labour force. As discussed by Jafarey and Lahiri (2002), children are born unskilled but will receive training in period one and become skilled worker in period two. Hence countries with low educational attainment will have unskilled labour in abundance, including child labour. It is reasonable to expect that any increase in this variable would have negative effect on child labour.

Female employment is likely to empower women by enhancing their status and increasing their decision-making power. This will tend to result in the improvement of child condition/welfare. Therefore any increase in this variable will reduce child labour incidence. However, there could be an opposite effect if the variable captures the labour market effect. For example, there is evidence for the fact that usually women enter the job market when the earnings from their male counter parts decrease from the subsistence level of living. They are usually involved in home based work or self-employment, where they often involve children in simple work, for example in the food processing industries of Pakistan, small children often accompany their mothers and help in peeling shrimps. While in some parts of India mothers involve children in beedi (tobacco rolling) work. Hence, for this variable, the study expects that if it captures the effect of gender and development it will have a negative sign while if it captures the effect of labour market it will have a positive sign.

Furthermore, in order to predict the effect of sectoral composition on incidence of child labour, this study has included the share of agriculture sector and share of mining and manufacturing sector in the model. The share of agriculture sector is included in the model as child labour is often considered as a rural phenomenon hence share of agriculture sector is assumed to have a positive effect while manufacturing sector may

have either positive or negative effects depending upon the requirement of skill composition. For example, it may have a negative effect if the sector requires more skilled labour than unskilled while the effect could be positive if the production process involves unskilled labour in abundance.

Finally, the role of aid in reducing child labour is also interesting, something that past studies have ignored. The reason behind inclusion is to evaluate the claim that child-labour laws only worked in countries where the standards of living had risen to a level where it has no longer remained an economic necessity for children to work. Child labour has decreased in Asian countries such as Japan and South Korea as their economies have grown stronger. Child labour could automatically end with the economic development. Trade sanctions and boycotts are considered as counter-productive because they retard economic growth. Foreign aid is considered as a growth promoting instrument or often seen as a tool helping countries in their development process. Although aid is not the only solution for long term development or growth, it is nevertheless an essential component. Furthermore, there exists mixed evidence on the effect of aid on social sector development programmes such as foreign aid promoting health and education expenditure but it is expected to have an indirect effect – it provides support for the development process which helps poor countries in investing in their human development programmes which will affect the living standards of the poor people thus affecting poverty in the long run; which will definitely have its impact on child labour as well.

3.4.1 Estimation Technique

Simple OLS estimation of equation 3.1 relies on the assumption that explanatory variables are not correlated with the error term ε_{it}. If Cl_{it} and any of the variables of interest are simultaneously determined or if the model has omitted variable bias, then this assumption is violated, and OLS estimates will be biased. In this study Trd_{it}, FDI_{it} and $Incm_{it}$ have simultaneity bias while $Crdt_{it}$ might have omitted variable bias. Income is endogenous as income explains presence of child labour while child labour also affects income. FDI is endogenous as it reduces child labour but it might be the case that child labour affects FDI. For example, countries with high incidence of child labour will also have low skilled labour in abundance and literature suggests that FDI is often attracted to countries where skilled labour is in abundance. Trade openness is

endogenous because availability of child labour and labour standards determines trade flows while trade expansion also affects child labour as explained earlier. Finally, credit is endogenous because in some countries it is easier to have access to credit as compared to others; this is the issue of omitted variables bias – i.e. there are variables that could correlate with credit availability but are unobservable such as a well-developed infrastructure. Menon (2010) working on Pakistan Integrated Household survey data for 1991 points out that credit could be endogenous for two reasons; firstly, household will borrow only when they consider themselves having experience in managing the funds [Menon (2010) considers this as an issue of self-selection bias]. Secondly, some areas have easier access to credit as compared to other areas; this might be because of the well-developed infrastructure [Menon considers this issue as having omitted variables bias at the community level]. Presence of self-selection problem and omitted variables bias results in endogeneity problem. Hence, OLS estimates will be biased. Instrumental variable regression method is an appropriate solution for the problem. Therefore for estimating equation 3.1 instrumental variable (IV) approach is followed. As the data is panel data, both time specific and country specific test are applied before estimating equation 3.1 in order to check if the country specific and time specific controls are needed. F-statistics 77.89 (p-0.000) and 3.22 (p-0.016) indicate that both country and time specific intercepts are needed.

Furthermore, prior to the estimation, the presence of endogeneity is tested. The study performed the Durbin-Wu-Hausman test in order to see if endogeneity is present in the data. In the entire regressions Durbin-Wu-Hausman test rejects the null hypothesis that variables are exogenous and thus confirms the presence of endogeneity in all the system of equations [see last rows of tables 3.4 to 3.7]. After confirming the endogeneity the next step is to find suitable instrument for the variables and to check whether or not the instrument used passed the over identification tests (OID). The insignificant OID test confirms that instruments are over identified [see last rows of tables 3.4 to 3.7]. Another related issue is strength of the instrument used. In order to check, F-test is performed on the instrument selected. A probability of F-test less than 0.05 shows that the instruments used are not weak [see annex A-3.8 for reference].

Finally, to handle the issue of presence of zero in the dependant variable the study applied Tobit model. This is because working on the ILO estimates of economically

active population aged 10-14, the study came across samples of countries having zero values[11]. The reason behind this is that in many countries, the legal age for working is 15 or older, and the country's labour force survey does not collect work-related information on children under that age. Hence ILO database reports zero participation rates for children in these countries. Now the question arises as to how to treat these observations. On one hand, the zeros could be interpreted as "missing values" and these observations could be discarded. However, this is likely to lead to biased estimates if the zero rates reflect reality in those countries. The vast majority of countries for which zeros are reported are wealthier, more developed ones, i.e., once classified by the World Bank as "upper-middle income" or "high income" countries. The study first excluded the countries that are classified by the World Bank as high or upper-middle income countries; the sample is now left with only low and middle income countries and the zeros left in the remaining sample are treated as censored data. This justifies the estimation of Tobit model using IV. Therefore, in order to control the censored data and to check the robustness of the estimated model, the study re-estimated the equation 3.1 using random effect Tobit model as well. However, the Tobit model is not used here as a main estimation technique because it relies on two assumptions: heteroskedasticity and normality of the error term, and if these assumptions fail the estimates will be inconsistent. Furthermore, Madala (1992) also pointed out that:

> *"Every time we have some zero observations in the sample, it is tempting to use th*e tobit model. However, it is important to understand what the model really says *[Madala (1992), Page 341]"*.

The zero child labour percentage in developing countries in our case may represent the real situation as well. Madala pointed out that if the observed zero values are not due to censoring but rather explaining the real situation then the appropriate procedure is to model the decision that produces the zero observation rather than to use tobit model. Deaton (1997) also argue that limited dependent model like tobit can lead to inconsistency in estimates because of the heteroskedasticity. According to him the standard likelihood function has the property that the derivatives of the log likelihood function with respect to β's are independent of σ, at-least in expectation, is not true for the log likelihood function of the tobit model. Deaton argues that the scale and location

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[11] See Swinnerton and Rogers (2001) for more detail.

are independent in the OLS regression but dependent in the tobit model. This dependence causes the β's to be inconsistent. Deaton identified that the tobit procedure yields estimates that are biased upwards and there is no general guarantee that the attempt to deal with censoring, by replacing OLS with the tobit, will give estimates that reduces the bias. Moreover even if there is no heteroskedasticity the tobit estimates could still be bias because it requires distribution term to be normal. Since the distribution of the error term is unknown, it is unclear how likelihood function could specify in order to do better [see Deaton (1997) for more detail]. On the basis of the arguments placed by Madala and Deaton we estimated equation 3.1 using country Fixed effect test while tobit model is estimated only as a robustness check.

3.4.2   Measurement Issue

Till now the study has explained the theoretical foundations of the equation to be estimated and highlighted the statistical problem faced during the study, principally, endogeneity. This section highlights the problem related to measuring income of the poor before proceeding to identify the instruments applied.

To measure the income of the poor, cross- national studies have often used real GDP per capita but researchers point out that GDP per capita could predict misleading effect. For example, Swinnerton and Rogers (1999) and Tanka (2003) stress that income inequality is more closely related to child labour than simple real GDP per capita. According to the authors, GDP per capita does not represent the economic equality among the population of the country and only a small percentage of the population holds most of the nation's wealth, thus GDP per capita may not describe the situation accurately. Therefore based on the methodology given by Dollar and Kraay (2000), this study developed another proxy for income of the poor using data of Gini coefficient and bottom quintile income share –Q1 i.e. income accruing to the bottom fifth population as a measure of income of the poor. Dollar and Kraay (2000) define the poor as those in the bottom fifth of the income distribution of a country.

Dollar and Kraay (2000) used two approaches for measuring the income of the poor, they first defined the poor as the poorest 20% of the population. Then they obtained the information on the share of income accruing to the poorest quintile. They measured mean income in the poorest quintile directly, as the share of income earned by the

poorest quintile times mean income (Real GDP per capita), divided by 0.2. For the countries for which they have information on the Gini coefficient but not on the first quintile share, they assumed that the distribution of income is lognormal, and thus the share of income accruing to the poorest quintile as the 20th percentile of this distribution was obtained. According to them if the distribution of income is lognormal, i.e. log per capita income ~ N (μ, σ) and the Gini coefficient on a scale from 0 to 100 is G, the standard deviation of this lognormal distribution can be obtained by:

$$\sigma = \sqrt{2}. \emptyset^{-1}\left(\frac{1 + G/100}{2}\right) \qquad (3.2)$$

Where $\emptyset(.)$ denotes the cumulative normal distribution function [Aitchinson and Brown (1966)]. According to Dollar and Kraay (2002), by using the properties of the mean of the truncated lognormal distribution, the 20th percentile of this distribution can be given by:

$$\emptyset\left(\emptyset^{-1}(0.2) - \sigma\right) \qquad (3.3)$$

On the basis of the methodology given in Dollar and Kraay (2002), this study also constructed the income of the poor by using the data sources such as UN-WIDER (World Income Inequality Database) and EHII [12] (Estimated Household Income Inequality Data Set). UN-WIDER is a substantial extension of the income distribution dataset constructed by Deininger and Squire (1996) and Lundberg and Squire (2000).

Furthermore, when incorporating the above measure another problem emerges, i.e. for most of the countries, data for poorest quintile is not available. Using this variable thus means reducing the sample size substantially. For most of the countries, data of Q1 beyond 2000 is also not available. Although it may best reflect income of the poor but in the absence of sufficient data, this study limited the main analysis by using Real GDP per capita as proxy for income. Nevertheless, realizing its importance, a separate analysis is done based on only those countries in the sample that have reported data of Q1 and Gini co-efficient.

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[12] EHII is a global dataset, derived from the econometric relationship between UTIP-UNIDO, other conditioning variables, and the World Bank's Deininger & Squire data set. EHII 2008 has 3,513 observations. This data set can be downloaded from: http://utip.gov.utexas.edu/data.html

3.4.3 Instrument for Foreign direct Investment (FDI), Credit and Income of the poor

The basic strategy in instrumental variable estimation is to find an estimator that should be correlated to the endogenous variables but not with the dependent variable (child labour). It is hard to find valid instruments. As far as instrumenting income is concerned, in the literature widely used instruments include; growth rate in real GDP per capita, initial real GDP per capita, investment to GDP ratio, government consumption expenditure (measuring size of the government) or lagged values of real GDP per capita. For credit the literature has identified price of the credit or the costs associated with gaining access to credit, as valid instruments. The price of credit is interest rate on the loan but the data on real interest rate have large number of inconsistencies and missing values. Because of this limitation infrastructure development is used as an instrument. It is hypothesized to correlate with gaining information on borrowing. As far as valid instrument for FDI is concerned, the only study that controls endogeneity in FDI within the child labour framework is done by Davies and Voy (2009)[13]. Hence, finding instrumental variable for FDI turns out hard and tricky. Recent literature on FDI and growth indicates that FDI is greatly influenced by host country policies, infrastructure development, political situation etc.

Thus, after a thorough review of literature available and based on the Wu-Hausman, OID and F-test[14], the following instruments are selected: investment as percent of GDP, rural population as percentage of total population, index of Political rights [index of political right was first used by Davis and Voy (2009) as instrument for FDI] and number of telephone lines (indicator of infrastructure development) when real GDP per capita is in the model. Population growth instead of investment as percent of GDP is used to instrument income of the bottom quintile population. Inclusion of these variables significantly increases the explanatory power of the estimated coefficients.

3.4.4 Instrument for Trade Openness and Export

As far as instrument for trade openness and Export (% GDP) is concerned, the two most recent studies on the relationship between globalization and child labour have used the gravity model to identify the exogenous component of trade [Edmonds and Pavcnik (2006) and Davies and Voy (2009)]. In a gravity model, country size measures the

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[13] To come up with the instrument they used gravity model approach.
[14] See last rows of tables 3.4 to 3.7 for Wu-Hausman and OID test statistics.

output and benefits from trade while distance between trading partners used as a proxy for transportation costs. The studies on gravity model which explore the effects of trade on other variables rather than child labour have shown that both factors are robustly related to trade [Eichengreen and Leblang, (2008); Li and Reuveny, (2002); Lim and Decker, (2007); López- Córdova and Meissner, (2008)]. Gravity model has thus been recognized as a widely accepted tool for the creation of an instrument for trade i.e. to avoid endogeneity biases. Hence, the study adopted gravity model approach to create the instrument for trade openness and export. The equation estimated for the instrument is as follows:

$$Ln\,(Trd_{ijt}/GDP_{it})$$
$$= \beta_0 + \beta_1 Ln(distance_{ijt}) + \beta_2 Ln(pop_{jt}) + \beta_3 comnlang_{ijt}$$
$$+ \beta_4 border_{ijt} + \beta_5 parea_{ijt} + \beta_6 landlock_{ijt}$$
$$+ \mu_{ijt} \qquad (3.4)$$

Where; $\qquad Ln\,(Trd_{ijt}/GDP_{it}) = (export_{ijt} + import_{ijt})/GDP_{it}$

$Ln\,(Trd_{ijt}/GDP_{it})$ is calculated as the natural log of the sum of trade flows between countries 'i' and 'j' divided by country 'i's' GDP.

$Ln(distance_{ijt})$ is log of the distance between countries 'i' and 'j'.

$Ln(pop_{jt})$ is country 'j's' population.

$parea_{ijt}$ is the product of the area of country 'i' and 'j' in square kilometres.

$comnlang_{ijt}$ is a dummy variable equal to 1 if the countries share a common language.

$border_{ijt}$ is a dummy variable equal to 1 if the countries share a common border.

$landlock_{ijt}$ measures the number of landlocked countries (0, 1 or 2).

't' is time period (1970, 1980, 1990, 2000 and 2010).

The same equation was re-estimated after replacing $Ln\,(Trd_{ijt}/GDP_{it})$ with $Ln\,(EXPRT_{ijt}/GDP_{it})$ and after assuming that the variables that determine trade between two countries will also determine the export between the two countries. Thus, the instrument for trade openness also represents the instrument for export. We instrumented openness and export based on the geography of country 'i'. The predicted values for the bilateral openness and export from the above equation are then summed for country 'i' across its trading partners.

In order to check the endogeneity in trade and exports, the Hausman test approach is applied. Both endogenous trade and export together with the predicted values of trade and export are entered in the regression framework. Basic assumption is that if in the presence of endogenous variables predicted variable are significant then the variables are endogenous. In this case the predicted values are highly significant indicating presence of endogeneity in the two variables. Therefore this study uses the predicted value of trade and export in all the analysis.

3.4.5 Data Sources

The study uses the data on percentage of the population 10–14-year-olds that are actively engaged in work. Data is compiled by the International Labour Organization (ILO) and is available with 10-year intervals, beginning from 1950 for 174 countries. However, for empirical assessment, the study uses the data of 129 developing countries from 1970 onward[15]. "Active population" includes people who worked (for wage or salary, in cash or in kind, as well as for family unpaid works) for at least 1 hour during the reference period (International Labour Organization, 1996)[16]. Although the reported data may suffer underreporting problem as child labour is by law illegal and children usually work in hidden informal sector or work as unpaid family helper in agriculture sector. Nevertheless, the ILO datasets have been adjusted on the basis of internationally accepted definitions, therefore allowing cross-country comparisons (Ashagrie, 1993). The data can be downloaded from United Nation Common Database using ESDS. Domestic Credit to private sector (% GDP) is included to serve as a proxy for the degree of financial market imperfections and credit market constraints. In the absence of reliable data at cross country level this variable is assumed to serve as a good proxy because an environment with poor financial market institutions might not be favourable for the provision of domestic credit to the private sector. The data is taken from the World Bank Development indicator.

In order to develop the income of the bottom quintile of the population, the data on Gini coefficients and Q1 (bottom quintile income share) are needed. The data on Q1 and Gini coefficient are hard to find. In order to come up with the desirable number of

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[15] The reason behind not using the data of 1950 and 1960 is that most of the data on macro-economic indicator is not available before 1970 using the panel comprising of data 1950-60 leaves out the missing values.

[16] The data for the age 5-14 is not available in the absence of which it was considered worth to explore the issue on the basis of available data.

observations, data is compiled using different sources. The main source is UN-Wider, world income inequality database developed by The World Bank. UN-Wider database includes the database of Deininger and Squire (1996) and Lundberg and Squire (2000). In addition to these, some more information is also taken from EHII (Estimated Household Income Inequality Dataset, Downloaded from: http://utip.gov.utexas.edu/data.html). To come up with the instrument for trade openness, the bilateral trade data is taken from Direction of Trade Statistics and UN Comtrade database while geographical characteristics are from CEPII database (website: http://www.cepii.fr/anglaisgraph/bdd/gravity.htm) and Rose 2004. Data on Real GDP per capita is taken from the Penn World Table 6.3 (adjusted on PPP). Average year of adult schooling is from Barro and Lee's dataset. Share of different sectors representing size of different sectors such as agriculture, mining and manufacturing comes from UN-Statistics Division. Data on pupil teacher ratio (primary level) is again compiled by using different sources such as UNESCO and World Bank Education Statistics. Rest of the data, such as data on FDI, Import (% GDP), population growth, life expectancy etc. is from World Bank Development Indicator. Most of the data is downloaded using the ESDS website [see annexure A-3.1 for further detail].

3.5   Results

The result section is sub-divided into two parts; the first part discusses the simple correlation among the variables and highlights some determinants of income. It also discusses the main results and compares alternative measures of income and role of trade openness and exports. The section also examines results based on gender of the child. The second part presents some sensitivity analyses.

3.5.1 Core Results

a)   Simple Correlations

In generalizing the effects of income, globalization and credit on the incidence of child labour, the study first sheds light on the simple correlation among the variables. Figures 3.3 to 3.6 depict these relationships for the chosen 129 countries across the 4 decades. Figures 3.3 to 3.6 show negative association of log real GDP per capita, trade openness, FDI inflow and domestic credit to private sector with child labour. Negative association of trade and FDI with child labour could be because of the negative association of child

labour with income. Trade openness and FDI inflow generates employment opportunities in the economy which increases income. This increase in income may lead to reduction in child labour. Hence trade and FDI inflow may reduce child labour via income. Hence before exploring the impact of trade and FDI on child labour, the study first highlights some determinants of income including trade openness and FDI inflow.

Figure 3.3: Relationship between Child Labour and Income

Source: World Bank and Penn World Table
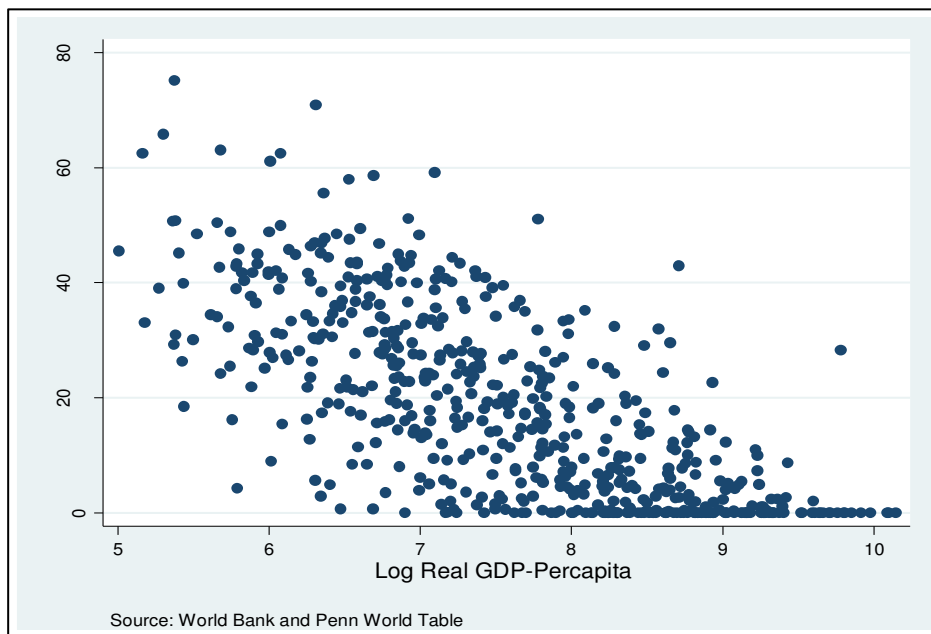
Figure 3.4: Relationship between Child Labour and Trade openness

Source: World Bank and Penn World Table
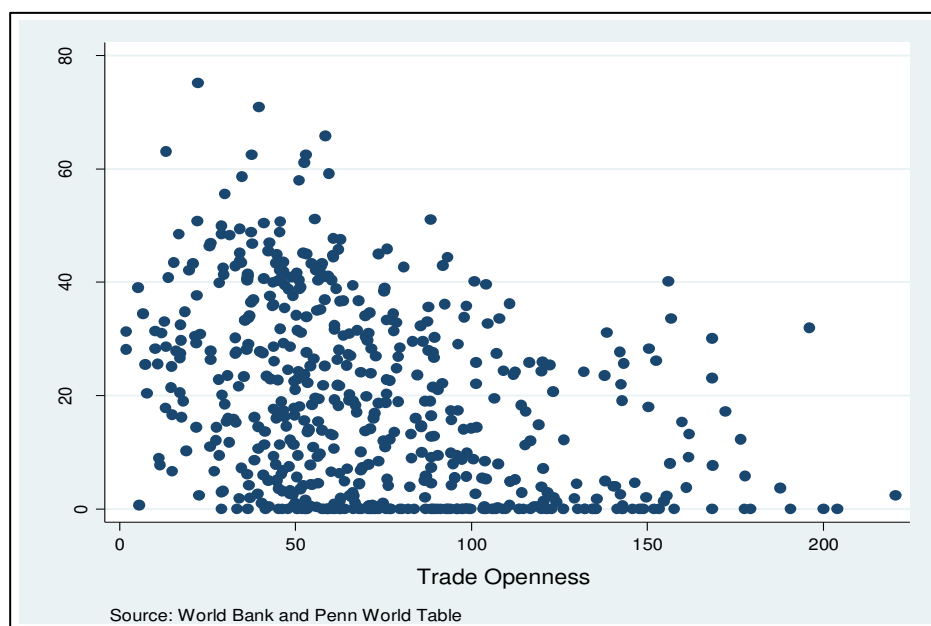
Figure 3.5: Relationship between FDI and Child Labour

Source: The World Bank Development Indicator
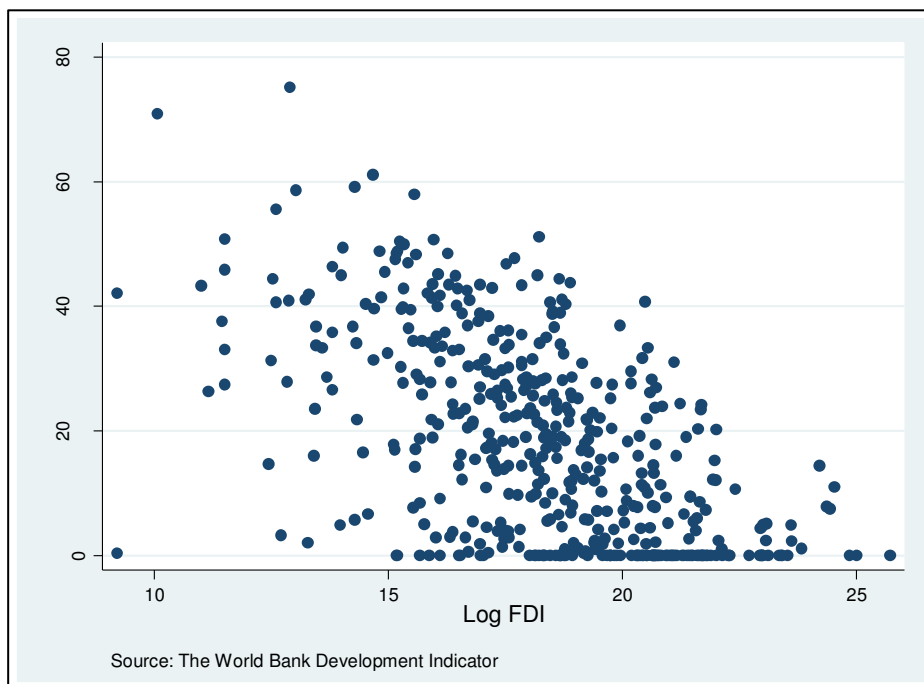
Figure 3.6: Relationship between Access to Credit and Child Labour

Source: The World Bank Development Indicators
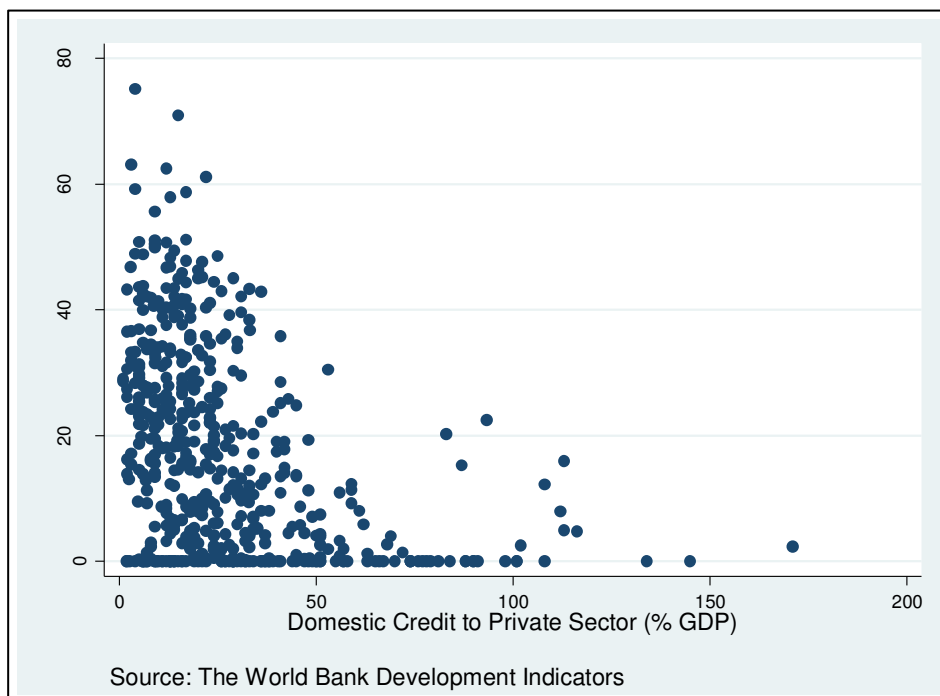
b) Determinants of Income – Effect of Trade and FDI inflow via Income

From the discussion in section 3.2 it is evident that variables such as trade and FDI may not only have direct (substitution effect) effect on incidence of child labour but may affect indirectly through income (income effect). This may be true for other variables as

well. In this section we explore the variables having indirect affect via income. Table 3.3 presents the results. Both FDI and openness to trade have positive and significant correlation on log real GDP per capita. Positive and significant effect of trade openness and FDI indicate that trade and FDI increase income. Therefore trade and FDI may affect child labour through income. The phenomenon as explained earlier may work in following way: expansion in trade and penetration of FDI generates employment opportunities that affect wages and thereby income, which in turn helps poor families to reduce child labour supply. But here one should remember that an increase in employment opportunity may increase child labour incidence as well. The overall effect of trade and FDI inflow hence depends on the magnitude of the effect of the two.

Table 3.3: Determinants of Income

	(Country Fixed Effect)
Dependent variable:	Real GDP per capita
Log FDI (inflow)	0.07(0.04)**
Log Bank Credit to Private sector (% GDP)	0.13(0.13)
Log of Trade Openness	12.11(0.10)***
Share of agriculture Sector in GDP	-0.04(0.00)*
Share of Manufacturing Sector in GDP	-0.01(0.18)
Adult Average year of Schooling	0.02(0.50)
Pupil teacher Ratio Primary	0.00(0.71)
Female labour force participation rate	0.00(0.27)
Aid (% GNI)	-0.01(0.05)**
Region 2	0.34(0.09)***
3	0.26(0.16)
4	0.17(0.51)
6	0.04(0.87)
7	0.03(0.88)
Year 1980	0.63(0.26)
1990	1.15(0.04)**
2000	0.76(0.15)
2010	0.92(0.09)***
Constant	5.94(0.00)*
F /chi2 Test	23.16
N	276
R-squared	0.82

*Note: *,** and *** represents Coefficient is Significant at 1%, 5% and 10% respectively. Numbers in parenthesis are p-values.*

In addition to the trade and FDI inflow, share of the agriculture sector shows a significant effect. The effect of share of the agriculture sector is negative. The negative effect on income means that any increase in the share of the agriculture sector will lead to lower economic development and thereby lower the income of the poor. This may

result in an increase in child labour incidence. As far as foreign aid is concerned, the study expects that it will promote economic growth and thus will assist in reducing child labour. Its negative effect on real GDP per capita is puzzling but not surprising. There exist two strands of literature; one claims that a positive relationship exists between aid and economic growth, while the other literature claims that the relationship is negative between the two. The positive relation is based on the argument that foreign aid supplements domestic resources and encourages savings thereby leading to economic growth. The second view (claiming negative effect) stresses that foreign aid substitutes rather than supplementing domestic resources. The negative relation between foreign aid and economic growth could exist because of the factors such as economic policies, state intervention, business cycles, and stability of foreign aid flows in the recipient countries. Furthermore, the results also indicate that average year of adult schooling, female labour force participation rate and credit availability have positive but insignificant effects on real GDP per capita.

c) Results based on Real GDP per capita

As explained earlier, the study investigates the role of real GDP per capita in reducing if not eliminating child labour by using the pooled data from 1970 to 2010. It was found that the role of income in reducing child labour is highly significant. The proposition that child labour is poverty driven seems to be a powerful justification. Explicitly, a 10 percentage point increase in real GDP per capita was found to reduce the incidence of child labour by almost 8 percentage point after controlling for possible endogeneity[17] [while standardized beta coefficients predict that one standard deviation increase in income will reduce child labour incidence by almost 5%]. This answers the first part of the first question: income remains a significant determinant even after controlling for endogeneity. In addition to this, non-linearity in income variable is also tested by including the square of the log real GDP per capita. The positive and significant co-efficient of the quadratic term shows the non-linear effect of income on child labour. Therefore it can be concluded from the analysis that the effect of income on the incidence of child labour is nonlinear but non-monotonic.

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[17] The Wu-Hausman test for endogeneity [chi2 = 6.62 and p-value = 0.08] predicts the presence of endogeneity therefore study follows instrumental variable approach – see section 3.4 for more detail.

Table 3.4: Determinants of child Labour

Dependent variable: Child labour (All)	Fixed Effect Test			Tobit		After Dropping the zeros	
	With RGDP	**Without RGDP**	**Above Threshold Income sample**	**With RGDP**	**Without RGDP**	**With RGDP**	**Without RGDP**
Log RGDP per Capita	-76.83(0.00)*	-	-5.69(0.24)	-37.74(0.00)*	-	-70.9(0.02)**	-
Square of Log RGDP per Capita	4.04(0.00) *	-	-	1.26(0.01) *	-	2.99(0.06)***	-
Log FDI (inflow)	-0.39(0.78)	-2(0.07) ***	0.67(0.71)	1.75(0.28)	-3.01(0.001)*	2.49(0.46)	-2.59(0.04)**
Log Bank Credit to Private sector (% GDP)	-0.26(0.94)	4.46(0.16)	-4.64(0.70)	-0.15(0.12)	-0.16(0.153)	0.50(0.90)	0.05(0.99)
Log of Trade Openness	-3.09(0.20)	-5.35(0.02)**	1.92(0.72)	-2.04(0.37)	-7.16(0.00)*	-4.09(0.29)	-9.20(0.00)*
Share of agriculture Sector in GDP	-0.35(0.21)	0.27(0.09)***	-0.70(0.56)	-0.42(0.006)*	-0.05(0.666)	-0.47(0.18)	0.10(0.65)
Share of Manufacturing Sector in GDP	-0.10(0.40)	0.01(0.90)	-0.28(0.64)	-0.15(0.02) *	-0.13(0.05)*	-0.05(0.73)	-0.07(0.62)
Adult Average year of Schooling	-1.91(0.01) *	-3.07(0.00)*	0.27(0.68)	-2.16(0.00) *	-3.01(0.00)*	-1.19(0.24)	-2.70(0.00)*
Pupil teacher Ratio Primary	0.08(0.38)	0.14(0.14)	0.01(0.96)	-0.05(0.45)	0.01(0.847)	-0.04(0.74)	0.11(0.26)
Female labour force participation rate	0.18(0.00) *	0.17(0.01)*	-0.04(0.84)	0.14(0.00)*	0.11(0.002)*	0.26(0.01)*	0.14(0.06)***
Aid (% GNI)	-0.39(0.00) *	-0.24(0.00*)	-0.95(0.75)	-0.24(0.00)*	-0.14(0.00)*	-0.48(0.00)*	-0.24(0.01)*
Region 2	5.91(0.14)	10.38(0.01)*	-6.11(0.53)	0.57(0.87)	-1.9(0.61)	12.12(0.03)**	11.67(0.04)**
3	3.12(0.34)	3.12(0.35)	-3.16(0.70)	5.4(0.071)*	-2.09(0.41)	7.21(0.24)	0.69(0.86)
4	2.63(0.55)	4.24(0.36)	6.10(0.45)	0.51(0.85)	-2.66(0.32)	10.13(0.11)	4.86(0.36)
6	3.23(0.40)	4.10(0.31)	-	6.75(0.05)**	0.7(0.827)	7.46(0.15)	3.40(0.44)
7	7.36(0.03) **	10.80(0.00)*	-6.97(0.51)	9.08(0.00)*	6.71(0.01)*	11.70(0.00)*	10.69(0.01)*
Year 1980	8.35(0.43)	-9.12(0.33)	-	11.15(0.00)*	-1.29(0.50)	21.57(0.23)	-7.27(0.34)
1990	12.82(0.22)	-4.52(0.63)	-	16.57(0.00)*	1.52(0.46)	12.25(0.36)	-8.50(0.30)
2000	11.11(0.21)	-2.25(0.79)	-3.77(0.61)	14.2 (0.00)*	4.4 (0.12)	17.54(0.16)	0.22(0.98)
2010	11.10(0.22)	-1.30(0.87)	-	16.34(0.00)*	8.6 (0.03)*	27.05(0.04)**	9.42(0.21)
Constant	342.7(0.00) *	-13.7(0.60)	90.82(0.42)	186.3(0.00)*	20.9(0.27)	282.8(0.03)**	-19.50(0.57)
F /chi2 Test	24.03	23.02	9.35	68.96	64.89	15.65	16.04
N	328	328	25	274+ 54-Censored)		274	274
R-squared	0.83	0.81	0.38	0.242	0.234	0.75	0.72
OID Test	0.39	-	-	-	-	-	-
p-value OID Test	0.53	-	-	-	-	-	-
Endogeneity Test chi2(3)	6.62(0.08)	-	-	-	-	-	-

*Note: *,** and *** represents Coefficient is Significant at 1%, 5% and 10% respectively. Estimation technique used is 2SLS based on countries fixed effect. Income, Credit and FDI are instrumented by Investment (% GDP), rural population as percent of total, index of political rights and number of telephone lines while instrument for trade openness is based on gravity model.*

Turning to the next question i.e. whether globalization affects child labour or does the effect channels through income? It is evident from table 3.4 that the effect of trade and FDI is insignificant. However, Edmonds and Pavcnik (2006) argued that the effect of trade is only significant when income is excluded from the model. Hence, as a next step, the study re-estimated the model without income. In the absence of income the effect of trade and FDI now turns significant and negative. This shows that the effect of trade and FDI could channel through income i.e. the effect of globalization on reducing child labour incidence is indirect and works through income. The phenomenon may work like this: globalization increases the employment opportunities in an economy thereby increasing the income (recall table 3.3 for positive effect of trade and FDI on real GDP per capita) while increase in income reduces child labour incidence (see table 3.4 for negative effect of income on child labour). Using estimates from equation 3.1, precisely one standard deviation increase in trade openness was found to be associated with the reduction of almost 0.21% child labour, while one standard deviation increase in FDI inflow was found to be reducing the child labour by almost 0.33%.

d) Effect of Credit and other Control Variables

After exploring the effect of income and globalization on child labour incidence, the study now turns to investigate the role of credit market. It is assumed that if the poor and unskilled families face the borrowing constraints then whenever trade lowers the wages of poor families, the incidence of child labour will increase. Consequently the study expects a negative association between credit market imperfections and child labour. However, the study does not find strong support for the assumption, as the co-efficient of credit variable is negative but insignificant. Hence, overall for credit market, study concludes that it may not have significant effect as both trade and FDI are already considered as important factors in reducing child labour through an increase the income. Therefore, demand for borrowing to cope up with the income shock does not show significant effect.

After exploring the main variables we now examine the effects of some important control variables. Among the control variables, average year of adult schooling shows a significant negative effect on the incidence of child labour while the effect of pupil-teacher ratio shows a relatively insignificant effect. Countries with low educational

attainment usually have unskilled labour in abundance including child labour. Therefore, any increase in average adult of schooling means higher level of education attainment which may lead to a decline in the incidence rate.

Results also exhibit negative association of Aid (% GNI) with child labour. This variable is incorporated to identify the channel through which growth can be promoted. Literature indicates that the aid could affect the growth and may increase the living standard of the people. This study hypothesizes that higher living standards may help in reducing child labour. Role of aid has never been explored under the framework of child labour and our result also predicts a negative effect of aid on GDP per capita, therefore, the study interpreted the negative effect of aid on child labour with caution. The study concludes that foreign aid may be effective in reducing the child labour incidence by promoting the social expenditure but in the absence of any past evidence (literature) no concrete conclusion could be drawn; aid may be effective in reducing child labour.

As far as the effect of agriculture sector on child labour is concerned, agriculture sector was found to be reducing the income (see table 3.3 for reference) and after dropping the income from the model (see table 3.4) its effect on child labour seems to be positive and significant. The positive effect indicates that child labour is more of a rural phenomenon and any expansion in the agricultural activity may lead to increase in the child labour incidence. Agricultural activities that usually involve children include harvesting and planting of crops, weeding, looking after livestock, marketing and storage of farm produce. Children are rarely involved in activities like uprooting of trees and chemical spraying.

Based on the argument that female empowerment leads to the welfare of the house especially children, the study expected that the effect of female labour force participation rate will be negative. But instead it is found to be increasing child labour incidence. One possible explanation might be that in most of the developing countries (especially in Asian countries) females often participate in the labour force when the income from the male earning drops from the subsistence level. If this is the case, then these poor households are also more likely to offer their children for child labour, especially girls. Hence, this variable might be capturing the effect of labour market

more than the empowerment effect. In order to investigate this, the study introduced male participation rate in the main model (see table 3.5). Both male and female labour force participation rates have positive and significant effect in overall sample and sample for girls. In the boys' sample only the male labour force participation rate is significant. This shows that the variable might be capturing the effect of labour market rather than empowerment effect.

Table 3.5: Effect of Male and Female Labour Force Participation Rate

			(Country Fixed effect)
Dependent variable: Child labour	**All**	**Boys**	**Girls**
Log RGDP per Capita	-79.48(0.00)*	-76.57(0.0)*	-82.49(0.00)*
Square of Log RGDP per Capita	4.52(0.00)*	4.26(0.00)*	4.79(0.00)*
Log FDI (inflow)	-1.27(0.34)	-1.73(0.26)	-0.79(0.55)
Log Bank Credit to Private sector (% GDP)	2.46(0.47)	2.44(0.53)	2.46(0.46)
Log of Trade Openness	-3.37(0.15)	-3.88(0.15)	-2.85(0.21)
Share of agriculture Sector in GDP	-0.13(0.64)	-0.24(0.45)	-0.02(0.94)
Share of Manufacturing Sector in GDP	-0.01(0.93)	-0.03(0.80)	0.01(0.91)
Adult Average year of Schooling	-1.95(0.00)*	-2.42(0.00)*	-1.47(0.03)**
Pupil teacher Ratio Primary	0.06(0.48)	0.07(0.47)	0.05(0.56)
Female labour force participation rate	0.13(0.04)**	0.07(0.32)	0.19(0.00)*
Male labour force participation rate	0.44(0.00)*	0.45(0.01)*	0.44(0.00)*
Aid (% GNI)	-0.36(0.00)*	-0.36(0.00)*	-0.36(0.00)*
Region 2	8.35(0.04)**	9.11(0.04)**	7.61(0.05)**
3	1.34(0.67)	1.89(0.60)	0.79(0.80)
4	3.38(0.42)	-0.80(0.87)	7.64(0.07)***
6	1.95(0.59)	-0.86(0.84)	4.77(0.19)
7	8.13(0.01)*	7.08(0.05)**	9.27(0.00)*
Year 1980	-4.43(0.69)	-0.47(0.97)	-8.61(0.43)
1990	0.51(0.96)	0.40(0.97)	0.73(0.94)
2000	1.82(0.84)	3.68(0.72)	-0.08(0.99)
2010	-0.19(0.98)	5.14(0.63)	-5.63(0.54)
Constant	311.45(0.00)*	316.7(0.01)*	306.18(0.00)*
F /chi2 Test	25.75	21.59	25.07
N	327	327	327
R-squared	0.85	0.82	0.84

Note: *,** and *** represents Coefficient is Significant at 1%, 5% and 10% respectively. Numbers in parenthesis are p-values.

Finally, due to the presence of zeros in the dependent variable this study has estimated the main model using the tobit model (although we have also dropped all zero observations from the sample as a comparator). The results of the tobit estimation is presented in the last columns of table 3.4. Results are not different to those obtained previously. Income is highly significant in reducing the child labour but the effect is again non-linear. Trade and FDI are insignificant in presence of income while after

dropping income from the model both are significant and negative. Hence the tobit estimates, are similar to those previous obtained but owing to the reliance on assumptions of heteroskedasticity and normality we would not wish to consider tobit as our principal estimator. Further, dropping the zeros will also result in bias in estimates as Madala (1992) pointed out that the appropriate procedure is to model the decision that produces the zero observation. Therefore in the reminder of the sections we have kept country fixed effect as the main model.

e) Exploring Alternative measures of Income

Table 3.6 provides the analysis based on the alternative measures of income. Income is represented by Real GDP per capita, income share held by bottom quintile of the population (hereafter Q1) and adult wage rate. As said earlier all the three proxies are instrumented before entering the model specifically Real GDP per capita model includes following instruments; investment as % GDP, rural population as percent of total, index of political rights and number of telephone lines while in the model where income is represented by poorest quintile income, investment as % GDP is replaced by population growth. The wage model includes fertility rate, annual percentage change in inflation and log of investment (% GDP) in addition to rural population as percent of total, index of political rights and number of telephone lines. In all the three models instrument for trade openness is based on gravity model [see section 3.4.1 and 3.4.3 for more detail].

The basic expectation is the same: trade and FDI will affect income, which in turn affects incidence of child labour. Table 3.6 provides the same result for real GDP per capita and income held by bottom quintile of the population while the effect of adult wage rate is insignificant on child labour. Precisely, income held by bottom quintile population has significant non-linear effect on child labour as predicted by the real GDP per capita. A 10 percentage point increase in the income represented by Q1 found out to be reducing the incidence of child labour by almost 5.6 percent point [i.e. one standard deviation increase in income of the bottom quintile of the population reduces the incidence of child labour around 4%]. The nonlinear term further shows that a 10 percentage point increase in the income share held by bottom quintile population is associated with the 0.3 percentage point increase in child labour [i.e. one standard

deviation increase in income of the bottom quintile increases the incidence of child labour around 3.6%].

Trade openness and FDI again shows the same behaviour. In the presence of income both are insignificant, however, after dropping income from the model both turn significant. The effect of trade and FDI in reducing the incidence of child is slightly pronounced under the new measure. Specifically, one standard deviation increase in the trade reduces child labour by almost 0.29% (previously 0.21%) while one standard deviation increase in FDI inflow reduces the incidence by almost 0.61% (previously 0.33%). As far as credit availability is concerned the effect is again insignificant.

This study incorporated wages in the child labour model to elaborate upon the argument given by Jafarey and Lahiri (2002). According to them, trade sanctions reduce the price of unskilled products and lower the demand of unskilled labour including child labour. This reduces the wages paid to the unskilled workers, thus reducing the income of the impoverished families, leading to increase in child labour. If wages are the channel through which trade may affect child labour, then the question which arises in mind is what could be its impact? In order to evaluate the possible effect of wages on child labour real GDP per capita is replaced by the adult wages per month. Although the direct effect of wages is worth investigating using the variable but the problem with this variable is that in a cross country framework it's hard to find any data on wages. Furthermore, for the countries where data does exists, it is not easy to compare the data. Different countries report wage data in varied formats. For example, some report monthly wages while others report hourly or weekly wages. Some countries report wages for a particular group [like male or skilled wages in the country only – see Freeman and Oostendorp (2005) for more detail]. Freeman and Oostendorp (2005) has standardized and adjusted the data to make it comparable across countries.

Although using this data drops the sample size significantly to 77 observations only, nevertheless, it may provide greater insight into the problem. The effect of wages on child labour is analysed after controlling for endogeneity. In order to control the endogeneity, wages are instrumented by the fertility rate, log of investment to GDP ratio, annual percentage change in inflation rate, number of telephone lines and rural population as percentage of total population. After establishing the fact that wages are endogenous in the child labour model and instruments used to predict the effect of

wages on child labour are not weak instruments, the study proceeds with the analysis. The result shows that the effect of wages[18] in reducing child labour is insignificant and the magnitude of the effect is lower than what the earlier two proxies of income have demonstrated. The insignificant effect of the wages may be because of the insufficient number of observation. Once again, in the presence of wages the effect of trade openness and FDI is insignificant but after dropping wages from the model the effect of both trade and FDI turns significant. Now one standard deviation increase in trade is found to be reducing child labour by almost 3%. While one standard deviation increase in FDI reduces the incidence of child labour around 0.15% thus reinforcing our earlier conclusion that trade and FDI only affect child labour through income.

In this section the study discussed the effect of both income of the bottom quintile population and wages as an alternative to real GDP per capita as proxies of income. Given the insignificance of wages, the study chose the best proxy by comparing only income of the bottom quintile population and real GDP per capita. To do so, the Akaike information criterion (AIC) and Bayesian information criterion (BIC) were used to choose the best model: the lower the AIC and BIC values the better will be the model. The AIC and BIC values for the model using income of the bottom quintile are 626.8 and 706.4 respectively, while for the model having real GDP per capita in the model the AIC and BIC values are 628.5 and 708.1 respectively. AIC and BIC values are slightly higher in case of real GDP per capita. Therefore, the study concludes that the income of the bottom quintile population rather than real GDP per capita is the better income proxy to use when analysing child labour incidence. As this alternative measure is computed by using income share of the bottom quintile population and Gini coefficient hence this may also show the prevalence of inequality in an economy. The significant effect of this measure therefore may also imply that policies to combat child labour incidence should take into account the inequalities that exist in an economy.

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[18] We have also tested the effect of adult wages after dropping the nonlinear term but the effect remains insignificant.

Table 3.6: Effect of Income on child Labour

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Dependent variable: Child labour (All)	With RGDP	Without RGDP	With Q1	Without Q1	With Wages	Without Wages
Log RGDP per Capita	-76.83(0.00)*	-	-	-	-	-
Square of Log RGDP per Capita	4.04(0.00)*	-	-	-	-	-
log Income of Bottom Quintile	-	-	-56.27(0.00)*	-	-	-
Square of the log Income of Bottom Quintile	-	-	2.57(0.00)*	-	-	-
Log Wages Per month	-	-	-	-	33.73(0.18)	-
Square of Log Wages Per month	-	-	-	-	-0.82(0.65)	-
Log FDI (inflow)	-0.39(0.78)	-1.98(0.07) *	-1.80(0.52)	-3.6(0.06)***	17.17(0.28)	-3.7(0.11)***
Log Bank Credit to Private sector (% GDP)	-0.26(0.94)	4.46(0.16)	2.72(0.45)	4.16(0.26)	-22.97(0.32)	7.33(0.31)
Log of Trade Openness	-3.09(0.20)	-5.35(0.02) *	-2.56(0.64)	-7.35(0.03)**	43.54(0.35)	-18.25(0.06)***
Share of agriculture Sector in GDP	-0.35(0.21)	0.27(0.09) *	0.03(0.88)	0.13(0.47)	0.94(0.13)	0.19(0.44)
Share of Manufacturing Sector in GDP	-0.10(0.40)	0.01(0.90)	0.03(0.82)	0.02(0.89)	0.52(0.23)	-0.03(0.82)
Adult Average year of Schooling	-1.91(0.01)*	-3.07(0.00) *	-3.06(0.00)*	-3.69(0.00)*	0.78(0.82)	-3.55(0.00)*
Pupil teacher Ratio Primary	0.08(0.38)	0.14(0.14)	0.07(0.50)	0.06(0.56)	0.6(0.10)***	0.18(0.17)
Female labour force participation rate	0.18(0.00)*	0.17(0.01) *	0.14(0.06)***	0.18(0.02)**	0.30(0.12)	0.07(0.32)
Aid (% GNI)	-0.39(0.00)*	-0.24(0.00) *	-0.38(0.04)**	-0.3(0.07)***	2.15(0.29)	-0.55(0.07)***
Region 2	5.91(0.14)	10.38(0.01) *	5.70(0.27)	10.5(0.05)**	-45.35(0.3)	16.68(0.10)***
3	3.12(0.34)	3.12(0.35)	2.63(0.53)	1.96(0.64)	2.29(0.75)	-5.26(0.21)
4	2.63(0.55)	4.24(0.36)	0.43(0.94)	-0.45(0.94)	2.02(0.87)	-9.34(0.23)
6	3.23(0.40)	4.10(0.31)	3.86(0.48)	2.06(0.72)	30.09(0.25)	-4.86(0.34)
7	7.36(0.03)**	10.8(0.00) *	8.21(0.05)**	10.1(0.02)**	-23.38(0.39)	12.56(0.14)
Year 1980	8.35(0.43)	-9.12(0.33)	-9.84(0.27)	-13.31(0.15)	-	-
1990	12.82(0.22)	-4.52(0.63)	3.24(0.75)	-2.74(0.76)	-1.21(0.88)	7.06(0.08)***
2000	11.11(0.21)	-2.25(0.79)	2.25(0.77)	-2.17(0.79)	-45.36(0.36)	19.30(0.05)**
2010	11.10(0.22)	-1.30(0.87)	5.79(0.59)	6.45(0.57)	-	-
Constant	342.7(0.00) *	-13.7(0.60)	323.5(0.00)*	8.7(0.77)	-47.93(0.66)	-109.52(0.22)

(Country Fixed effect)

Dependent variable: Child labour (All)	With RGDP	Without RGDP	With Q1	Without Q1	With Wages	Without Wages
F /chi2 Test	24.03	23.02	16.09	15.38	18.94	21.00
N	328	328	196	196	77.00	77.00
R-squared	0.83	0.81	0.78	0.75	0.87	0.87
OID Test	0.39(0.53)		0.15(0.69)		0.83(0.66)	
Endogeneity Test chi2(3)	6.62(0.08)		10.19(0.02)		9.82(0.02)	

*Note: *,** and *** represents Coefficient is Significant at 1%, 5% and 10% respectively. Numbers in parenthesis are p-values. Estimation technique used is 2SLS based on countries effect. Income (based on Q1), Credit and FDI are instrumented by population growth, rural population as percent of total, index of political rights and number of telephone lines; instrument for trade openness is based on gravity model while wages per month are instrumented by fertility rate, annual percentage change in inflation, log of investment (%GDP), rural population as percent of total, index of political rights and number of telephone lines.*

Table 3.6 (a): Comparing the two proxies of Income

Model	RGDP per Capita	Income of Bottom Quintile
Number of observation	328	328
ll(null)	-389.35	-389.35
ll(model)	-293.22	-292.37
Degrees of Freedom	21	21
AIC	628.45	626.75
BIC	708.10	706.40

f) Exploring an Alternate measure of Trade

The idea behind including export in place of trade is based on the argument that trade sanctions reduce price of unskilled exportable goods which reduces wages and income, thereby affecting child labour. Therefore, the only channel through which trade could affect child labour is exports rather than trade openness (export plus import as ratio of GDP). Jafarey and Lahiri (2002) have shown that when trade sanctions reduce price of unskilled exportable good, the income of the poor decreases. This increases the demand for loan, consequently increasing the interest rate. This results in a higher supply of child labour, because poor families cannot borrow to meet the income shock. In their model, a reduction in the price of exportable goods may also increase the consumption demand of that good which may affect the imports, assuming that both export and import are substitutable.

However, Edmonds (2009) argues that the dominant effect of an increase in international trade on children in developing economies is through changes in relative prices and living standards. Edmonds' (2009) argument is based on the fact that children in developing economies are not usually engaged in trade related sectors. They mostly work in agriculture sectors. Children are rarely involved in traded sectors because trade related sectors are relatively more skill intensive than agriculture and informal sectors. Hence, the effects of trade through wages in the trade related sector will be negligible.

The above two points, one predicting the effect of export on child labour through changes in the wages paid and the second arguing that trade will only affect child labour by having its consequences on the living standard, force the study to compare the effects of the two to find out if any dissimilarity exists. In order to do so, the study first replaces trade openness measure with the exports to GDP ratio, while in the last column imports and interest rates are also introduced (dropping credit)[19] to give a better understanding of the Jafarey and Lahiri model.

Result shows (table 3.7) no significant difference between the effect of trade openness and export. Both trade and exports have significant effect after dropping income from

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[19] Credit variable is drop because interest rate usually consider as the cost of borrowing. Therefore, interest rate can be used to predict the role of credit market imperfection on child labour.

the model. One standard deviation increase in export reduces the child labour around 0.42% which is higher than 0.21% when one considers the effect of trade openness. As export is also significant after dropping income from the model, it shows that exports also increase the income of the poor and increase in income reduces the supply of child labour. As said earlier the phenomenon may work like this: globalization increases the employment opportunities in an economy thereby increasing the income (recall table 3.3 for positive effect of globalization on Real GDP per capita) while increase in income reduces child labour incidence. Hence we conclude that income may be the channel through which trade/export and FDI could affect child labour.

As explained earlier, the last two columns incorporate the effect of imports and real interest rate as well. Before going into the detail of the analysis, two things need clarification: first of all, as data on real interest rates are hard to find, the sample size decreases to 306 observations. Second the real interest rate in the Jafarey and Lahiri model is endogenous. As a first step, this study checks the possible endogeneity of this variable. The Wu-Hausman test indicates the presence of endogeneity. Hence, this section uses the instrumental variable approach to predict the effect of real interest rate. Results show insignificant effect of real interest rate on incidence of child labour. The effect of FDI and imports show significant negative effect after dropping income from the model. However, now the effect of export (% GDP) is significant with income included in the model.

Overall as the results shows that the effect of both trade and export share is significant only after dropping income from the model we conclude that income may be the channel through which trade could affect child labour. Our conclusion may rest on the argument given by Edmond (2009) that trade sanctions may not have significant effect on the incidence of child labour as proportion of child labour in export related industries is negligible. The channel though which trade could affect child labour is by increasing the living standard of the poor.

Table 3.7: Effect of Trade, Exports and Imports on child Labour

(Country Fixed effect)

Dependent variable: Child labour (All)	With Trade openness		With Export only		With Export and Import	
	With RGDP	Without RGDP	With RGDP	Without RGDP	With RGDP	Without RGDP
Log RGDP per Capita	-76.83(0.00)*	-	-75.78(0.00) *	-	-63.4(0.00)*	-
Square of Log RGDP per Capita	4.04(0.00)*	-	4(0.00) *	-	3.1(0.01)*	-
Log FDI (inflow)	-0.39(0.78)	-1.98(0.07) *	-0.42(0.75)	-1.92(0.07)***	-3.0(0.39)	-6.39(0.01) *
Log Bank Credit to Private sector (% GDP)	-0.26(0.94)	4.46(0.16)	-0.11(0.97)	4.49(0.16)	-	-
Log of Trade Openness	-3.09(0.20)	-5.35(0.02) *	-	-	-	-
Log Export as ratio of GDP	-	-	-3.6(0.2)	-5.73(0.02)**	-4.6(0.07) ***	-5.82(0.03) **
Log Import as ratio of GDP	-	-	-	-	-4.9(0.50)	-12.98(0.02) **
Log Real Interest Rate	-	-	-	-	2.0(0.76)	-6.50(0.22)
Share of agriculture Sector in GDP	-0.35(0.21)	0.27(0.09)***	-0.34(0.23)	0.270.09)***	-0.7(0.00) *	-0.42(0.03) **
Share of Manufacturing Sector in GDP	-0.10(0.40)	0.01(0.90)	-0.10(0.40)	0.01(0.91)	-0.3(0.03) **	-0.21(0.07) ***
Adult Average year of Schooling	-1.91(0.01) *	-3.07(0.00)*	-1.96(0.01) *	-3.11(0.00) *	-1.4(0.05) **	-2.21(0.00) *
Pupil teacher Ratio Primary	0.08(0.38)	0.14(0.14)	0.07(0.40)	0.13(0.15)	0.2(0.03) **	0.21(0.04) **
Female labour force participation rate	0.18(0.00)*	0.17(0.01) *	0.18(0.01) *	0.17(0.01) *	0.1(0.09) ***	0.08(0.25)
Aid (% GNI)	-0.39(0.00)*	-0.24(0.00) *	-0.39(0.00) *	-0.24(0.00) *	-0.5(0.08) ***	-0.03(0.88)
Region 2	5.91(0.14)	10.38(0.01) *	6.14(0.13)	10.34(0.01) *	3.1(0.54)	4.69(0.31)
3	3.12(0.34)	3.12(0.35)	3.15(0.34)	3.23(0.33)	-6.3(0.34)	-9.87(0.06) ***
4	2.63(0.55)	4.24(0.36)	2.79(0.53)	4.22(0.36)	-5.6(0.59)	-15.(0.06) ***
6	3.23(0.40)	4.10(0.31)	3.25(0.40)	4.05(0.32)	-6.1(0.59)	-16.4(0.06) ***
7	7.36(0.03)**	10.80(0.00) *	7.56(0.02)**	10.85(0.00) *	0.2(0.97)	-1.28(0.80)
Year 1980	8.35(0.43)	-9.12(0.33)	8.31(0.43)	-8.82(0.35)	5.4(0.59)	-2.95(0.77)
1990	12.82(0.22)	-4.52(0.63)	13.34(0.20)	-3.54(0.71)	12.0(0.27)	10.82(0.32)
2000	11.11(0.21)	-2.25(0.79)	11.36(0.20)	-1.85(0.82)	12.7(0.26)	13.12(0.24)
2010	11.10(0.22)	-1.30(0.87)	11.36(0.21)	-0.88(0.91)	17.8(0.21)	21.55(0.11)
Constant	342.7(0.00)*	-13.7(0.60)	329.6(0.00) *	-22.8(0.42)	351.9(0.00) *	150.7(0.06) ***

Dependent variable: Child labour (All)	With Trade openness		With Export only		With Export and Import	
	With RGDP	Without RGDP	With RGDP	Without RGDP	With RGDP	Without RGDP
F /chi2 Test	24.03	23.02	24.03	23.14	19.45	19.08
N	328	328	328	328	306	306
R-squared	0.83	0.81	0.83	0.81	0.80	0. 79
OID Test	0.39		0.37		1.6	
p-value OID Test	0.53		0.55		0.45	
Endogeneity Test chi2(3)	6.62		6.68		15.26	
p-value	0.08		0.08		0.002	

*Note: *,** and *** represents Coefficient is Significant at 1%, 5%,and 10% significance level respectfully. Numbers in parenthesis are p-values. Estimation technique used is 2SLS based on countries effect. Income, interest rate and FDI are instrumented by Investment (% GDP), rural population as percent of total, index of political rights, general government gross fixed capital formation and number of telephone lines while instruments for trade openness and export (%GDP) are based on gravity model.*

g) Disaggregating the result by Child's Gender

The discrimination against women remains in debate throughout the world. For many girls, childhood is a period of taking responsibility for household and child care tasks. Gender discrimination is particularly evident in South Asia. In South Asia girls usually face a number of problems due to their gender identity. Keeping in mind gender discrimination across the world, this section estimated the model in equation 3.1 separately for male child labour and for female child labour. The result is discussed below.

Table 3.8: Determinants of child Labour by Gender

				(Country Fixed effect)
Dependent variable: Child labour	**Boys**		**Girls**	
	With RGDP	**Without RGDP**	**With RGDP**	**Without RGDP**
Log RGDP per Capita	-73.89(0.00)*	-	-79.87(0.00)*	-
Square of Log RGDP per Capita	3.77(0.01)*	-	4.31(0.00)*	-
Log FDI (inflow)	-0.85(0.58)	-2.69(0.03)**	0.09(0.95)	-1.25(0.24)
Log Bank Credit to Private sector (% GDP)	-0.28(0.94)	4.70(0.18)	-0.25(0.94)	4.20(0.18)
Log of Trade Openness	-3.62(0.19)	-6.14(0.02)**	-2.55(0.29)	-4.55(0.05)**
Share of agriculture Sector in GDP	-0.46(0.15)	0.19(0.27)	-0.24(0.38)	0.34(0.03)**
Share of Manufacturing Sector in GDP	-0.12(0.36)	0.00(0.98)	-0.08(0.52)	0.03(0.78)
Adult Average year of Schooling	-2.39(0.00)*	-3.63(0.00)*	-1.43(0.04)**	-2.51(0.00)*
Pupil teacher Ratio Primary	0.09(0.39)	0.15(0.14)	0.07(0.44)	0.12(0.18)
Female labour force participation rate	0.12(0.08)***	0.11(0.12)	0.24(0.00)*	0.24(0.00)*
Aid (% GNI)	-0.39(0.00)*	-0.24(0.01)*	-0.39(0.00)*	-0.25(0.00)*
Region 2	6.65(0.15)	11.01(0.02)**	5.17(0.19)	9.76(0.02)*
3	3.70(0.32)	3.31(0.37)	2.53(0.43)	2.93(0.37)
4	-1.52(0.76)	-0.04(0.99)	6.86(0.12)	8.61(0.06)***
6	0.44(0.92)	1.09(0.81)	6.03(0.11)	7.11(0.08)***
7	6.32(0.09)***	9.65(0.01)*	8.49(0.01)*	12.03(0.00)*
Year 1980	12.48(0.30)	-5.53(0.59)	4.01(0.70)	-12.92(0.17)
1990	12.88(0.27)	-4.37(0.68)	12.88(0.21)	-4.57(0.62)
2000	13.12(0.19)	-0.21(0.98)	9.06(0.30)	-4.33(0.6)
2010	16.59(0.10)***	3.45(0.70)	5.52(0.53)	-6.15(0.44)
Constant	348.2(0.01)*	-0.5(0.99)	337.3(0.00)*	-27.4(0.29)
F /chi2 Test	20.69	20.66	23.28	21.79
N	328	328	328	328
R-squared	0.81	0.79	0.82	0.80

*Note: *,** and *** represents Coefficient is Significant at 1%, 5% and 10% respectively. Numbers in parenthesis are p-values. Estimation technique used is 2SLS based on countries effect. Income, Credit and FDI are instrumented by Investment (% GDP), rural population as percent of total, index of political rights and number of telephone lines while instrument for trade openness is based on gravity model.*

The effect of income is non-linear and significant for both girls and boys. Comparing the result by gender, the study shows that income effect is slightly higher for the girls'

sample than for the boys' sample. Precisely, a 10 percentage point increase in income reduces child labour incidence among girls by 8%, while in case of boys the reduction is 7.4%. Turning to trade and FDI, the results again show notable effect of the two after dropping income from the model in case of boys sample while for the girls sample only trade openness is significant after dropping the income. Comparing the result across gender shows that one standard deviation increase in trade openness reduces the child labour of girls by 0.19% while for boys the reduction is 0.23%. As far as FDI is concerned, one standard deviation increase in FDI inflow reduces child labour for boys by almost 0.42% while the effect of FDI on female child labour is insignificant.

Overall, it can be concluded from the results that the effect of income is in favour of female child labour. However, FDI inflow remains insignificant for the girls sample while the effect of trade openness in reducing child labour is slightly more pronounced for boys.

3.5.2 Some Sensitivity Analysis

Although the above discussion answers all the research questions the chapter aimed to address, there are some regression analyses that are performed to have a greater insight of the issue. For example, the results discussed above do not show significant effect of credit market imperfection on child labour incidence. Before generalizing any conclusion based on insignificant effect, this study has taken into account Dehejia and Gatti's (2005) model [DG in short hereafter]. Dehejia and Gatti (2005) explain that credit affects child labour significantly. Their baseline model is very simple. They regressed child labour percentage on log of real GDP per capita (both in its linear and quadratic form), child labour percentage in 1950, percent of rural population and a time trend. In the latter stages they further included a measure of income variability – standard deviation of annual growth in real GDP per capita for the previous 10 years. Their result shows significant and negative effect of credit on child labour while a positive and significant effect of income volatility. As the DG model shows a significant effect of credit, the present study attempted to re-estimate the DG model. The motivation behind replicating the DG model is to investigate further the effect of credit on child labour. Result is presented hereunder in table 3.9.

Table 3.9: Access to Credit and child Labour under DG Model

	Replication of DG-Model	DG-Model with Countries fixed effect
Log RGDP per Capita	-31.5(0.0) *	-56.3(0.00)*
Square of Log RGDP per Capita	1.85(0.0) *	3.27(0.00)*
Bank Credit to Private sector	-0.06(0.0) *	-0.78(0.50)
Log FDI (inflow)	-	-1.91(0.00)*
Income Variability	-7.4(0.01) *	27.96(0.32)
Log of Trade Openness	-	-7.02(0.00)*
Rural population as % total population	0.08(0.002) *	0.24(0.00)*
child labour in 1950	0.59(0.0) *	-
Time Trend	-1.67(0.0) *	-

*Note: *,** and *** represents Coefficient is Significant at 1%, 5% and 10% respectively. Numbers in parenthesis are p-values. Estimation of DG model is based on OLS regression.*

The result predicts a significant and negative effect of credit as in the original DG model. Although credit, the variable of interest, now turns negative and significant but the drawback in using DG model is that it is not corrected for endogeneity and country specific fixed effect. Hence, as a next step, the DG model is corrected for country fixed effect. The result now shows insignificant effect of credit. As the data of the current study confirms the need of country specific estimation, a country- specific intercept is applied in the main regression model.

Furthermore, in addition to the income variable, we have also investigated the presence of non-linearity among other variables as well. Table 3.10 shows the result after including nonlinear terms and interaction terms of all the variables of interest with real GDP per capita and trade and FDI with credit. Results demonstrate the insignificant effect of most of the interaction and quadratic terms except for interaction term of FDI with credit and interaction term of credit with real GDP per capita. The interaction term of FDI with credit and the non-linear credit term are also significant after dropping income from the model. In order to draw some conclusions we have conducted a set of joint significance tests. The joint significance test of the credit variable (credit, its square and all the interaction terms that include credit) is not statistically significant (F-statistic 1.52 with p= 0.21). Application of the same test on the FDI variable and the trade variables finds a significant effect (F-statistics 3.37 with p-0.02) in the former and an insignificant effect (F-statistics 1.92 with p-0.14) in the latter.

Furthermore, inclusion of non-linear and interaction terms resulted in the loss of explanatory power of income variable. Hence, before proceeding further the BIC is applied to select the best model. The BIC value for the model without inclusion of non-linear term and interaction terms work out to be lower (710.85) than with the inclusion of these terms (728.41). Therefore, on the basis of BIC test in the main analysis, these terms are not included but nevertheless the study does acknowledge that non-linearity may exist in FDI variable.

Table 3.10: With Interaction & second order Terms

Dependent variable: Child labour (All)	With RGDP	Without RGDP
Log RGDP per Capita	-68.56(0.15)	-
Square of Log RGDP per Capita	1.89(0.51)	-
Log FDI (inflow)	-0.21(0.99)	-13.60(0.20)
Square of Log FDI (inflow)	-0.97(0.13)	0.07(0.82)
Log Bank Credit to Private sector (% GDP)	19.79(0.68)	24.16(0.50)
Square of Log Bank Credit	-2.10(0.53)	-6.01(0.04)**
Log Trade Openness	-9.91(0.88)	-9.29(0.88)
Square of Log Trade Openness	0.71(0.82)	0.51(0.87)
Interaction term: openness*Real GDP	1.76(0.59)	-
Interaction term: FDI*Real GDP	3.32(0.11)	-
Interaction term: Credit*Real GDP	-7.27(0.09)***	-
Interaction term: Trade*Credit	2.12(0.64)	4.86(0.14)
Interaction term: FDI *Credit	3.56(0.06)***	2.81(0.05)**
Share of agriculture Sector in GDP	-0.44(0.18)	-0.07(0.77)
Share of Manufacturing Sector in GDP	-0.17(0.23)	-0.10(0.46)
Adult Average year of Schooling	-1.69(0.07)****	-2.38(0.00)*
Pupil teacher Ratio Primary	0.07(0.58)	0.18(0.05)**
Female labour force participation rate	0.15(0.16)	0.06(0.42)
Aid (% GNI)	-0.26(0.11)	-0.08(0.39)
Region 2	3.47(0.44)	4.14(0.36)
3	3.58(0.54)	-1.07(0.78)
4	1.26(0.84)	-2.37(0.65)
6	2.31(0.65)	-0.02(0.99)
7	7.16(0.09)***	6.31(0.10)***
Year 1980	14.53(0.43)	-13.48(0.16)
1990	19.35(0.21)	-4.59(0.65)
2000	16.95(0.22)	-3.07(0.73)
2010	14.71(0.32)	-5.18(0.56)
Constant	251.52(0.49)	85.43(0.78)
F /chi2 Test	17.05	19.36
N	328	328
R-squared	0.76	0.79

*Note: *,** and *** represents Coefficient is Significant at 1%, 5% and 10% respectively. Numbers in parenthesis are p-values. Estimation technique used is 2SLS based on countries effect. Income, Credit and FDI are instrumented by Investment (% GDP), rural population as percent of total, index of political rights and number of telephone lines while instrument for trade openness is based on gravity model.*

3.6 Conclusions

The purpose of this chapter was to investigate the link between globalization, defined as increase in trade openness and penetration of FDI, and incidence of child labour, while taking into account the role of credit market imperfections. The empirical assessment was based on the cross- sectional analysis of 129 developing countries for four decades, from 1970 to 2010. The issue was relevant under the current scenario of financial crises especially for the policy makers for whom a major concern is the well-being of children. The most common view about child labour is that children are forced into labour as the family incomes fall. This chapter also showed that income does affects child labour. The only difference in this study and all the previous studies is that it predicts the negative effect of income using two different measures of income after correcting endogeneity bias. It also investigated the role of wages separately to predict the direct effect of wages on child labour. To the best of the author's knowledge, these measures have not been incorporated in earlier studies at the cross- sectional level.

The study first estimated the effect of income on child labour incidence by using real GDP per capita, and then estimated the effect by using two other alternative measures of income: income held by bottom quintile of the population and adult wages. Income held by bottom quintile of the population was estimated by using Gini coefficient and bottom quintile income share Q1 data. Thus this proxy may also help in understanding the income inequality argument given by Chenery et.al, (1974) and Tanaka (2003) i.e. under more equal income distribution with the same income per capita, countries experience low incidence of child labour. This argument was tested by comparing the estimates of different proxies of income. Among the three alternative measures, adult wages were found to have an insignificant effect (this may be because of the insufficient number of observation) while Real GDP per capita and income held by bottom quintile of the population showed a significant but nonlinear effect. On the basis of AIC and BIC test, the study concludes that the income of the bottom quintile of the population rather than real GDP per capita is the better income proxy to use when analysing child labour incidence. As this measure is based on Gini coefficient and income share of bottom quintile population, the study further concludes that an effective policy to reduce child labour incidence should also take into account inequality that exists in an economy.

As explained earlier, this chapter has also investigated the potential impacts of international trade and FDI on child labour after correcting for endogeneity. Evidence shows that countries more open to trade and having higher FDI inflow have lower incidence of child labour. But the effect of both the variables after correcting for the endogeneity is significant only after dropping the income variable. Therefore, the study concludes that expansion in trade and FDI increases employment opportunities thereby increasing the income of the poor. This increase in income will then reduce child labour incidence.

Furthermore, this study has also evaluated the two arguments, one predicting the effect of export on child labour through changes in wages, while the other arguing that trade will only affect child labour through affecting the living standard, by comparing the results of exports and trade openness. The study concludes that trade sanctions may not have significant effect on the incidence of child labour as proportion of child labour in export related industries is negligible. The channel though which trade may affect child labour is by increasing income thereby affecting living standard. As evident from the analysis, not only trade and FDI, but also exports are significant only after dropping income from the model.

As far as the effect of credit market imperfection is concerned, our analysis does not find any significant effect of credit on child labour. We incorporated credit variable in the model with the hypothesis that in order to overcome the income shock due to trade sanctions, poor people will borrow and thus credit will reduce child labour. Our results show a positive effect of trade and FDI on real GDP per capita while negative effect on child labour. Therefore, for credit variable, the study concludes that the effect of credit is insignificant because both trade and FDI are promoting the income and reducing child labour.

The result also shows a highly negative and significant effect of increase in average year of adult schooling on incidence of child labour. In developing countries, mainly because of the low level of educational attainment, unskilled labourers are in abundance. This includes child labour as well. Therefore any increase in average years of schooling will result in skilled labour formation leading to high wages and a reduction in the supply of child labour. Presence of high skilled labour increased labour

productivity and economic growth over the long run. It may also result in more equal and uniform distribution of income because of an increase in the relative wage for unskilled labour resulting from a reduced supply of unskilled labour. This may also help in attracting FDI, leading to further economic development.

The result also provides empirical evidence of the negative relationship between aid and incidence of child labour. Increasing aid flow from developed countries to developing countries was found to reduce child labour. Hence, the study concludes that if the developed nations fund programs that target working children for rehabilitation and education (like UNICEF program "food for education") this may help in reducing child labour in the developing countries. With the help of foreign aid, World Bank poverty reduction programs and UNICEF programs, a change could be made. Working children may end up going to school rather than working. With a ban on child labour and support for the education assistance programmes, children may benefit.

Annexures

Annex A- 3.1: Variables Description, sources and Availability of Data

Variables	Definition	Source	Effects	Availability
AGR	Share of agriculture sector in GDP	UN-Statistics Division (Shares of breakdown of GDP/Value Added at current prices in Percent)	+ve	1970-2008
MANF	Share of Mining and Manufacturing sector in GDP	Statistics Division (Shares of breakdown of GDP/ Value Added at current prices in Percent)	-ve/ +ve	1970-2008
YRSCH	Average years of total schooling, 15+ total	World Bank online Databank of Education	-ve	1960-2010
CRDT	Domestic Credit to Private Sector (% GDP)	World Bank online Databank of WDI/GDF	-ve	1960-2008
FLFPR	Labour Force Participation rate, female (age 15-64)	World Bank online Databank of WDI/GDF	-ve/ +ve	1970-2008
MLFPR	Labour Force Participation rate, male (age 15-64)	World Bank online Databank of WDI/GDF	-ve/ +ve	1970-2008
PUPTECH	Pupil-teacher ratio, primary	World Bank Education Statistics/UNESCO Institute for Statistics (UIS)	+ve	1970-2008
RCGDP	Real Gross Domestic Product per Capita, current price	Penn World table 6.3	-ve	1950-2007
FDI	Foreign direct investment, net inflows (BoP, current US$)	World Bank online Databank of WDI/GDF	-ve	1970-2008
REGON	Region	World Bank Development Report	-	2009
INCGROP	Income group	World Bank Development Report	-	2009
CHLDAB	Economically Active children 10-14 percent of the total	Economic Activity rate, 1950-2010 (ILO-estimate/Projection) using UN common Database through ESDS	-	1950-2010
IMPORT	Import (% GDP)	World Bank online Databank of WDI/GDF	-ve	1960-2008
RELINTR	Real Interest rate	UN common data base (UN estimate)	+ve	1970-2009
AIDGNIPERCT	Net ODA received (% of GNI)	World development Indicator through ESDS	-ve	1960-2008
TRD	Bilateral trade data based on Export plus Import divided by GDP	Direction of Trade by IMF and UN Comtrade Database	-ve	1970-2009
DISTANCE	Distance between country *i and j(used to calculate bilateral trade openness)*	The CEPII Gravity Dataset: downloaded from: http://www.cepii.fr/anglaisgraph/bdd/gravity.htm	-	-
POP	Population	World Bank online Databank of WDI/GDF	-	1960-2008
COMNLANG	country i and j share Common languages	The CEPII Gravity Dataset: downloaded from: http://www.cepii.fr/anglaisgraph/bdd/gravity.htm	-	-
BORDER	country i and j share Common border	The CEPII Gravity Dataset: downloaded from: http://www.cepii.fr/anglaisgraph/bdd/gravity.htm	-	-
AREA	Area in (square kilometer)	The CEPII Gravity Dataset: downloaded from: http://www.cepii.fr/anglaisgraph/bdd/gravity.htm	-	-
RURAL	Rural Population	The CEPII Distance Dataset: Downloaded from: http://www.cepii.fr/anglaisgraph/bdd/distances.htm	-	-
PR_SCORES	Index of political rights	Freedom House: Freedom in the World Comparative and Historical Data: downloaded from: http://www.freedomhouse.org/template.cfm?page=439	-	1973-2010
INCMPOR	Income of the poor; Computed using data of Gini and Q1	UN-Wider (World Income Inequality Database), Deininger and Squire (1996), Lundberg and Squire (2000) and EHII (Estimated Household Income Inequality Dataset, Downloaded from: http://utip.gov.utexas.edu/data.html	-ve	Compiled from 1970 to latest available

Annex A- 3.2: Summary Statistics of Variables

Variables	Obs.	Mean	Std. Dev.	Min	Max
Child labour (All)	614	17.87	16.51	0	75.14
Child labour (boys)	645	18.81	17.72	0.00	75.93
Child labour (girls)	645	15.22	15.83	0.00	74.35
Real GDP per Capita	576	3474	3981	150	25383
Log Real GDP per Capita	576	7.58	1.11	5.01	10.14
Foreign Direct Investment (Net inflow)	475	1.9E+9	9.1E+9	1.E+4	1.5E+11
Log Foreign Direct Investment (Net inflow)	475	18.29	2.76	9.21	25.72
Domestic Credit to Private Sector (% GDP)	476	25.18	21.97	1	145
Export (% GDP)	507	32.03	20.65	0	154
Trade Openness	578	72	40	2	220
Log Trade Openness	578	4.11	0.65	0.70	5.40
Log income of the bottom quintile	299	10.07	1.15	6.62	13.44
Real Interest Rate	326	2.81	0.65	1.62	8.47
Share of agriculture Sector	576	24.57	15.77	1.20	78.05
Share of Mining & Manufacturing	576	23.89	14.18	0.52	88.52
Average Year of Adult Schooling	479	5.14	2.61	0	11
Pupil Teacher Ratio Primary	474	34.72	13.71	9	93
Female Labour Force participation rate	574	50.00	21.37	2	92
Aid (% GNI)	502	7.75	13.27	0	186

Annex A- 3.3: Correlation matrix

	Child labour	Real GDP per capita	FDI	Credit	Export (%GDP)	Trade Openness	Share of agriculture Sector	Share of Mining & Manufacturing	Average Year of adult schooling	Pupil Teacher ratio Primary	Female labour force participation rate	Aid (% GNI)
Child labour	1											
Real GDP per capita	-0.5912	1										
FDI	-0.1818	0.3679	1									
Credit	-0.4115	0.5395	0.2892	1								
Export (%GDP)	-0.1678	0.2587	0.8875	0.294	1							
Trade Openness	-0.4104	0.3138	0.0237	0.3892	0.0118	1						
Share of agriculture Sector	0.6817	-0.6364	-0.21	-0.469	-0.174	-0.2952	1					
Share of Mining & Manufacturing	-0.412	0.2539	0.131	0.1903	0.1995	0.153	-0.5769	1				
Average Year of adult schooling	-0.7703	0.6959	0.247	0.4227	0.1755	0.4498	-0.6037	0.2796	1			
Pupil Teacher ratio Primary	0.6509	-0.5329	-0.21	-0.395	-0.1812	-0.2732	0.4823	-0.2231	-0.574	1		
Female labour force participation rate	0.2979	0.0475	0.1022	-0.051	0.0802	0.0513	0.2939	-0.1964	0.082	0.2221	1	
Aid (% GNI)	0.257	-0.2926	-0.10	-0.185	-0.1	0.0353	0.4475	-0.3017	-0.22	0.2451	0.247	1

Annex A- 3.4: First Stage Regressions (regressions with Real GDP per capita)

Dependent variables:	Log RGDP	Log FDI	Log Domestic Credit
Investment to GDP ratio	0.00(0.69)	-0.02(0.41)	0.00(0.72)
Rural population as % total population	-0.01(0.00)*	-0.04(0.0)*	0.00(0.42)
Number of Telephone Lines	-3.E-09(0.41)	0.00(0.00)*	0.00(0.00)*
Political Freedom Index	-0.03(0.35)	-0.10(0.38)	-0.13(0.01)*
Log of Trade Openness	0.01(0.95)	-0.61(0.17)	-0.02(0.91)
Share of agriculture Sector in GDP	-0.02(0.00)*	-0.03(0.22)	-0.03(0.00)*
Share of Manufacturing Sector in GDP	0.00(0.85)	0.00(0.92)	-0.02(0.03)**
Adult Average year of Schooling	0.04(0.24)	-0.01(0.91)	0.05(0.25)
Pupil teacher Ratio Primary	-4.E-03(0.46)	0.01(0.72)	0.01(0.41)
Female labour force participation rate	0.00(0.44)	-0.01(0.51)	-5.E-03(0.4)
Aid (% GNI)	-0.01(0.02)**	-0.01(0.37)	0.00(0.63)
Region 2	0.04(0.86)	-0.03(0.96)	-0.54(0.07)***
3	-0.08(0.66)	-1.61(0.01)*	-0.49(0.05)**
4	-0.08(0.79)	-1.58(0.08)***	-0.12(0.76)
6	0.00(1.00)	-1.04(0.18)	-0.29(0.36)
7	-0.14(0.47)	-1.16(0.06)***	-0.28(0.27)
Year 1980	0.86(0.15)	-1.38(0.44)	-0.68(0.41)
1990	0.83(0.16)	0.04(0.98)	-0.93(0.27)
2000	0.96(0.06)***	0.97(0.53)	-1.12(0.10)***
2010	1.38(0.01)*	2.30(0.15)	-0.39(0.57)
Constant	8.19(0.00)*	17.44(0.00)*	4.99(0.01)*
F /chi2 Test	22.63	10.31	5.61
N	323	292	321
R-squared	0.82	0.67	0.50

*Note: *,** and *** represents Coefficient is Significant at 1%, 5% and 10% respectively. Numbers in parenthesis are p-values. Estimation technique used is based on country fixed effect*

Annex A- 3.5: First Stage Regressions (regressions with Income of the bottom Quintile – Q1)

Dependent variables	Log Income based on Q1	Log FDI	Log Domestic Credit
Population Growth Rate	0.02(0.77)	-0.08(0.72)	0.05(0.59)
Rural population as % total population	-0.02(0.00)*	-0.03(0.02)**	-2.E-03(0.74)
Number of Telephone Lines	0.00(0.82)	0.00(0.06)***	0.00(0.00)*
Political Freedom Index	-0.04(0.40)	0.01(0.92)	-0.12(0.01)*
Log of Trade Openness	0.55(0.01)*	-0.84(0.11)	0.02(0.92)
Share of agriculture Sector in GDP	-0.03(0.00)*	-0.05(0.06)***	-0.03(0.01)*
Share of Manufacturing Sector in GDP	-0.01(0.42)	-0.02(0.44)	-0.02(0.01)*
Adult Average year of Schooling	-0.01(0.89)	-0.08(0.49)	0.05(0.37)
Pupil teacher Ratio Primary	0.00(0.82)	0.01(0.49)	-2.E-03(0.8)
Female labour force participation rate	-3.E-03(0.53)	-0.01(0.36)	-0.01(0.08)***
Aid (% GNI)	-0.02(0.17)	-0.03(0.17)	0.02(0.21)
Region 2	-0.07(0.82)	-0.14(0.86)	-0.72(0.04)**
3	-0.63(0.04)**	-1.65(0.02)**	-0.54(0.09)***
4	-0.62(0.14)	-2.19(0.03)**	-0.39(0.38)
6	-0.35(0.35)	-1.7(0.07)***	-0.52(0.19)
7	-0.87(0.00)*	-1.45(0.03)**	-0.46(0.14)
Year 1980	0.90(0.17)	0.96(0.52)	1.31(0.06)***
1990	2.05(0.00)*	2.28(0.14)	1.32(0.06)***
2000	1.39(0.01)*	2.47(0.08)***	0.82(0.16)
2010	1.78(0.00)*	4.55(0.00)*	1.08(0.09)***
Constant	16.70(0.00)*	14.0(0.01)*	4.58(0.04)**
F /chi2 Test	13.01	5.52	3.68
N	196	177	194
R-squared	0.74	0.52	0.39

*Note: *,** and *** represents Coefficient is Significant at 1%, 5% and 10% respectively. Numbers in parenthesis are p-values. Estimation technique used is based on country fixed effect*

Annex A- 3.6: Determinants of Child Labour (without Controlling Endogeneity)

(Country Fixed Effect)

Dependent variable: Child labour	With RGDP	Without RGDP
Log RGDP per Capita	-37.43(0.02) **	-
Square of Log RGDP per Capita	2.01(0.05) **	-
Log FDI (inflow)	-0.89(0.12)	-1.10(0.06) ***
Log Bank Credit to Private sector (% GDP)	3.29(0.02) **	2.85(0.06) ***
Log of Trade Openness	-1.94(0.1) ***	-2.30(0.04) **
Share of agriculture Sector in GDP	0.01(0.91)	0.22(0.07) ***
Share of Manufacturing Sector in GDP	-0.13(0.20)	-0.07(0.51)
Adult Average year of Schooling	-2.77(0.00) *	-2.99(0.00) *
Pupil teacher Ratio Primary	0.24(0.01) *	0.23(0.02) **
Female labour force participation rate	0.15(0.01) *	0.13(0.04) **
Aid (% GNI)	-0.21(0.01) *	-0.14(0.08) ***
Region 2	4.31(0.16)	3.59(0.26)
3	1.38(0.62)	0.67(0.82)
4	-0.87(0.83)	-1.59(0.70)
6	-1.08(0.78)	-0.71(0.86)
7	3.34(0.26)	5.75(0.05) **
Year 1980	15.16(0.08) ***	8.44(0.34)
1990	11.03(0.20)	1.90(0.83)
2000	13.63(0.09) ***	6.59(0.43)
2010	15.60(0.06) ***	9.28(0.29)
Constant	162.63(0.02) **	-0.89(0.96)
F /chi2 Test	24.53	22.48
N	328	328
R-squared	0.81	0.77

*Note: *,** and *** represents Coefficient is Significant at 1%, 5% and 10% respectively. Numbers in parenthesis are p-values.*

Annex A- 3.7: Hausman Test for Trade openness

	(Country Fixed Effect)	
Dependent variable: Child labour	**With Trade openness**	**With Export (%GDP)**
Log FDI	-2.09(0.08)***	-2.40(0.04)**
Log Bank Credit to Private sector (% GDP)	5.12(0.12)	5.47(0.09)***
Log Trade Openness/Export	-0.95(0.33)	-1.87(0.05)**
Predicted Log Trade openness/Export	-5.02(0.05)**	-6.08(0.02)**
Share of agriculture Sector in GDP	0.26(0.12)	0.26(0.10)***
Share of Manufacturing Sector in GDP	-0.02(0.86)	-0.01(0.94)
Adult Average year of Schooling	-3.10(0.00)**	-3.11(0.00)*
Pupil teacher Ratio Primary	0.17(0.07)***	0.15(0.11)
Female labour force participation rate	0.16(0.02)**	0.17(0.01)*
Aid (% GNI)	-0.22(0.01)*	-0.22(0.01)*
Region 2	10.52(0.01)*	11.13(0.01)*
3	2.75(0.42)	2.87(0.38)
4	3.36(0.48)	3.54(0.44)
6	3.15(0.44)	2.15(0.59)
7	10.45(0.00)*	10.47(0.00)*
Year 1980	-15.14(0.12)	-13.09(0.17)
1990	-1.77(0.84)	-0.13(0.99)
2000	-1.70(0.84)	-0.14(0.99)
2010	-1.60(0.85)	0.16(0.98)
Constant	-17.38(0.51)	-37.63(0.19)
F /chi2 Test	21.53	22.83
N	311	311
R-squared	0.81	0.82

*Note: *,** and *** represents Coefficient is Significant at 1%, 5% and 10% respectively. Numbers in parenthesis are p-values. Estimation technique used is based on country fixed effect*

Annex A- 3.8: Diagnostic Test (F-Test for Instrument)

Instrument for	F-test
Model with Real GDP per Capita	
Real GDP per capita	3.60(0.01)*
Credit	3.97(0.006)*
FDI	7.35(0.00) *
Model with Income of Bottom Quintile	
Income of Bottom Quintile	4.59(0.0025)*
Credit	3.57(0.011)*
FDI	2.52(0.05)**
Model with Export, Import and Real Interest rate	
Real GDP per capita	2.45(0.043)**
Credit	1.91(0.10)***
FDI	2.05(0.083)***
Real Interest rate	11.12(0.00)*

Annex A- 3.9: Literature on Child Labour

Authors	Variable Used	Estimation Technique	Major Objective	Findings
Mahmood Hussain and Keith. E. Muskan (2003)	Child labour 10-14 Average year of schooling, human capital stock (over age 25), GDP per capital, Pupil Teacher Ratio, cost of education, distance from school (as school quality indicators)	Seemingly unrelated Regression using cross sectional data across time; 1960, 1970 and 1980 of 64 countries (192 observation)	Main objective of the paper was to relate the household decision to allocate the child time on labour and human capital.	They proved their proposition by developing theoretical model based on production function, household constraint and preferences.
Eric Neumayar and Indra De Soysa (2005)	Labour force participation rate (10-14). GDP per capita, share of Agriculture sector, trade openness, trade policy (freedom exchange with foreigners) FDI, pupil teacher ratio (Grade 5), Health and Education Expenditure	OLS, Hausman test for Endogeneity, using Data of 128 countries for the year 1995	Explore the effect of openness on child labour	Estimation predict the effect of openness on incidence of child labour the direction cannot be predicted thus authors suggest causality based analysis
Robert C. Shelburne (2001)	Children 10-14 (not active in labour force). Per capita income, openness, GNP, Dummy for countries having Communist rule.	Log Linear Model. Estimated Box cox Transformation using Data of 113 low, lower middle and upper middle income countries from WDI for the year 1996	Effect of trade openness on child labour	Open economy reduces the incentives to allow child labour thus trade sanctions may be counterproductive, their result also shows that when the society become more democratic the process of change bring economic changes that will undermine the practice of child labour
Rajeev H. Dehejia Roberta Gatti (2002)	Child labour (10-14) as percentage of total population age 10-14.Credit to private sector, GDP per capita, rural population as % of total population, Gross primary/secondary school enrolment ratio, Fertility rate export share in GDP, import share in GDP, Ratification Dummy and dummy for legal origin	OLS, Tobit, Robustness checks, fixed effect test and non-parametric choice of functional form using data of 172 countries for the year 1950,60,70,80,90 and 95	Effect of credit on child labour incidence	Using the series of estimation and Robustness measure prove that the credit market effect child labour
Carol Ann Rogers & Kenneth A. Swinnerton (2001)	Economically active population 10-14.Real GDP per worker, Inequality, relative size of the child to adult population and some instrumental variables (to avoid measurement error)	Tobit using data of 89 countries for the year 1990	Explore the effect of inequality, labour productivity on child labour incidence	In economies, where there is more than enough aggregate income to eliminate child labour, and child labour exists it is largely because the distribution of income is sufficiently unequal

Authors	Variable Used	Estimation Technique	Major Objective	Findings
Basu and Van (BV-model) (1998)	None	Theoretical model	Child labour Demand and supply using multiple equilibrium approach. Exploring labour market situation; Under what conditions imposing ban will not desirable	Adult wage if less than the effective child wage firm will employ adult only, if greater it will employ child only and if equal it remain indifferent, rise in the relative # children child labour increases, ban will raise the adult wage but as long as it will be less than the adult wage plus the child wage it will only worst off the family.
Swinnerton& Rogers (SR-model) (1999)	None	Theoretical extension of BV model	BV model extended to show child Labour exist because the return to capital are distributed unequally.	Comment on BV (1998): BV model depend on luxury and substitution axiom but SR mention another axiom; distribution axiom, SR model show that if non labour income distributed with equity child labour in BV model would not exist.
Basu & Van (Reply to SR comment) (1999)	None	Theoretical extension of earlier BV model	Explain conditions under SR model not work. However the issue consider in SR model were considered and earlier BV model was extended	SR model recommend that all profit must accrue to the worker but they do not show how the distribution brought about, their suggestion is interpreted as appealing thus BV consider it as deserve intension. The extended BV model report an equilibrium where some people work and some not as SR model focus on the equilibrium in which all children work or no children work however in their model either of these not hold.
Shankha Chakraborty and Mausumi Das (2003)	None	Model/Charts	Link Mortality, fertility, growth, human capital, child labour and credit	In the presence of high Mortality rate, perfect credit market would not translate child labour into human capital across generation.

Authors	Variable Used	Estimation Technique	Major Objective	Findings
Alan B. Krueger (1996)	None .	Review of theoretical Literature	Review the theoretical arguments for and against linking international labour standards to trade. Discuss in detail the argument that international labour standards are merely disguised protectionism	- Labour standards could enhance the efficiency of the labour market and improve the distribution of income in some situations, but could prove counterproductive for efficiency and equity in others. - Prove that the prevalence of child labour declines sharply with national income. - Provide support that an International labour standard in advanced nations does not necessarily represent disguised protectionism.
Beegle, K.,Dehejia, R.H. and Gatti; R. (2005)	Labour hour (wage + non-wage), school enrolment, highest grade completed, occupation, earnings, and health. Instruments used are rice prices and community disasters; other variables include household and community-level controls.	OLS, IV-2SLS and Fixed Effect using Vietnam Living Standards Survey (VLSS), 1992-93 and 1997-98	Investigated the extent to which transitory income shocks lead to increases in child labour and whether household access to credit mitigates the effects of these shocks.	- Child labour significantly reduces school attainment. - Loss from reduced education is more than fully offset by increased labour market experience as a child. - no significant effects of child labour on health - A community disaster is associated with an increased use of child labour, and rice prices are associated with reduced child labour. - instruments are not correlated with the incidence of illness among children - no evidence that the value of durable assets (a measure of wealth) is correlated with the occurrence of community disasters
Beegle, K.,Dehejia, R.H. and Gatti; R. (2006)	Child labour hours, a measure of income shocks (an indicator of crop lost to pests and other calamities; Share of the value of crop loss to total crop value), individual, household, and community characteristics, assets measure non-land household wealth, mother's and father's schooling, the presence of the mother and father in the household, the child's age, and interview-wave and season fixed effects	Fixed Effect using Kagera Health and Development Survey (KHDS) of the Kagera region in Tanzania from 1991 to 1994	Effect of credit on child labour incidence	- crop shocks are transitory shocks to household income - shocks are significant relative to household wealth - crop shocks lead to a significant increase in the level of child labour - Educational enrolment decreases in response to shocks - households with a typical level of asset holdings are able to fully offset the shock
Ranjan P. (2001)	None	Theoretical model	overlapping generations general equilibrium model to understand the determinants of child labour	- There is a positive relationship between inequality in the distribution of income and the incidence of child labour. - credit constraints here means that either parents are unable to borrow with the promise by children that the parents will be reimbursed for this in the future; or, children are unable to borrow to reimburse their parents of the foregone earnings while going to school. Net result is that the borrowing against the future earnings of children is not possible.

Authors	Variable Used	Estimation Technique	Major Objective	Findings
				- The impact of trade sanctions on factor prices in a country reduce the unskilled wage and increase the skilled wage thus a decline in the unskilled wage reduces the income of the parents who are unskilled. In a world with credit constraints, this would increase the incidence of child labour for children of the unskilled.
Cigno et al., (2002)	10–14 labour participation rate, or by the primary school nonattendance rate. trade openness (the trade ratio (exports plus imports, divided by GDP) or by a dummy taking value one if the country is open according to the Sachs–Warner definition, zero), real per-capita income, health policy (the share of public health expenditure in GDP) and skill composition the share of the workforce aged 25 or over which completed only primary education, and by that which attained secondary or higher education	Fixed Effect using Data of Developing countries from World Development Indicator for the year 1980, 1990, 1995 and 1998	Effect of trade liberalization on child labour incidence	- Parental decisions whether a child should work or go to school depend on the costs and benefits of education. - In a country that starts out with a largely uneducated workforce, globalization raises the wage rates of uneducated, relative to educated workers. That reduces the incentive to educate a child, and raises the incentive to make the child work at the earliest opportunity. On the other hand, if the wage rate of uneducated workers rises in absolute as well as relative terms, this will have a positive income effect on the demand for education. The net effects of globalization are thus ambiguous. - Controlling for GDP, skill composition of the adult workforce, and weight of public health expenditure in GDP, trade openness as measured by the Sachs–Warner index is found to have a negative effect on child labour
Edmonds and Pavcnik (2006)	Percent of a country's population ages 10–14 that is economically active. Instrument for openness is trade by geography and instrument for income is 15 year lag GDP-PC and Investment, other control variables include average years of schooling in the population, capital per worker, whether the country is a signatory on child labour conventions, country's latitude, share of the population that is rural, average import duty and measure of political freedom	IV-2SLS using data of 113 countries For 1995	Explores the effect of Income and Trade openness on child labour incidence.	- there is a negative association between child labour and openness - After correcting for endogeneity, a 10% increase in openness is associated with a 7% decline in child labour at the data means. - For the average non-OECD country, a 10% increase in the ratio of trade with OECD countries to GDP is associated with a 9% decline in child labour - Decline in child labour with openness appears to stem entirely from the association between trade and income - Control for income differences across countries, result in no evidence of a substantive or statistically significant association between trade and child labour.
Davies and Voy, (2009)	Labour Force participation rate of 10–14. Openness, FDI, Logged real GDP, average years of school completed over the age of 25, percentage of the population living in rural areas, political freedom index and a dummy if country had signed ILO Convention 138.	IV-2SLS and Fixed effect for Robustness check using data of 145 countries for the year 1995	Explore the effect of Income, trade openness and FDI.	- When an IV for FDI is used, the magnitude of the effect of FDI on child labours increases. - the effect of FDI is channelled through its impact on per capita income

Authors	Variable Used	Estimation Technique	Major Objective	Findings
Dwibedi J.K. and Sarbajit Chaudhuri (2010)	None	Theoretical model	Explain how foreign capital inflows might produce favourable effect on the incidence of child labour in a developing economy despite affecting wage inequality adversely. Developed three-sector general equilibrium model for the purpose.	- An inflow of foreign capital leads to (i) increases in both adult unskilled wage and skilled wage; and, (ii) a decrease in child wage rate and (iii) a fall in return to capital. The skilled–unskilled wage inequality worsens if the high-skill sector is capital intensive relative to the low-skill sector. - An inflow of foreign capital lowers the incidence of child labour in the economy if the high-skill sector is capital-intensive relative to the low-skill sector.
Swaminathan M. (1998)	None	Uses data on child labour in the city of Bhavnagar in the state of Gujarat from a survey conducted in the year 1995	Analysed the features of child labour in in Bhavnagar, an area of high economic growth in western India.	Major activities, occupations, wages and schooling.

Child labor is not a problem that can be solved with slogans and ringing declarations. Evidences make it clear that child labor cuts across policy boundaries: health, education, labor market, capital market, social security, criminal law, international peace keeping, income growth, and distribution all have a bearing on child labor. Therefore, reducing child labor cannot be regarded as just another policy issue alongside others; it is only one dimension of many, possibly all, policies in the field of development [Cigno, Rosati and Tzannatos-2002].

4. Labour Market Conditions and Incidence of Child labour: A case study of Pakistan

4.1 Introduction

The issue of child labour has attracted much attention from academics, policy makers, social activists and anthropologists in Pakistan over the years. There is an extensive literature available which addresses the economics of child labour but it has been observed that the literature overlooks the effects of local labour market conditions. A high proportion of the literature merely focuses on poverty, household and the child's own characteristics as major determinants – mainly emphasizing on the supply side and overlooking the demand side. Demand for child labour usually arises due to the prevailing labour market conditions such as segmentation of economy between formal and informal sector, degree of substitution between adult and child labour (eventually leading to adult unemployment) and most importantly the wage structure. Although any slight improvement in the adult labour market condition will also have its effects on the supply side, for example improvement in the labour market conditions will definitely enhance the welfare of the people which in turn results in the decline of child labour supply as parents will be in a better position to take the decisions of getting their children out from work force[20]. Therefore the main objective of the chapter is to provide empirical evidences on the labour market conditions influencing incidence of child labour. More specifically it will analyse the effects of adult wages, unemployment rate and segmentation of economy between formal and informal sector affecting child labour. Empirical assessment has been done using the data of children aged between 10 to 14 years. The data set is selected from the national level surveys of Labour Force of Pakistan and covers the period from 1997-98[21] to 2007-08. A pseudo panel data

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[20] See Goldin (1979); Horan and Hargis (1991); Bonnet (1993); Basu (2000) and Ranjan R. (1999).
[21] In Pakistan Fiscal year began from July and ends in June. Usually surveys also design to cover the fiscal year.

approach is followed to assess the labour market conditions. Unlike all the previous studies, this study contributes in the existing literature by assessing the labour market conditions that affect demand and supply of child labour. It also traces the effect of changes in the labour market conditions on the incidence of child labour with respect to time. To the best of author's knowledge, it is the first study that takes into account labour market conditions using the pseudo- panel approach.

The analysis presented hereafter in this chapter will highlight the issues that have not yet addressed in Pakistan before. Historically speaking there exists an extensive literature[22] exploring the supply side determinants of child labour (as explained earlier) few exceptions include Ghayur (1996); Hussain (1998); Bhalotra (2001 and 2007); Bhalotra and Heady (2003) and Rafia (2009).

Ghayur (1996), working on the data of Child Labour Force survey of (1996)[23] for the first time concluded that labour market in Pakistan is unable to absorb the current labour force causing problems of unemployment and under-employment. Moreover, a quarter of the employed labour force's earning income was sufficient to meet only half of their subsistence level requirements. The employment in Pakistan is characterized below productivity with long working hours and few remunerative work opportunities. Poor working conditions are a normal feature at considerable number of work places. Hussain (1998) analysing a survey of 400 child workers in 200 small scale establishments in Lahore District during 1990 concluded that most of the working children are employed in small scale, unregistered establishments in the informal sector and are earning an average monthly income of around four hundred and sixty three[24] rupees only (US $ 21). The survey has also indicated that child workers in the construction- related industries faced at least 16 different hazards to their health and safety with approximately 12 casualties reported per work place during the preceding year of survey. Rafia (2009) working on a survey of 150 boys from Rawalpindi District concluded that the major determinant of child labor is poverty and the ownership of

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[22] List includes Hussain (1985); Hamid (1994); Weiner & Noman (1995); Jafri & Rashid (1997); Burki & Fasih (1998); Burki & Shahnaz (2001); Khan (2001); Ranjan R. (2000 & 2001); Chaudhuri & Farzana (2002); Khalid & Shahnaz (2004); Toor (2005); Hai et.al. (2010); Hou (2009); Moazam & Ajmal (1994); Khan and Ali (1991); Khan (2003); Ali & Khan (2004); Hazarika & Bedi (2003); Bhalotra (2004) and Iram & Fatima (2009).
[23] Child labour force survey was conducted by Federal Bureau of Statistics Pakistan in 1996, it is the first and the only survey conducted at national level to assess the situation of child labour.
[24] Inflation adjusted – with CPI around 22.42

asset has a negative impact on participation decisions. Sixty nine percent of her sampled children worked forty-eight hours during a week and fifty seven percent earned less than four hundred and seventy[25] rupees (US $ 6). In addition to these Bhalotra and Heady (2003) clarify the roles of land, income and household size, allowing for labour and credit market imperfections. According to them the wealth paradox can be explained in terms of imperfections in the land and labour market. They argue that effect of labour market imperfections are reinforced by the ill- functioning of land markets while credit markets have opposite effect. In the presence of imperfect labour market, land owners will not be able to hire the adult labour needed hence they will rely on children and the child labour incidence will be higher among them. This is because the marginal product of labour increases with the increase in farm size. Furthermore the large land owners cannot sell the land if they fail to hire labour due to ill- functioning of the land market (land cannot be sold or purchased easily). The failure of the land market therefore reinforces labour market failure. In their article they have shown that farm size has highly significant and positive effect on both boys' and girls' labour even after controlling for endogeneity (see table 2.1 for further detail on the results).

Bhalotra (2001 and 2007) estimated the wage elasticity of child labour supply using the data of rural household for the period 1991. According to her the wage elasticity is negative and significant for boys which show that boys work due to poverty compulsion. Her study further points out that substitution effects associated with the land ownership dominate wealth effects for girls but not for boys. Girls belonging to households with large land holding are likely to work more. Household income in her model also emphasizes that the effect of income is negative and significant in the case of boys but not for girls. All the above mentioned studies are informative but also have their own limitations as their assessments are based broadly on descriptive analysis except for Bhalotra (2001 and 2007) and Bhalotra and Heady (2003). Their studies are based on the Pakistan Standard of Living measurement Survey for the period 1991 and much has changed since then. However, international evidence provides both theoretical and empirical support for the effect of labour market conditions on the incidence of child labour.

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[25]Inflation adjusted – with CPI around 212.4

For example, working on the wage structure, Cain and Mozumder (1980)[26] argued that the economic value of children cannot be properly assessed without reference to the structure of the labour market. The structure of the labour market determines the level of wages, which in turn determines the contribution of child labour to household income. Basu and Van (2000) also stressed upon the role of adult market wages as one of the major determinant of child labour supply. They assumed that the household sends children to work only in those circumstances when adult market wages are below the wages required for subsistence level of living. Hence any increase in the adult market wages will reduce the supply of child labour to some extent. But what if there exists a demand side effect of adult market wages? In such a case any increase in the adult wages would ultimately reduce their demand (demand for adult labour). This situation might lead to an increase in the incidence of child labour at least in those sectors where adult labour can be substituted by child labour. Although children are an imperfect substitute for adult labour but evidence does suggests that higher adult wages create adult unemployment and higher incidence of child labour. A book published by ILO in 1998 concluded that:

> *"Child labour is a cause of and may even contributes to adult* unemployment a*nd low wages" (ILO-*1998).

Furthermore, working on the adult minimum wage law, Basu (2000) concluded that although one route to curbing child labour is to intervene in the adult labour market, but this kind of intervention is only fruitful if it raises the marginal productivity of adult workers, thereby raising wages and employment (Basu, 2000). Otherwise it may result in an increase in adult unemployment. In the Basu (2000) model, a minimum wage can result in a higher supply of child labour which, in turn, may further cause a loss in adult employment and an increase in the supply of child labour. According to Basu (2000) the full impact of this multiplier-like process could be large. Moreover, adult wages are not homogenous. Dwibedi and Chaudhuri (2010) clearly showed that highly skilled workers' wages are sufficiently high and they are unlikely to send their children to work. In his framework, incidence of child labour falls as the wages of unskilled labour increases and as skilled wages relative to the unskilled labour changes. According to him any increase in the skilled wages makes education more attractive and in the overall

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[26] As cited in Grootaert and Kanbur (1995)

economy incidence of child labour declines. Moreover, unskilled adult labour will only send their children to work if the wages earned is below the required subsistence level as suggested by Basu and Van (1999).

Further to this, Kar et.al, (2003) pointed out that demand for child labour is mainly generated due to segmentation of the economy into formal and informal sectors. Kar et.al, (2003) highlighted the role of degree of informality and technology used in the production process as a major demand side factor. Formal sector, being closely monitored by the laws in the country, is less likely to employ a child for work, however, informal sector which itself does not adhere to any regulation for various interests of its own often rely on cheap child labour. In addition to this in many developing countries there is a tendency towards in-formalization of production methods, with formal enterprises either breaking up into smaller units or sub-contracting to households or informal enterprises (mainly to escape from social legislation and charges which add to the cost of labour). In such conditions the demand for child labour may increase [see Kar et.al, (2003) and Hussain (1998) for more detail]. Chaudhuri (2009) analysing the effect of labour policy on child labour by considering a two sector general equilibrium model also concluded that the labour policy affects the formal and informal sector differently. Overall arguments provided above raise few questions in mind. Are households more likely to send their children to work if they live in regions where wages are low? Is there any demand side effect of higher adult wages? If the demand side effect does exist, does this lead to higher adult unemployment rate? And is the effect sensitive to the degree of segmentation between formal and informal economy?

As explained earlier literature in Pakistan has not yet explored the effect of labour market conditions on child labour in greater detail. Although a few studies based on cross tabulations did try to highlight the labour market conditions but they failed to provide a comprehensive analysis of the effect of labour market conditions; especially those related to the presence of large number of unskilled workers, informal sector, prevailing wage rates [except for Bhalotra[27](2001) and (2007)] and the unemployment

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[27]Bhalotra (2001) and (2007) have presented both theoretical and empirical analysis on the issue, her work is very extensive and highly valuable but based on the Pakistan Living and Standard Measurement Survey of 1991. Much has changed since then especially after the child Deterrence Act of 1997 therefore her work need re-assessment.

situation on child labour. Moreover, none of the studies done so far have highlighted the differences across divisions/districts/cities and time. Therefore, the major objective of this chapter is to explore the labour market conditions by considering the following arguments:

Higher adult market wage rates will either reduce the child labour incidence by enhancing the welfare of the household or else it could also attract more children to work. This will only happen if employers, to remain cost competitive, substitute adult labour with cheap child labour. Therefore, adult wages could have two opposite effects. One arises due to income effect while the other arises because of the substitution effect. The substitution effect results in the higher adult unemployment level. The adult unemployment again has two types of effects; the demand and the supply side effects. For example, the higher the adult unemployed proportion in an area (Divisions/Districts/Cities in this case) the lower will be the probability for a child to find employment or the demand for child labour decreases in the presence of higher adult unemployed proportion in an area. The supply side effect arises because of the loss in the household income i.e. the higher the adult unemployed proportion in a house, the lower will be the income of the household and the higher will be the supply of child labour. Finally, Informal sector being dis-organized in nature with low skilled requirement accommodate most of the child labour in an economy. In the informal sector due to less skill requirement children easily substitute adult labour resulting in higher child labour incidence. Therefore, the higher the degree of in-formalization, the higher will be the demand for child labour.

The arguments discussed above provide both supply and demand side picture of the labour market effects. This chapter tries to explore both demand and supply side of the story. For the assessment of the above arguments six cross -section data of Labour Force Surveys (1997-98 onward) is used to make a pseudo panel. The assessment is done across divisions/districts/cities and time. Hence it is the first study to explore the effects of labour market conditions across division/district/cities and time. The chapter is organized as follows; section 4.2 provides key features of labour market in Pakistan, section 4.3 provides some theoretical point raised in the literature, section 4.4 provides detail on data employed and construction of pseudo panel, section 4.5 specifies econometric technique, section 4.6 discusses results and the final section concludes.

4.2 Key Features of the Labour Market Structure in Pakistan

Labour Market structure in Pakistan is mainly characterized by high unemployment rate, higher degree of informality and irregularity in the job structure, gender discrimination, high proportion of illiterate labour force and existence of large wage differential among sectors. Many of these key features are closely related to child labour incidence.

a) In-formalization:

The concept of informal economy[28] was first brought in fore-front by ILO in 1970's. Hart (1971) first brought up the discussion on an informal economy. In the earlier period it was characterized as the economy representing poor or black economy. It incorporates all the economic activities that cannot be classified under the organizational structure of formal sectors [see Burki and Afaqi (1996) for more detail]. Since 1970 the role of informal sector in generating employment, appropriate technology, skill generation and entrepreneurship development has been explored in many developing countries, as the concept is mainly embraced in the labour market of less developed countries. Despite the relative importance of informal sector in creating employment opportunities its effect on child labour cannot be overlooked especially in case of Pakistan where a high proportion of children are engaged in this sector.

The economy of Pakistan is facing multiple problems of high population growth, urbanization, and unemployment of labour force. The supply of labour force has increased faster than the rate of job creation. Migration to urban areas due to mechanization has made the problem even worse. A high proportion of the urban labour force is engaged in the informal sector, which provides income earning opportunities to small businesses and skilled and unskilled workers including apprentices [Burki and

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[28]According to the Resolution adopted by the 15th International Conference of Labour Statisticians (ICLS), the informal sector comprises units, such as households enterprises, engaged in the production of goods and services with the primary objective of generating employment and income to the persons concerned, not necessarily with the deliberate intention of evading the payment of taxes or other legislative or administrative provision. These units typically operate at a low level of organization, on small scale. The assets used do not belong to the production units as such but to their owners. This concept is formulated into an operational definition based on three criterions, first household enterprise, and the two others size and registration. These three criterions can be used optionally, alone or in combination. Given the ambiguity of the registration criterion in Pakistan, the definition of the informal sector is formulated in terms of the first two criterions, namely, household enterprise and size of employment. Hence; all household enterprises owned and operated by own-account workers and employee less than 10 persons are informal. It exclude all household enterprises engaged in agricultural activities (Labour Force Survey of Pakistan, (2007-08) – Chapter concept and definitions).

Afaqi (1996)]. Children usually start working as apprentices under a system commonly known in Pakistan as ustad-shagird system (student-teacher system). The main purpose of sending the children to work is to equip them with the skills and to get some financial support for household as well. The children working under this system are often paid less and face extremely harsh working environments, often dangerous for their health. Slowing down of the economy, political instability, inconsistency of the policies and the rise in the energy prices (oil and electricity) has led to the closure of many industrial units. The shrinking formal sector has resulted in the expansion of the informal sector and has increased unemployment, both leading to high incidence of child labour.

Table 4.1: Non- Agriculture worker in the informal sector

(%)

Year	All Pakistan	Rural	Urban
2001-02	64.6	68.3	61.1
2003-04	70.0	72.9	67.2
2005-06	72.9	74.8	71.0
2006-07	71.9	73.1	70.7
2007-08	72.8	75.1	70.5
2008-09	73.3	76.2	70.6
2009-10	73.3	76.3	70.4
2010-11	73.8	76.5	71.2

Source: Labour Force Survey of Pakistan (Various Issues), Federal Bureau of statistics, Government of Pakistan. Years represents fiscal years.

Further to this, due to the world pressure on export, the number of working children in the large-scale formal sector has declined substantially after 1997 (in the first five years of 20th century especially) but child work still exists to a significant extent by means of the "Contract System" [see Hussain (1998) for more detail]. In this system children remain employees of a contractor in the informal sector while actually working for larger industries. The proportion of working children may have increased or decreased as a result of changes in labour demand due to increase in trade. Hence in general growth in the informal sector may lead to child labour. Hussain (1998) has raised the issue of contract system but his work is based on simple descriptive analysis. The issue is worth exploring especially across time. Table 4.1 provide information on the employment share of the non-agriculture worker in the informal sector across time. It is evident from the table that almost 74% of the non-agricultural workers are engaged in the informal sector. Since 2001-02 there is considerable growth in the employment

share of informal sector. It has increased from 65% in 2001-02 to 74% in 2010-11. This needs careful examination as it is the informal sector that can absorb most child labour due to its nature; such as being unorganized, with no record keeping liability, operating in a small area and sometimes illegal in nature.

b) Wage Structure:

In developing countries due to the inadequate measurement of unemployment rate through labour force surveys, wage rates are often recommended for observing changes in the labour market [Godfrey (1993)]. Nasir (2000) provides an extensive review of the labour market conditions in Pakistan. According to Nasir (2000), labour market of Pakistan is dual in nature and possesses both flexibility as well as inflexibility in wages. The formal sector employing skilled labour force is found to be less flexible and resists downward movements in wages whereas informal sector is more flexible. The inflexibility in the formal sector is mainly because of the higher demand of the skilled workers. Skilled workers in Pakistan are relatively short in supply and in order to retain them, firms in the formal sector offer them higher wages. On the other hand informal sector is larger in size than the formal sector but is un-organized and unprotected. Workers employed in the informal sector do not possess the bargaining power. Production process in the informal sector does not require any sophisticated technology hence human capital requirement is low. Therefore majority of the work force in the informal sector is not only illiterate but also less skilled/unskilled. As a result, both the productivity and wages are low in this sector [Nasir (2000)].

As the informal sector accounts for almost 74% of the economy, the key factor of labour market in Pakistan is flexibility of wages. In a competitive market where wages are flexible children could easily be substituted for the adult labour. In Pakistan children participate in certain type of wage employment– for example, Ghayur (1996) indicates that occupational classification of child labour is such that two-thirds of them work in the agricultural sector mainly as unpaid family helpers, while in urban areas children are often engaged in the informal sector. Table 4.2 and 4.3 provide detail on the average monthly real wages of paid employee[29] across time and industries. During the past nine

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[29]Labour Force survey of Pakistan only provides information about the monthly wages of paid employees only; it does not include information about the income of the agriculture self-employees, own account workers and employers.

years (since 2001-02) real wages have experienced a growth of almost 21% with an average of 2% annual growth. Both urban and rural wages have increased. However growth in the urban wages is slightly lower (18%) than the rural wages (25%).

Table 4.2: Average Monthly Real Wages

			(Rs.)
Year	All Pakistan	Rural	Urban
2001-02	3316	2761	3972
2003-04	3664	3011	4425
2005-06	3795	3166	4533
2007-08	4161	3492	4957
2008-09	3979	3347	4711
2009-10	4022	3376	4766
2010-11	4009	3452	4699

Source: Labour Force Survey of Pakistan (Various Issues), Federal Bureau of statistics, Government of Pakistan.

As far as the wages across industrial divisions are concerned Table 4.3 shows large differences in wages across the major industries. Agricultural workers are earning the lowest average monthly wages around Rs. 2,331 while workers in the financial and electricity, gas and water sectors enjoy the highest average monthly wage (almost Rs. 8,541 per month in financial sector while almost Rs. 7,113 per month for electricity, gas and water). For the rest of the sectors wags are reported around Rs. 3,000 to Rs. 5,000 in 2010-11.

Figure 4.1: Average Monthly Real Wages
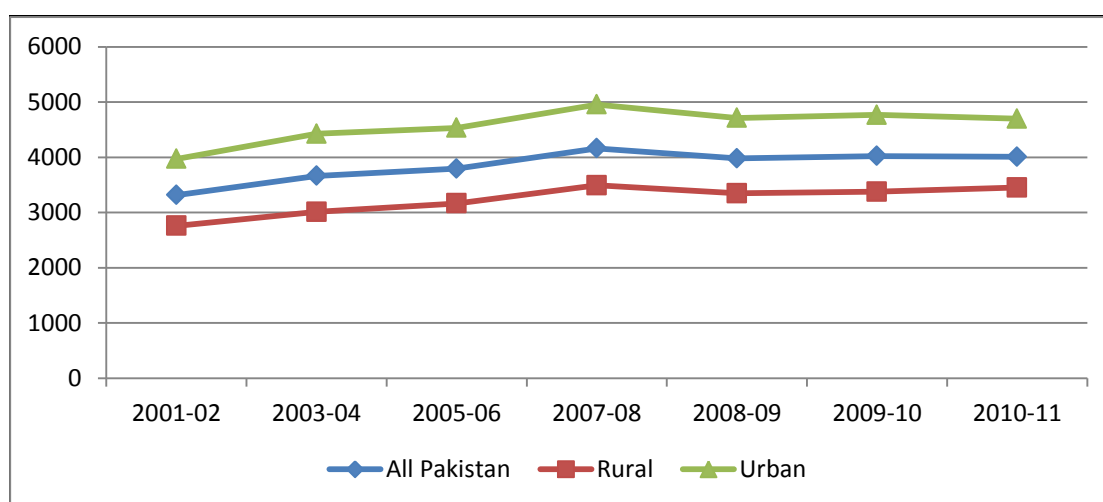
Table 4.3: Average Monthly Real Wages by Major Industry

(Rs.)

	2007-08	2008-09	2009-10	2010-11
Agriculture, forestry, hunting and fishing	2202	2919	2317	2331
Mining & quarrying	4632	3992	3254	4953
Manufacturing	3773	3527	3514	3496
Electricity, gas & water	7371	6453	6785	7113
Construction	3664	3392	3446	3414
Wholesale, retail trade, restaurants & hotels	3173	3082	3083	2832
Transport, storage and communication	4495	4205	4382	4283
Financing, insurance, real estate services	10197	8346	8477	8541
Community, social and personal services	4903	5007	5123	5415

Source: Labour Force Survey of Pakistan (Various Issues), Federal Bureau of statistics, Government of Pakistan.

c) Unemployment and working conditions:

Basu (2000) presents a theoretical model in which imposing a minimum wage in the adult labour market causes adult unemployment to rise and further aggravates the problem of child labour. While considering the argument of trade sanctions, Basu and Van (1999) provide a theoretical model which relates adult unemployment and supply of child labour. However, no study has been done in Pakistan so far that tries to empirically test this proposition. Table 4.4 illustrates that the unemployment rate in Pakistan has been fairly stable in the last fifteen years. It peaked in 2001-02, falling until 2007-8. Thereafter it has risen slightly. Comparing the urban rural areas it is evident that the unemployment rate in the urban areas (8.8%) is higher than the rural areas (4.7%); almost double.

Table 4.4: Unemployment Rate

(%)

Year	All Pakistan	Rural	Urban
1996-97	5.9	5.0	7.98
1999-00	7.8	6.9	9.9
2001-02	8.3	7.55	9.8
2003-04	7.7	6.7	9.7
2005-06	6.2	5.4	8.0
2006-07	5.3	4.7	6.7
2007-08	5.2	4.7	6.3
2008-09	5.5	4.7	7.1
2009-10	5.6	4.8	7.2
2010-11	6.0	4.7	8.8

Source: Labour Force Survey of Pakistan (Various Issues), Federal Bureau of statistics, Government of Pakistan.

Figure 4.2: Unemployment Rate
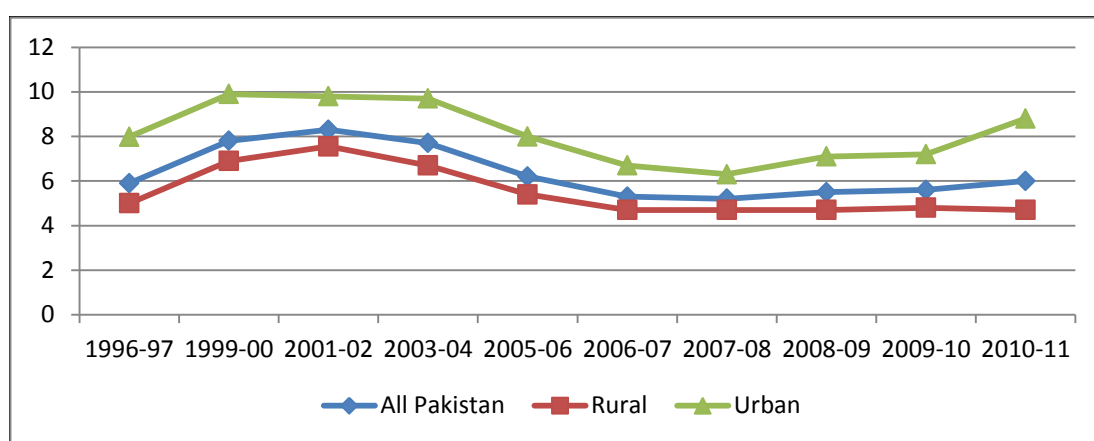
Moreover, working conditions in Pakistan are dangerous and harm children by ruining their eyesight, causing bone deformations, chronic lung diseases, and also sometimes result in the death of children [see Chaudhuri and Farzana (2002)]. In the absence of the reliable data on work related injuries, studies often use working hours as a proxy for the working condition. Studies on Pakistan have documented that children often work 40-50 hours per week. The hours of child work basically depends on the potential income from child work and the degree of labour substitution between child and parents. In the context of prevailing unemployment and flexible wages this issue is also worth exploring. Table 4.5 clearly shows that almost 25% of the employed labour force is working around 42 to 48 hours per week including children as well. Child Labour Act of Pakistan allows only 14 hours per week for children aged less than 14.

Table 4.5: Distribution of Employed population by Hours of Work

	(%)
	2010-11
Not Worked	0.7
Less than 15 Hours	1.6
15-24 Hours	5.4
25-34 Hours	7.4
35-41 Hours	20.4
42-48 Hours	24.5
49-55 Hours	11.6
56 or more Hours	28.4

Source: Labour Force Survey of Pakistan 2010-11, Federal Bureau of statistics, Government of Pakistan.

4.3   Theoretical Framework

In assessing the issue of child labour incidence, it is necessary to understand all the factors affecting supply and demand of child labour. Supply-side factors of the incidence of child labor range from social, cultural, household factors to poverty related causes. On the other hand demand for child labour arises as a consequence of specific features that children have. This is based on the nimble finger argument. Children's hands make them particularly effective at performing certain tasks such as stitching soccer balls, picking cotton etc. If the demand for child labour arises because of children's physical features it can easily be eliminated or reduced by technological advancement [Brown et.al, (2002)]. Technological advancement usually lowers the demand for unskilled labor including child labour; for example, demand for child labor in Egyptian farms declined with mechanization [see Levy (1985) for more detail] and during the British industrial revolution (after the technological change throughout the 19th century), the usefulness of child workers considerably reduced in the textile industry.

These two examples also provide empirical support for the idea that demands for child labor could be affected by the changes in the demand for unskilled labour relative to skilled labor. Furthermore, the rise in the demand for skilled labor raises the returns to education and reduces the child labour incidence. Diamond and Fayed (1998) using Egyptian household survey data estimated the elasticities of complementarity between adult and child labor. They found that adult female labor is a substitute for adult male and child labor, but child and adult male labor are complements.

Dwibedi and Chaudhuri (2010)[30] using a three sector general equilibrium model have presented basic relationship among child labour, wages and skilled composition. Their child labour supply function shows that any increase in the current wages will raise consumption and hence lower child labour supply. It will also have positive income effect on the future consumption reducing child labour incidence further. However, according to them any increase in the child wage rate will increase the opportunity cost of schooling and will lead to more child labour supply. Moreover, any changes in the skilled and unskilled wages will influence the returns to education and the decision made by adults about the child's schooling. If the skilled wages increases or unskilled

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[30] See section 2.1 part (b) for more detail discussion on the model.

wages decreases it will make education more attractive and thus will increase child schooling. They also propose that any change leading to the expansion in semi-skilled or skilled sector and contraction in unskilled sector would result in lowering the demand for labour (both child labour and unskilled labour) in the unskilled sector and an increase in the demand for skilled labour. This will decrease the unskilled wages and raise the skilled wages. A decrease in child wage rate means a decrease in the opportunity cost of schooling.

Chaudhuri (2009)[31]considered a small open economy case to generalize the effect of changes in wage policy on child labour by considering a case of two sectors; formal and informal. According to him in the formal sector, workers received high wages due to the high bargaining power thus the formal sector does not rely on child labour, while workers in informal sector earned only a competitive wage thus they are compelled to supply child labour.

Following Basu and Van (1998) 'Luxury Axiom' he assumes that there exists a critical level of family income, such that the families will send their children to work if and only if the adult wage rate is less than the critical level. Adult worker in the formal sector earns wages greater than this critical level. Hence, workers who are working in the formal sector will not send their children to work. On the other hand, an adult worker employed in the informal sector earns less than this amount and therefore is compelled to send his children to work in order to supplement the family income. Wages in the formal sector are higher than the informal sector because of the existence of well-organized trade unions to bargain with employer in respect of working condition, benefits and wages. According to Chaudhuri (2009), whenever wages in the formal sector fall,[32]demand for labour in the formal sector increases. As a result formal sector expands while the informal sector contracts. Contraction in the informal sector means fall in the production. This would further decrease the demand for adult labour and child labour in this sector.

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[31] See section 2.1 part (c) for more detail discussion on the model

[32]Adult wages can change directly because of some policy measures such as minimum wage law or because of the economic development or may be because of the changes in the trade policy. Here Chaudhuri (2009) assumes that wages falls because of the policy reform.

Both Dwibedi and Chaudhuri (2010) and Chaudhuri (2009) based their model on the condition that factors of production are fully employed. Thus rise in one factor means reduction in another factor. However, Basu (2000) points out that if there is a certain amount of unemployment expected to prevail in the labour market some risk averse adults fearing that they might lose jobs. Hence they may start sending more children for work than they would have done at the same wage rate if they were assured of the full employment in the economy. Moreover, a traditional argument against child labour is based on the fact that child labour substitutes adult labour and therefore increases the adult unemployment rate and lowers their wages.

Galli (2001) addressing the economic consequences of child labour also argues that unemployment in the adult market is due to the presence of child labour which often displaces adult labour. In order to remain cost competitive employers prefer hiring children in place of adults. Children can be hired on relatively low wages as compared to adult labour for the same amount of work. The situation differs in urban and rural areas. In urban areas, where informal sector exists, child labour can have a negative impact on adult employment and wage rate. Activities performed in informal sectors require less skill or training - such activities are mostly unskilled. Thus it's easy to substitute adult labour with child labour. Therefore, child labour leads to an increase in adult unemployment, which further forces adults to put their children to work thus generating a vicious circle. While in rural areas most of the child labourers work side-by-side with adult. This complementarity between adult and child labour in agriculture has also been observed in the case of family enterprises. As pointed out by Grootaert and Patrinos (1999);

> *"There is a danger that promoting household enterprises (the informal* economy) will increase parents demand for their children to work in *these enterprises"*.

In summary child labour is substitutable in the urban informal sector but in agriculture and household enterprises, children seem to complement rather than substitute adult workers. So the presumed negative impact of child labour on adult unemployment or wages is restricted to the urban informal sector only. The actual substitution of adults with children depends on whether the employers have reasons for preferring children to

adults. Ranjan R. (2000) concluded that child and adult labour are shown to be substitutes or complementary depending on their gender, age, region residing and sector employed.

Furthermore, it has also been observed that rigid labour laws also lead to higher wages. This means investors may not be able to compete effectively with other countries where labour laws are relatively flexible. Consequently, they close down their businesses which lead to unemployment. Under this argument flexible labour law may provide the solution but flexible labour law also generally mean, wage reductions for the poor labour class. Hence, this aggravates wage inequality and unemployment problem. Consequently, this increases poverty and affects child labour problem [Chaudhuri (2009)].

Finally, considering the presence of child labour in the exporting sector, Kar et.al, (2003) argue that imposing import ban on the products made with the use of child labor will affect the exportable sector based on technology. If the technology used to produce exporting good is such that the children cannot be substituted, then exporting sector completely stops production. If instead child labor could be substituted by adult labor, then the production continues. But, as the sector was operating at the world prices due to presence of cost advantage generated from the use of child labor, any imperfect substitution of child labour will reduce the cost advantage and exporting sector may have to stop production creating unemployment further. Alternatively, in the absence of strictly enforced child labor laws, the sector may be producing non-traded goods instead. However, it must produce at the world prices and thus may face insufficient demand within the country to sustain previous production level. In any case, output and employment in exporting sector fall due to imposition of import ban [Kar et.al, (2003)]. In case of Pakistan (as explained in section 4.2) Husain (1998) has argued that children mostly work for the exporting sector through contract system by engaging in the informal sector or in the subsidiary sectors which provide raw material to the exporting sectors. Hence, it is not necessary that children are directly employed in the exporting industry.

The above arguments indicate the importance of the size of the informal sector, wages of adult labour and substitution/complementarity between adult labour and child labour

(effecting adult unemployment) in explaining the child labour incidence. In summary, the contraction in the informal sector would result in reducing both adult and child labour demand. This situation aggravates the adult unemployment problem if the condition of full employment is relaxed. How much unemployment rate will be affected depends on the degree of substitution and complementarity between children and adult labour.

4.4   Data and Methodology

This chapter uses data from Pakistan Labour Force Survey (LFS). The LFS is a household survey, carried out by the Federal Bureau of Statistics (FBS) since 1963. It includes information concerning skill development, employment generation, size and the volume of informal sector, characteristics and nature of employment. The questionnaire and methodology of LFS have undergone pertinent improvements. The questionnaire was revised in 1990 and further improved to include questions on migration, informal sector, occupational safety and health in 1995 and 2001-02.

Chart 4.1: Sampling Framework for LFS
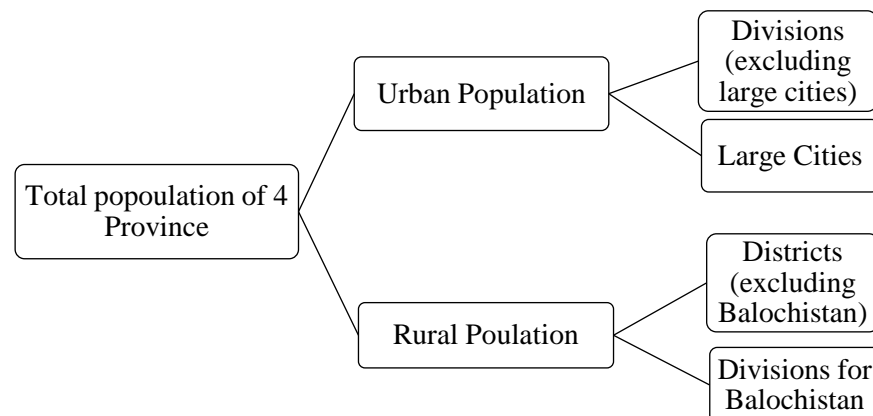
The data set comprises of repeated cross sections since each year different households are surveyed. A household is selected using the two step stratified random sampling. The sample is about 36,000 households taken during the year 2007-8 and covers all urban and rural areas of the four provinces of Pakistan. Considering heterogeneity in the urban population, a higher proportion of sample size is allocated to urban domain. Moreover considering the small area and population, a higher proportion of sample is also assigned to province of NWFP and Balochistan. After fixing the sample size at provincial level, further distribution of sample is made to different strata in rural and urban domains. In the urban domain after excluding the population of large cities from

the administrative divisions the remaining urban population is grouped together to form a stratum. However in rural domain each administrative district in the Punjab, Sindh and NWFP is considered an independent stratum whereas in Balochistan, each administrative division constitutes a stratum.

For the assessment purpose six cross section surveys; 1997-98, 1999-00, 2001-02, 2003-04, 2005-06 and 2007-08 are pooled to from a pseudo panel. The advantage of using the pseudo- panel approach over the simple cross section data is its ability to explain the past characteristics while simultaneously predicting the future behavior. Cross-section data has its own limitations such as   non-availability of individual histories needed for constructing instruments or for transforming a model to first-differences or in deviations from individual means. Pseudo- panel is not true panel but nevertheless it has its advantages over simple cross section or time series data. The important point is that repeated cross-sections are substantially large, both in terms of number of individual or household covers and the time period that they span. Although to analyze the effect of labour market conditions over time one would definitely want a panel of individuals or households that can be traced back over time in order to investigate the changes in wages, unemployment rate, skill formation and other conditions. But the key methodological issue in using the LFS is that LFS's are only cross-sectional. Estimation of cross-section data can result in the unobserved individual heterogeneity problem. To overcome the problem Deaton (1985) has suggested use of cohort i.e. estimating the empirical relationships based on 'cohort means' rather than individual observations. Cohorts are defined as groups of individuals sharing some common characteristics like sex, date of birth, region etc. According to Deaton (1985) pseudo-panels do not suffer from attrition problem that genuine panels have, and are usually available over longer time periods compared to genuine panels.

4.4.1 Pseudo Panel

Consider following simple model:

$$y_{it} = x_{it}\beta + \alpha_i + \varepsilon_{it} \qquad\qquad t = 1\ldots\ldots T \qquad\qquad (4.1)$$

Where, x_{it} is a (K× 1) vector of explanatory variables, assumed to be exogenous, i is an index of individuals (children aged 10-14 in this case) and t refers to time periods. As LFS does not follow the same individuals every time, true panel data is not available to

estimate the above equation. Following Deaton (1985) cohorts C, based on divisions/districts/city (based on the sampling framework adopted by FBS) are therefore identified, such that child i is a member of one and only one cohort for each t. Averaging over the cohorts gives:

$$\bar{y}_{ct} = \bar{x}_{ct}\beta + \bar{\alpha}_{ct} + \varepsilon_{ct} \qquad c = 1 \dots C \qquad (4.2)$$

Let the size of the group c at time t be n_{ct} such that average value of all observed x_{it}'s in cohort c at time t can be written as:

$$\bar{x}_{ct} = n_{ct}^{-1} \sum_{i \in c}^{s=t} x_{is} \qquad (4.3)$$

The resulting data set is a pseudo- panel with repeated observations over T periods and C cohorts. The main problem in estimating equation (4.2) is that $\bar{\alpha}_{ct}$ depends on t and could be correlated with x_{ct}. Considering $\bar{\alpha}_{ct}$ as random error would lead to inconsistent estimator while considering them fixed unknown parameter would result in an identification problem unless the variation over t can be ignored $(\bar{\alpha}_{ct} = \bar{\alpha}_c)$. This assumption will only holds if the number of individual observation used to create cohort averages are large. Verbeek and Nijman (1993) have modified Deaton's estimator to achieve consistency for a fixed t and a fixed i per cohort. If the number of children in each cohort is large, then the size of the cohort $n_c = N/C$ tends to infinity and the measurement errors as well as their estimates tend to zero. This yields the cohort estimator β which is asymptotically identical to Deaton (1985) estimator of β.

$$\hat{\beta} = \left(\sum_{c=1}^{C} \sum_{t=1}^{T} n_{ct} (\bar{x}_{ct} - \bar{x}_c)^2\right)^{-1} \left(\sum_{c=1}^{C} \sum_{t=1}^{T} n_{ct} (\bar{x}_{ct} - \bar{x}_c)(\bar{y}_{ct} - \bar{y}_c)\right) \qquad (4.4)$$

Where, $\bar{x}_c = \left(\sum_{t=1}^{T} n_{ct}\right)^{-1} \sum_{t=1}^{T} \bar{x}_{ct} n_{ct}$, it is the time average of the observed cohorts means for cohort c. The properties of β estimator depend upon the asymptotic properties employed. Deaton (1985) considers the asymptotic properties when the number of cohorts C tends to infinity i.e. the number of individuals tends to infinity with constant cohort sizes. Moffitt (1993) assumes that the number of cohort is fixed while the cohort sizes increases with the increase in the number of individuals. In the Moffitt approach errors in variables problems disappear. This study also takes advantage of the assumption given in Moffitt. The number of cohort is fixed to 114 divisions/districts/cities while cohort sizes increases with the increase in the number of

children. The selection of division/districts/cities as cohorts is defined on the basis that it will not vary over time and observed for all individuals in the sample [see Verbeek, (2007) for more detail on selection of cohorts]. Studies have often used variables like age (date of birth), gender, race, or region as identifying cohorts. It requires that across the groups explanatory variables change deferentially over time. The choice of division/districts/cities fulfills this condition.

Finally, Verbeek and Nijman (1993) have suggested that when cohort size is at least 100 individuals, and the time variation in the cohort means is sufficiently large, the bias in the standard fixed effects estimator is small enough so that the measurement error can be ignored. Given the size of the LFS's and divisions/districts/cities chosen as cohort fulfill this size criterion in most of the cohorts. But still there are few cohorts mainly small districts which compromise of individuals less than 100. In order to check the bias that could arise because of the small size, another cohort was established i.e. districts and cities were merge to divisions. As results do not show a great difference hence in the final estimation divisions/districts/cities are kept as cohort.

Overall, 123,925 individual observations i.e. children aged 10-14 are selected from six of the cross section data of LFS. The construction of pseudo-panel data is done by computing cohort or cell means in each available cross-section, where the cells are defined by the four-digit district codes. This yields a balanced panel consisting of 114 groups (cohorts) for six time period, having a total of 684 observations (see annex A-4.6 for detail on cohorts and number of observation across cohorts).

4.4.2 Econometric Specification

Based on the discussions in section 4.3, labour market indicators such as wages[33], degree of informality, unemployment and sectoral composition are considered to be effective in explaining the demand and supply of child labour. The aim of the study therefore is to comprehensively look into these indicators as causes of child labour incidence. In order to conduct an in-depth analysis and to see how labour market factors influence child labour behavior fixed effect approach as suggested by Verbeek and Vella (2005) is applied. Verbeek and Vella (2005) suggested that the fixed effect

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[33] Although literature has identified the role of both adult wages and child wages but as child wages are endogenous in the child labour supply function for simplicity in the empirical assessment it was drop.

estimator based on pseudo panel of cohort averages provides an attractive choice for estimation. When the sizes of cohorts are large, the sample mean of the fixed effects provides a consistent estimator of the time-invariant population mean. Therefore, when n_c is large, the errors-in-variables problem caused by possible time variation in $\bar{\alpha}_{ct}$ is usually ignored and standard estimators like the fixed effect (within) estimators are used. Our study falls into this category as well because the average cohort size is reasonably large[34] except in few districts as explained earlier. Therefore, relationship among the variable of interest is estimated by the standard fixed effects estimator on the cohort means that eliminates any unobserved differences between individual cohorts. Specifically study has estimated following simple model:

$$CL_{ct} = WG_{ct}\beta_1 + UN_{ct}\beta_2 + IFS_{ct}\beta_3 + EXP_{ct}\beta_4 + AGR_{ct}\beta_5 + CT_{ct}\beta_6 + \varepsilon_{ct} \quad (4.5)$$

Where, WG[35], UN, IFS, EXP, AGR and CT are the time-varying exogenous variables (averages over cohorts) representing adult wages, unemployment rate, size of the informal sectors, exporting sectors, agriculture sector and some control variables such as child's own and household characteristics respectively. Here, sizes are measured in terms of proportion of adult employment in the respective sectors. $\beta's$ are the set of co-efficient and ε is the unobservable error term.

The dependent variable child labour CL comprises of children aged 10-14[36] engaged in work, including both paid and unpaid employment and work at household enterprises (including farms). Although the most often used definition of child labour in the literature is economically active children, aged 10-14, but as reports on Pakistan often document considerable school drop out after age 11 and 17, i.e. either after completion of primary or secondary education, study has also chosen age 17 as the cut-off point as

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[34] Further to this A Monte Carlo experiment by Verbeek and Vella (2005) also shows that the bias that is present in the within estimator for the dynamic model using genuine panel data, is much larger than what is found for similar estimators employed upon cohort aggregates [see Verbeek, (2007) for more detail]

[35] Based on the Davidson's and Mackinnon and AIC/SIC information the log function of the wages is included.

[36] The definition of child labour includes children in the worst form of employment and children in employment below the minimum age, excluding children in permissible light work, if applicable. It is therefore a narrower concept than "children in employment", excluding all those children who are working only a few hours a week (14 hours a week in the case of child labour Law in Pakistan) in permitted light work and those above the minimum age whose work is not classified as a worst form of child labour, "hazardous work" in particular (ILO, 2010). As at the meso level, the 'light work' allowed for by the definition can be excluded therefore meso level analysis is based on this definition.

well. The main analysis is therefore carried out for children aged 10-14 however, to show that the main results are robust to the age range a separate analysis is also done for the age group between 10-17.

As far as independent variables explaining the effects of labour market are concerned, first effect of monthly adult wages is explored. Monthly adult wages for the paid employees are used as LFS reports the wages of the paid employees only. This results in missing data problem. To overcome this problem individual monthly wages of adults are regressed on personal and household characteristics. More specifically explanatory variable of the wage equation includes age; age square, gender, household size, gender of the head of the household and education level. The predicted wages from the wage equation are then aggregated at household level to come up with household wages.

The main hypothesis concerning wages is that the higher the wages the lesser will be child labour supply. But this is the supply side effect; there may exist the demand side effect. Demand side effect will be generated when higher wages results in the higher cost of production pushing employers to substitute adult labour with cheap child labour causing increase in the demand for child labour. This could result in an ambiguous net effect. Children either substitute adults in case of unskilled labour or may enter in the employment as the parents get unemployed. In order to check whether or not the demand side effect exists, median wages at division/district/city level is also included in the model.

Further to this real wages are used instead of nominal wages. In order to compute the wages in real terms, wages are deflated by CPI values. CPI values are taken from the Economic Survey of Pakistan. Moreover, as wages could be endogenous in child labour model (wages effect child labour while child labour also effect wages) before running the model, endogeneity in the wage variable is tested by using the FE-GMM. To check the possible endogeneity[37], lag wages are used as instrument. On the basis of Davidson and Mackinnon test of exogeneity (see annex A-4.11 for the test statistics) study rejected the presence of endogeneity in wage variables. Hence in all the preceding analysis real wages are used as an exogenous variable.

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[37]Endogeneity may arise because of the simultaneity problem. Child labour is affected by the adult wages while child labour could also affect the adult wages by affecting their demand.

Furthermore, as indicated in section 4.3 that the effects of wages may differ because of the skill composition (skilled labour often enjoys high wages thus do not rely on child work); in the preliminary analysis both median wages of the skilled and unskilled labour was also included in the model. Skilled wages are represented by median wages earned by the labour having secondary education across divisions/districts/cities while, unskilled wages are represented by median wages of illiterate labour force across divisions/districts/cities. A number of regression analyses was performed by keeping and dropping the skilled unskilled wages in real and nominal term but as the effect is insignificant thus in main analysis only adult wages at division/district/city level in real term is included (capturing demand side effect). In the latter stages household wages are also dropped from main analysis as well because the household level wages do not show any significant effect in any of the regression equations. Furthermore, study also acknowledges that household wages also include contribution of child unpaid family work as well. Inclusion of this variable may over-estimate the effects of household wages on child labour supply. Therefore, to avoid the problem, adult wages at division/district/city level are only kept in the main model.

Unemployment rate in equation 4.5 represents the ratio of unemployed adult labour force to the total adult labour force. Adult unemployment could again exert two types of effects; supply side and demand side. First the higher the adult unemployed proportion in an area, the harder it is for the children to find an employment especially in the sectors where they are substituted. Therefore the higher the adult unemployed proportion in an area, the lower will be the demand for child labour. Second, the higher adult unemployment rate also means the lower household income forcing parents to send more and more children to work. In order to overcome loss in income, household increases supply of child labour. In order to check how adult unemployment affects child labour supply, proportion of unemployed adults within the household (showing supply side effect) is also included in the model. Due to simultaneity problem, both variables are first checked for the endogeneity bias as well using the lag variables as instrument. Davidson and Mackinnon test again rejects the endogeneity among the variables.

Points discussed above also raises a question regarding the availability of work opportunities i.e. from where do children get jobs? Variables that could best reflect the available opportunity for the children is the degree of in-formalization in the economy. Degree of informality represents segmentation of economy between organized (formal) and unorganized works (informal). As explained earlier this is the sector which absorbs a high proportion of child labour. Children often start working in this sector to acquire skill but after some time become regular worker. The system, as indicated before, is called ustad-shagird system (student teacher system). LFS defines informal sector as enterprises owned and operated by employers with less than 10 persons engaged on occasional or on a continuous basis, or as apprentice basis. Such enterprises have no system of keeping written records. Workers are often paid very low wages and working environment is sometimes dangerous to health. As there is low skilled requirement in this sector children easily get employed and sometime substitute adult unskilled labour. Therefore, the higher the proportion of the informal sector in an economy, the higher will be the probability of child labour. However the relation could be the other way around as well. For example due to the high incidence of child labour the informal sector may experience growth. In order to overcome this problem the size of the informal sector is measured as adult employment (excluding child labour) in the informal sector as a ratio of total adult employed labour force across divisions/districts/cities.

In relation to above, in Pakistan, like in other developing countries, to remain cost competitive, exporting industries employers often rely on child labour. Although due to world pressure on the exports especially after Child Deterrence Act of US, industries such as food beverages, clothing and apparel, sports goods and surgical instrument have now started substituting children with adult unskilled labour but still, in order to remain competitive, employers are now using a contract system approach. Children work for the exporting sector through contract system by engaging in the informal sector or in subsidiary sectors which provide raw material to exporting sectors. As it is hard to identify the presence of child labour in these sectors a proxy variable is included in the model showing the proportion of adult employed labour force in exporting sector or proportion of adult labour performing activities related to export sectors across divisions/districts/cities. The higher the proportion of adult employment in export

related industries[38] the higher will be the probability for children to be substituted or engaged in work through contract system. In order to empirically analyse the effect of above stated indicators, one cannot ignore the importance of agriculture sector as well. As in Pakistan almost 67% of the children aged 10-14 are working in agriculture sector and almost 64% of the total employed children work as unpaid family workers. Such a high proportion indicates that the larger the size of this sector, the higher will be the probability of child work (whether unpaid or paid).

In addition to the above stated labour market indicators, some control variables are also included in the model. These control variables could be grouped to capture the variations at the household and child level. To control the effects of household characteristics following variables are included; household size[39], the average years of schooling of male and female heads of the house, average years of schooling of the spouse of male heads and the gender of household head. To control the effects of the child's own characteristics, age and gender of the child were also included. (For more detail on the variables used, their definitions and expected relation see annex A- 4.3 for reference.)

Furthermore, study does acknowledge the presence of endogeneity in four variables, first adult wages. Adult wages are endogenous as higher the adult wages, the higher will be the demand for child labour as explained earlier. Recall the substitution effect discussed previously i.e. higher adult wages leads to higher cost of production hence employer substitute cheap chid labour to costly adult labour. Hence the higher wages will reduce adult labour demand thus affecting their wages. This simultaneity issue is also present with adult unemployment variable. Another variable household size was also checked for presence of endogeneity as well because parents often prefer more children to supply child labour.

As the data is panel in nature panel FE-GMM is applied using lag wages and adult unemployed proportions to instrument adult wages and adult unemployment rate while sex of first two born children is used as an instrument for household size. The

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[38] See Annex 4.17 for detail about export related industries in Pakistan.
[39] Household size could have endogeneity problem – child labour often affects decision of household to prefer more children. But test of endogeneity do not show the presence of endogeneity in the variable (see annex 11 for more detail).

hypothesis behind this inclusion is that if the first two born are of different gender then there is a probability that the household may not prefer further siblings and the lower the siblings, the lower will be the probability of child work. The result is annexed (annex A- 4.11). FE-GMM shows significant effect of only adult unemployment rate at household level and agriculture sector. The Davidson's and Mackinnon test of exogeneity after FE-GMM also rejects the endogeneity (chi2 = 0.666 with p-value = 0.62) among the variables therefore the main analysis is performed considering the exogeneity among the variables. Finally, although our study does not predict the presence of endogeneity in the system but this could be because of the absence of suitable instruments. In the absence of good instruments we rely on lag values and the model is exactly identified. The over-identification test cannot be performed therefore so the validity of instruments remains an open question. Nevertheless LFS data does provide us with a good opportunity to explore the effect of labour market indicators on child labour.

4.5   Results:

We began this section by providing some stylized facts about the sampled children aged between 10-14 and by giving some descriptive analysis of variables used in the estimation process. This section further proceeds by discussing estimated results of equation 4.5. The sensitivity/robustness analysis based on age range, working hours, Tobit and division based analysis is followed by the discussion on equation 4.5. Tobit model is estimated because of the presence of zero child labour in a cohort while estimation based on divisions is performed to check the error in variable bias due to the small cell sizes in few districts. Section on the robustness check also includes short discussion on estimation results of random effect and pooled OLS model as well. After checking the robustness of the model, study then proceeds to check the variations across provinces and time. The final sub-section discusses the results of some earlier periods, pooled from 1990-91 to 1994-5. Four data sets namely, LFS 1990-91, 1991-92, 1992-93 and 1994-95 are pooled to form another pseudo panel. Due to changes in the sampling methodology and the non-availability of codes for the divisions/districts/cities for earlier periods, these cannot be merged with the late 1990's periods (1997-98 onward). Hence, a separate analysis is done just to see if there exists any difference among the two sets of periods before and after 1997-98.

4.5.1 Descriptive Analysis

The percentage of economically active children after decreasing to 7% in 1999-00 from 9% in 1997-98 rose again first to 9% in 2003-4 and then to 12% in 2005-6 while, in 2007-08 it declined to 11%. The average working hour per week by children recoded in overall sample is around 39 hours. As far as education status is concerned, out of the total economically active sampled children (12,275) 91% are not currently enrolled. 64% of these economically active children are working as an unpaid family worker (either in agriculture sector or in household enterprises).

Table 4.6: Economically active children in Pakistan

Year of survey	Not in LF	In LF	Total
1997-98	12161 (91)	1247 (9)	13408
1999-00	13640 (93)	1049 (7)	14689
2001-02	14450 (92)	1259 (8)	15709
2003-04	15124 (91)	1536 (9)	16660
2005-06	25398 (88)	3350 (12)	28748
2007-08	30877 (89)	3834 (11)	34711
Total	111650 (90)	12275 (10)	123925

Note: #'s in Parenthesis are the row percentages.

Figure 4.3: Economically active children across Time in Pakistan
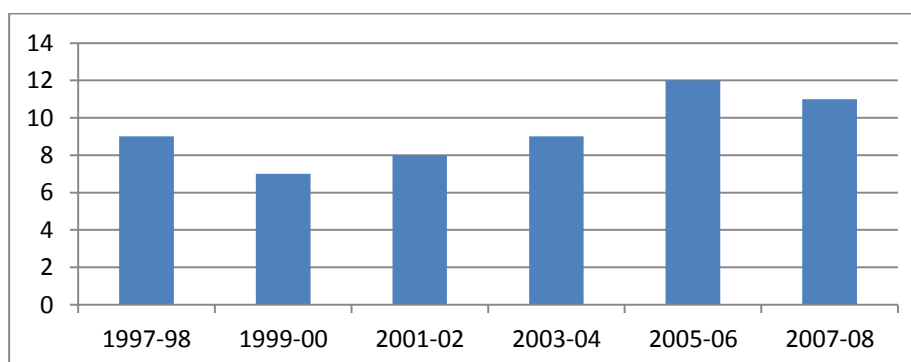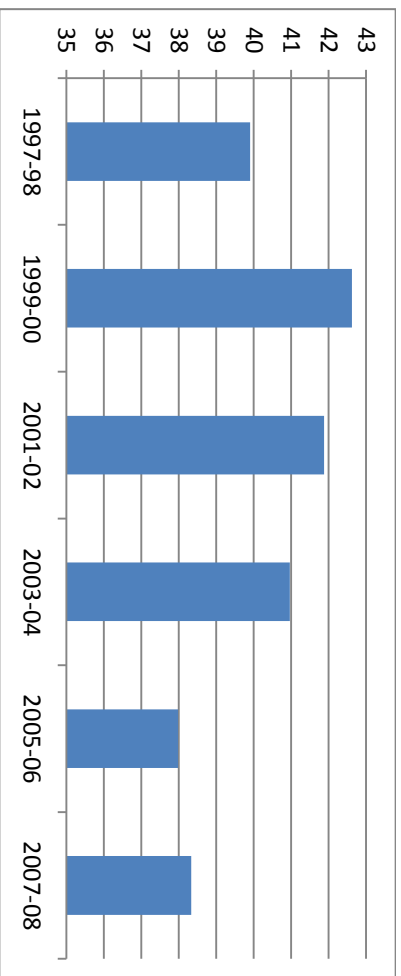
Figure 4.4: Working Hours of children across Time in Pakistan

Figure 4.5: Child Labour Proportion across Urban Cohorts
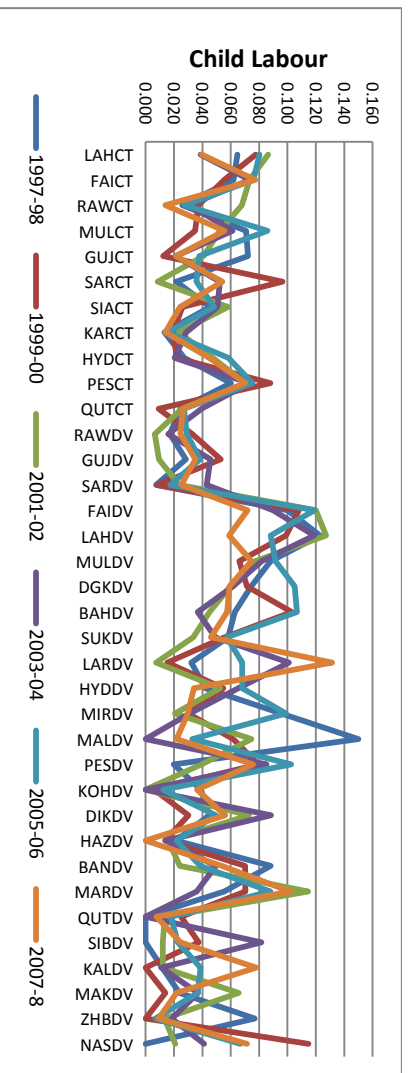
Figure 4.6: Child Labour Proportion across Rural Cohorts
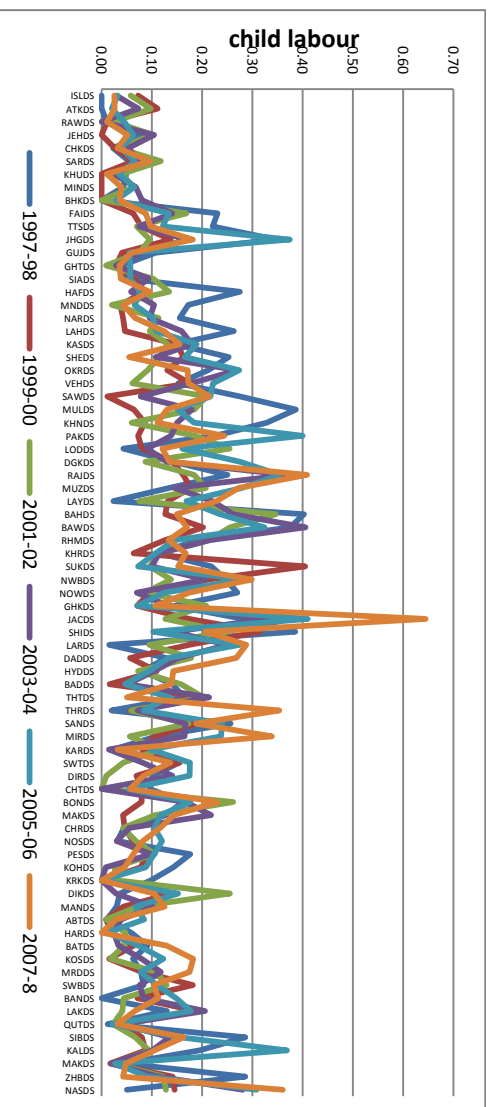
As explained above, the resulting pseudo panel from six LFS contains 684 observations. Number of observations across cohorts range from 280 observations in Mianwali

Districts to 6417 observations in Karachi district, above the minimum required number of observations in a cohort except for some districts in yearly years as explained before. After classifying the sample into cohorts' variables of interest were averaged out over the cohorts. Annex A- 4.1 presents summary statistics of the main variables used in the pseudo panel analysis. Some of the variables present increasing trends across time, for example average real wages increases from around Rs. 3000 to Rs. 4500. Average year of schooling of male head also increases from 3 years to 5 years (primary level of schooling). Average years of schooling of the spouse of male heads revolve around 1 or 2 years of schooling. The size of informal sector remains fairly stable throughout the year on an average employing around 46% adult labour force while exporting sector is employing around 8% adult labour force on average. Adult unemployment rate at district level also revolves around on an average between 8% to 12%.

Annex also illustrates that proportion of child labour first decreases as one moves from 1997-98 to 1990-2000 and it then increases till 2005-06 while 2007-08 record a slight decrease in child labour proportion on average. It is also interesting to note that as the proportion of child labour decreases from 9% in 1997-98 to 7% in the year 1999-00, average working hours increase from around 40 hours per week to 43 hours per week. Further to this, figure 4.6 shows that Jacobabad district has the highest proportion of child labour.

4.5.2 Main Results

Estimation of equation 4.5 (see table 4.7 for reference) demonstrates that all the indicators of labour market have significant effects on the incidence of child labour. Specifically adult wages, household unemployment rate, size of informal, agriculture and exporting sectors have positive and significant effect while adult unemployment rate at district level has negative and significant effect on the incidence of child labour.

Here informal sector excludes agriculture sector, although agriculture sector is also informal in nature but as ILO and Federal Bureau of Statistics (FBS) Pakistan considers this sector separately than the informal sector, this study has also explored the effects of

the two separately[40]. Literature points out that, due to its nature being not recognized or protected under the legal and regulatory frame works, informal sector provides high probability for child work. The positive and significant effects show that the higher the size of this sector, the higher will be the probability for child work. Precisely 1 percentage point increase in size of this sector increases the demand for child labour around 0.1 percentage points [one standard deviation increase in the size of the informal sector increases the demand for child labour around 1.73 percent]. Comparing the effects across the two regions shows that in rural areas a 1 percentage point increase in the size of the informal sector increases the child labour incidence around 0.1 percentage points while in urban areas it increases the child labour incidence by almost 0.06 percentage points.

Next, the effects of agriculture and exporting sectors were also explored by keeping in view that the presence of agriculture sector and exporting sector in an area results in higher probability of child work (as indicated by the past literature). Table 4.7 shows the positive effect of both agriculture sector and exporting sector on the probability of child work. Specifically a 1 percentage point increase in the size of the agriculture and exporting sector increases the demand for child labour around 0.22 and 0.15 percentage points respectively [one standard deviation increase in the size of agriculture and exporting sector increases the child labour incidence around 6.3 and 1.2 percent respectively]. The table confirms the proposition raised by Brown et. al., (2002) that in agriculture sector adult labour and child labour usually work together (complementary) hence, any increase in adult employment rate in agriculture sector will result in higher employment opportunity for the children as well. Higher employment share of adults in the exporting sector in a division/district/city, representing size of the exporting sector, also shows that higher size of this sector could leads to higher opportunities available for children to work in the hidden informal sector, producing intermediate products for the exporting sector. The adult employment share in the exporting sector (here employment of children in the exporting sector is not considered as it will create endogeneity problem) is included in the model as one cannot identify the presence of child labour in this sector from the data. The employment of children in this sector is

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[40]Here, informal sector is defined as all the activities performed by the own account worker in small household enterprises by engaging small number of employees (less than 10 by definition adopted by ILO and FBS) - excluding agricultural activities.

mostly hidden. Hence, in order to show its effect, size of the sector is used as proxy. The positive and significant coefficient at 99% confidence interval shows that presence of this sector in an area could increase the probability of child work.

Table 4.7: Labour Market Conditions and Child Labour (From 1997-98 -2007-08)

			(Fixed effect Test)
Dependent Variable: Child Labour	**All Pakistan**	**Urban**	**Rural**
Labour Market Conditions			
Size of the informal sector	0.097(0.001)*	0.061(0.046)**	0.101(0.022)**
Size of the Agriculture sector	0.217(0.000)*	0.066(0.083)***	0.237(0.000)*
Size of the Exporting sector	0.149(0.008)*	0.155(0.002)*	0.208(0.064)***
District Unemployment	-0.247(0.000)*	-0.042(0.483)	-0.289(0.000)*
Household Unemployment	0.122(0.009)*	0.113(0.015)**	0.109(0.045)**
Log of District wages	0.023(0.002)*	0.009(0.147)	0.029(0.009)*
Child Characteristics			
Child Age	0.019(0.376)	-0.011(0.64)	0.022(0.389)
Child if male	0.091(0.138)	0.070(0.138)	0.095(0.236)
Household Characteristics			
House headed by male	0.012(0.814)	-0.003(0.965)	0.006(0.927)
Education of the male head	-0.006(0.079)***	-0.001(0.671)	-0.009(0.094)***
Education of the female head	-0.008(0.387)	-0.001(0.926)	-0.007(0.726)
Education of the Spouse	-0.009(0.012)*	-0.008(0.025)**	-0.014(0.086)***
Household Size	0.006(0.078)***	0.002(0.464)	0.006(0.181)
Year Dummies			
Year 1999-00	-0.022(0.005)*	-0.005(0.37)	-0.027(0.037)**
Year 2001-02	-0.013(0.089)***	-0.008(0.221)	-0.012(0.353)
Year 2003-04	0.020(0.077)***	0.014(0.227)	0.033(0.094)***
Year 2005-06	0.030(0.006)*	0.018(0.054)**	0.038(0.026)**
Year 2007-08	0.009(0.347)	0.003(0.768)	0.020(0.214)
Constant	-0.369(0.169)	0.067(0.805)	-0.430(0.197)
R-Square: within	0.28	0.33	0.30
Between	0.53	0.15	0.61
Overall	0.43	0.22	0.45
Number of obs.	684	222	462
Number of groups	114	37	77
F-test (Prob. F-test)	9.21 (0.00)	4.97 (0.00)	7.15 (0.00)

*Note: *,** and *** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The estimation technique employed is fixed model. The cohort consists of four digit district codes. See Annex 4.9 for complete Estimation results.*

In order to separate the demand and supply side effect of adult unemployment rate two variables were included in the framework. Firstly, household unemployed adult proportion was measured to predict the supply side effect and secondly adult unemployed proportion at division/district/city level was measured to predict the demand side effect as indicated in section 4.4.2. The effect of adult unemployment rate at division/district/city level (predicting the demand side effect) is negative and significant. The negative and significant effect of adult unemployment rate clearly

shows that the higher the adult unemployment in an area the lower will be the demand for child labour as adult labour will be seeking employment actively. Thus the probability for a child to find employment will be lower. Specifically 1 percentage point increase in this variable reduces the demand for child labour around 0.25 percentage points at all Pakistan level and 0.29 percentage points in rural areas [one standard deviation increase in proportion of adult unemployed labour force reduces the demand for child labour by 1.94 percent at all Pakistan level while it reduces the demand for child labour around 2.57 percent in the rural areas]. The result is consistent with the discussions provided in Brown et.al (2002); Galli (2001) and Ranjan R. (2000). However its effect remains insignificant in urban areas of Pakistan. The insignificant effect of adult unemployment rate at division/district/city level indicates that, in the urban areas of Pakistan supply side effect of adult unemployment rate may be more dominating then its demand side effect.

As far as adult unemployment rate at household level is concerned it has shown the positive significant effect in predicting the supply side phenomenon. Income loss due to the adult becoming unemployed usually pushes families to rely on the child labour, therefore supply of child labour increases. A 1 percentage point increase in the household adult unemployed proportion increases the supply of child labour around 0.12 percentage points at all Pakistan level (in terms of standard deviation, 1 SD increase in the household adult unemployed proportion increases the supply of child labour around 1.4 percent). The effect of household unemployed proportion is significant in explaining the supply side effect both in urban and rural areas.

The same strategy as indicated above was used to predict the effects of adult wages as well i.e. to capture the demand and supply side effect separately, adult wages at household level and the aggregate level were introduced in the model. As the effect of adult wages at household level is insignificant throughout the regression models (see for example annex 4.15) hence it was then dropped from the framework (as explained earlier). The result therefore may be interpreted as; the demand side effect of adult wages might be more pronounced in Pakistan than the supply side effect. The demand side effect shows significant positive effect of adult wages on the incidence of child labour. The positive and significant effect may be interpreted as the higher the market wages for the adult, the higher will be the probability that the employer will substitute adult labour

to cheap child labour in order to remain cost competitive. Therefore the higher the adult wages the higher will be the demand for child labour.

The positive effect capturing the demand side effect is not difficult to understand if one assumes that the higher wages have the demand side effect on adult labour. In countries like Pakistan where formal sector is shrinking (due to low economic growth, political instability, rising energy prices etc.), any increase in wages would definitely decrease the demand for adult labour as the firm will not remain cost competitive. This leaves no choice for the firms but either to downsize or shut down or sub-contract to informal sector where adult labour can easily be substituted to cheap child labour. The shutdown of business or downsizing or sub-contracting will result in the expansion of informal sector and any expansion in the informal sector increases the demand for child labour. Hence, any strategy taken by the employer to remain cost competitive will definitely result in an increase in the child labour demand. As pointed out in Chaudhuri (2009), sometimes rigid labour laws (such as minimum wage law) lead to higher wages. Hence, investors may not be able to compete effectively with other countries where labour laws are relatively flexible. Consequently, they either close down their businesses creating unemployment or substitute adult labour with cheap child labour.

The higher wages leading to higher child labour demand may have a non-linear effect as well. Therefore, the non-linearity in this variable was also explored. As the results do not predict the presence of non-linearity in the variable (see annex 4.14 for more detail), in the final estimation framework study assumes linearity in the wage variable. Further on adult wages, discussion given in Dwibedi and Chaudhuri (2010) effect of wages on the basis of skilled composition is also explored (see annex A- 4.13 for reference). Both skilled and unskilled wages do not show any significant effect (as explained earlier). Hence in the main analysis, effects of adult wages at division/district/city level are explored only.

Finally, in estimating equation 4.5, in addition to labour market indicators a set of control variables has also been included. The controls include child's own and household's characteristics as explained in section 4.4.2. The result indicates that child's own characteristics do not influence the probability of child work significantly but the probabilities of child work is significantly affected by the household level

variables such as years of schooling of the male head and his spouse and household size. A 1 percentage point increase in the number of years of schooling of the male head and his spouse reduces the child labour incidence around 0.01 percentage point. While a 1 percent increase in the household size increases the incidence of child labour around 0.01 percentage point.

In summary study concludes that the labour market conditions in Pakistan have a significant effect on the child labour incidence either affecting their demand or supply. The demand for child labour arises mainly due to adult unemployment rate at aggregate level and due to an expansion in the informal, agriculture and exporting sector while positive and significant effect of adult unemployment rate at household level shows the supply side effect. Adult wages are also found to have significant affect which captures demand side effect.

4.5.3 Sensitivity Analysis

In order to strengthen the arguments provided in the above sub- section 4.5.2 study has performed some sensitivity checks using an extended sample children aged (10-17), by changing the definition of dependent variable (hours of child work), by changing the estimation technique to Tobit and by changing the cohort to divisions. Table 4.8 presents the results. Tale 4.8 shows that the main results remain unchanged after using the extended sample of child labour i.e. economically active children age 10-17. More specifically, real adult wages, adult unemployment rate at household level, sizes of the informal, agriculture and exporting sector once again have positive and significant effects as found earlier while adult unemployment rate at district level shows significant negative effect. A 1 percentage point increase in adult unemployment rate at district level decreases the demand for child labour aged 10 to 17 years by 0.34 percentage points (One standard deviation increase in the adult unemployment rate at district level decreases child labour incidence slightly less than 3 percent). While 1 percentage point increase in size of the informal, agriculture and exporting sector increases child labour incidence by 0.1, 0.25 and 0.28 percentage points respectively (specifically one standard deviation increase in the size of the informal, agriculture and exporting sector increases child labour incidence by 1.85, 7.2 and 1.96 percent respectively).

Although the analysis does not show any differences in the effects of labour market indicators no matter what sample is used but researchers sometime have applied average hours of weekly work as a suitable indicator of child labour instead of proportion of economically active children. Here in order to further confirm the main results this definition is also applied. The result again does not show any variation except that size of the coefficients are higher than what the earlier two definitions (working children aged 10-14 and 10-17) of child labour have estimated. For example one standard deviation increase in size of the informal sector increases child labour around 1.73 points when age 10-14 is considered while it increases hours of child work around 67 points. On the basis of the similarities, i.e. both extended sample and working hours of children showing the same effect of labour market indicators that earlier definition, child aged 10-14, has estimated, study concludes that the estimates found earlier are robust to whatever sample and definition used.

To further check the robustness of the result study has re-estimated the model using Tobit, random effect and pooled OLS techniques as well. Tobit model is estimated because of the presence of zero proportion of child labour in a cohort. The number of censored observation is 28, the zeros cannot be interpreted as "missing values" and observations could not be discarded as one could also argued that the discarded information could lead to biased estimates if not reflect reality. Hence, considering the issue equation 4.5 was re-estimated using the Tobit model for panel data (i.e. Random effect Tobit model). Table 4.8 presents the results. Tobit model again demonstrates the positive and significant effect of the real adult wages, adult unemployment rate at household level, sizes of the informal, agriculture and exporting sector while also showing the negative and significant effect of adult unemployment rate at district level. Once again illustrating that the effect of labour market indicators estimated by fixed effect model are robust for whatever definition and estimation technique used. Random effect and Pooled OLS estimates (annex 4.9) further confirms the above stated effects except that the effects of adult wages under pooled OLS is not significant.

In order to compare the estimates of fixed effect and random effect models Hausman test was performed. Null hypothesis of Hausman test indicates that individual effects are uncorrelated with the regressors [Hausman (1978)]. Therefore, if found correlated (H0 will be rejected), random effect model will produce biased estimators. Hence fixed

effect model will be preferred. The Hausman test rejects the null hypothesis, on the basis of the significant chi2 values; therefore study preferred fixed effect over random effect estimates.

Finally, Verbeek and Nijman (1993) have suggested that when the cohort size is at least 100 individuals, and the time variation in the cohort means is sufficiently large, the bias in the standard fixed effects estimator is small enough only then the measurement error can be ignored. Although almost all the cohorts fulfill the size criteria but still there are few districts which have less than 100 individuals. In order to check that the results are not affected by the measurement bias, large cities and districts were merged into divisions. This resulted in the 52 cohorts for 6 years. The overall number of observation although reduces to 312 as compared to 684 observation earlier but the individual cell size significantly increases to fulfill the cell size criteria. The results reported in the last column of table 4.8 reveals no significant difference once again. All the labour market indicators are significant at 5% significance level except for the household adult unemployment rate which is significant at 10% significant level. In sum study concludes that the effects reported in table 4.7 for the labour market indicators are robust for whatever, sample, definitions, techniques and cohort is used.

Table 4.8: Sensitivity Analysis

Dependent variable: Hours Worked/Child Labour (10-17)	Child Labour 10-17 (Fixed effect Test)			Working Hours (Fixed effect Test)			Tobit	Changing Cohort
	All Pakistan	Urban	Rural	All Pakistan	Urban	Rural	All Pakistan	All Pakistan
Labour Market Conditions								
Size of the informal sector	0.103(0.00) *	0.07(0.12)	0.097(0.03)**	3.75(0.00) *	3.01(0.03) **	3.724(0.034) **	0.113(0.0) *	0.111(0.004) *
Size of the Agriculture sector	0.247(0.00) *	0.13(0.02) **	0.26(0.00) *	8.4(0.00) *	2.84(0.09) ***	8.941(0.000) *	0.223(0.0) *	0.251(0.000) *
Size of the Exporting sector	0.275(0.00) *	0.23(0.0) *	0.35(0.003) *	5.79(0.017) **	6.65(0.007) *	6.950(0.131)	0.228(0.0) *	0.199(0.008) *
District Unemployment	-0.34(0.00) *	-0.096(0.26)	-0.379(0.00) *	-9.96(0.00) *	-2.23(0.402)	-11.140(0.001) *	-0.310(0.0) *	-0.322(0.019) **
Household Unemployment	0.13(0.007) *	0.14(0.03) **	0.12(0.035) **	4.3(0.03) **	4.1(0.062) ***	3.942(0.081) ***	0.160(0.0) *	0.213(0.074) ***
Log of District wages	0.025(0.005) *	0.011(0.12)	0.03(0.022) **	0.73(0.008) *	0.44(0.144)	0.882(0.035) **	0.020(0.01) *	0.022(0.046) **
Child Characteristics								
Child Age	0.023(0.034)	0.01(0.49)	0.03(0.054) **	1.03(0.22)	-0.83(0.392)	1.359(0.185)	0.030(0.06) **	-0.005(0.899)
Child if male	0.16(0.014) **	0.16(0.01) *	0.15(0.082) ***	4.7(0.05)**	3.67(0.06) ***	4.908(0.117)	0.070(0.07) ***	0.113(0.061) ***
Household Characteristics								
House headed by male	0.066(0.195)	0.05(0.38)	0.065(0.317)	1.63(0.4)	-0.48(0.875)	1.967(0.451)	0.088(0.07) ***	0.100(0.309)
Education of the male head	-0.007(0.04) **	-0.005(0.18)	-0.008(0.161)	-0.19(0.16)	-0.03(0.824)	-0.260(0.234)	-0.009(0.00) *	0.000(0.964)
Education of the female head	-0.005(0.68)	-0.004(0.72)	-0.005(0.829)	-0.38(0.34)	0.11(0.782)	-0.623(0.439)	-0.014(0.34)	-0.001(0.961)
Education of the Spouse	-0.01(0.005) *	-0.01(0.00) *	-0.01(0.10)***	-0.41(0.007) *	-0.41(0.012) *	-0.57(0.079) ***	0.001(0.7)	-0.005(0.253)
Household Size	0.009(0.006) *	0.004(0.432)	0.01(0.035) **	0.198(0.15)	0.12(0.424)	0.211(0.267)	0.008(0.00) *	0.007(0.026) **
Year Dummies								
Year 1999-00	-0.02(0.006) *	-0.004(0.69)	-0.03(0.019) **	-0.648(0.04) **	-0.14(0.594)	-0.840(0.123)	-0.020(0.01) *	-0.01(0.099) ***
Year 2001-02	-0.01(0.152)	-0.01(0.44)	-0.014(0.279)	-0.333(0.29)	-0.21(0.487)	-0.306(0.56)	-0.015(0.06) ***	-0.009(0.154)
Year 2003-04	0.029(0.02) **	0.045(0.00) *	0.028(0.172)	0.83(0.09) ***	0.83(0.09) ***	1.069(0.19)	0.011(0.3)	-0.004(0.752)
Year 2005-06	0.043(0.00) *	0.038(0.00) *	0.043(0.014) *	1.170(0.009) *	0.99(0.017) **	1.343(0.056) ***	0.032(0.00) *	0.030(0.017) **
Year 2007-08	0.017(0.129)	0.03(0.02) **	0.019(0.301)	0.273(0.495)	0.19(0.652)	0.519(0.445)	0.005(0.6)	-0.01(0.447)
Constant	-0.54(0.001) *	-0.28(0.209)	-0.591(0.008) *	-19.2(0.07) ***	6.97(0.539)	-24.1(0.066) ***	-0.590(0.00) *	-0.239(0.666)
R-Square: within	0.365	0.49	0.37	0.24	0.33	0.25	-	0.31
Between	0.584	0.06	0.66	0.48	0.09	0.60	-	0.60
Overall	0.510	0.18	0.53	0.38	0.18	0.43	-	0.50
Number of obs.	684	222	462	684	222	462	684(28 censored)	312
Number of groups	114	37	77	114	37	77	114	52
F-test (Prob. F-test)	15.8(0.00)	15.56(0.00)	11.26(0.00)	7.73(0.00)	3.86(0.00)	5.68(0.00)	-	5.51 (0.00)
Wald chi2 (Prob. > chi2)	-	-	-	-	-	-	378.79(0.00)	
Log Likelihood Ratio	-	-	-	-	-	-	904.78	

*Note: *,** and *** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The main estimation technique employed is fixed model otherwise mentioned. The cohort consists of four digit district codes or divisions. Based on the LFS data from 1997-98 to 2007-08.*

4.5.4 Incorporating Earlier Periods

The entire above estimated models provides empirical support for the effect of labour market indicator such as wages, adult unemployment rate and sizes of different sectors on determining the child labour incidence. The above estimated relations are based on the LFS's available after 1995-96. Although earlier data sets are also available but due to changes in the sampling frame work and non-availability of coding scheme for divisions/districts/cities these cannot be merged with the LFS's available after 1995-96. FBS only started giving coding scheme for the divisions/districts/cities after 1994-95. Previously only codes for provinces and regions were provided by the FBS [41]. Nevertheless, availability of the earlier data set provides good opportunity to realize the effect of labour market indicators in early 1990's. The estimate will also be important to analyse the effects of Child Deterrence act of US-1997. Earlier LFS data sets available are for the period 1990-91, 1991-92, 1992-93 and 1994-95. These data sets are again pooled to make a pseudo- panel and the four digit district code is again used as identifying cohorts. Based on the division/districts/cities 87 cohorts are identified for four years, yielding 384 number of observation. Fixed effect model is once again used to empirically estimate equation 4.5. Table 4.9 presents the results.

Table 4.9 does not exhibit any significant effect of adult wages, size of the informal sector and exporting sector. Only size of the agriculture sector and the adult unemployment rate illustrates some significant positive effect on child labour incidence. Among household and child characteristics child age and child if male shows significant effect. In urban areas agriculture sector shows insignificant effect as well while wages shows significant positive effect, in addition to the adult unemployment rate. Rural areas exhibit same results as predicted at all Pakistan level.

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[41]During the study FBS was contacted many times but after many attempts only one reply received that the codes are not available in the Department.

Table 4.9: Labour Market Conditions and Child Labour (From 1990-91 - 1994-95)

(Fixed effect Test)

Dependent Variable: Child Labour	All Pakistan	Urban	Rural
Labour Market Conditions			
Size of the informal sector	0.029(0.522)	-0.038(0.484)	0.040(0.494)
Size of the Agriculture sector	0.228(0.000) *	0.062(0.305)	0.243(0.000) *
Size of the Exporting sector	0.016(0.866)	-0.004(0.954)	0.039(0.823)
District Unemployment	-0.373(0.016) **	-0.195(0.097) ***	-0.463(0.034) **
Household Unemployment	0.290(0.012) *	0.370(0.02) **	0.310(0.029) **
Log of District wages	-0.012(0.467)	0.027(0.029) **	-0.017(0.468)
Child Characteristics			
Child Age	0.074(0.008) *	0.048(0.039) **	0.081(0.021) **
Child if male	0.160(0.006) *	0.080(0.139)	0.162(0.017) **
Household Characteristics			
House headed by male	-0.024(0.69)	-0.062(0.484)	-0.024(0.751)
Education of the male head	-0.001(0.819)	0.001(0.726)	-0.002(0.777)
Education of the female head	0.000(0.895)	-0.001(0.739)	0.000(0.997)
Education of the Spouse	-0.001(0.911)	-0.005(0.420)	0.002(0.905)
Household Size	0.002(0.736)	0.002(0.685)	0.004(0.558)
Year Dummies			
Year 1991-92	0.007(0.309)	-0.010(0.099) ***	0.012(0.242)
Year 1992-93	-0.005(0.500)	-0.011(0.05) **	-0.004(0.689)
Year 1994-95	-0.015(0.034) **	-0.514(0.10) ***	-0.019(0.064) ***
Constant	-0.958(0.01) *	-0.010(0.099) ***	-1.089(0.020) **
R-Square: within	0.29	0.392	0.310
Between	0.45	0.027	0.423
Overall	0.41	0.032	0.388
Number of obs.	346	116	230
Number of groups	87	29	58
F-test (Prob. F-test)	8.16 (0.00)	6.73(0.00)	6.55 (0.00)

Note: *,** and **** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The estimation technique employed is fixed model. The cohort consists of four digit district codes.

The substantial difference in two periods is may be because of the adoption of Child Deterrence Act that exerts pressure on the export in many developing countries which employ children. This has created unemployment not only in child labour market but also in adult labour market. In the earlier periods of 1990 adult unemployment rate at district level was revolving around 5 to 7% which goes up to 11.5% on average in the recent periods. Moreover, the insignificant effect of the informal sector in the earlier period is may be because of the fact that before Child Deterrence Act child labour was spread across both formal and informal sector. The fear of a trade ban has forced the formal sector not to employ children. As Kar et. al, (2003) theoretically shown that if formal sector imperfectly substitutes children with adult labour they do not remain cost competitive which leaves them no choice but to either shut down or sub-contract to the informal sector. This increases the demand for child labour in the informal sector.

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Therefore after the Act, child labour is more concentrated in the informal sector that provides hidden employment to children. Hence because of this reason in earlier periods informal sector has an insignificant effect while in the recent periods it is significant.

4.5.5 Labour Market Conditions at Provincial Level

As explained in the sampling methodology Pakistan has four provinces. These provinces differ in size, population, agro-climatic nature and economic structure. Balochistan is the largest province in terms of size but in terms of population Punjab is the most populous province. As far as agrarian structure is concerned Punjab has the most irrigated area thus have agriculture as a predominant activity. After Punjab, Sindh has the second largest share in agriculture production. Balochistan although most deprived province, is famous for oil, gas and mineral production. The coastal areas of Balochistan are famous for marine fishing and have the second largest sea port of the country as well. NWFP province is a mountainous province and remains famous for tourism. The beautiful valleys have remained an attraction for the tourist around the world since the time of independence. The hilly areas of Balochistan and NWFP are famous for fruit production as well. The geographical differences across the province result in variation in the labour market structure as well. That might affect child labour situation in a different way..

In order to compare the effect of labour market conditions of a province on incidence of child labour, equation 4.5 was estimated by disaggregating the sample by provinces. The results shows that the informal sector significantly increases the demand for child labour in Punjab and NWFP province while in other two provinces its effect is insignificant. Agriculture sector is significant across the entire four provinces in explaining the demand for child labour. Adult unemployment rate across division/district/cities, except NWFP province, significantly reduces the demand for child labour in rest of the three provinces. Adult unemployed proportion at household level significantly increases the supply of child labour in Punjab and Balochistan province only. Real adult wages significantly affect the demand for child labour only in Punjab province while exporting sector influence the demand for child labour in Balochistan province only.

Table 4.10: Labour Market Conditions and Child Labour by Province

(Fixed effect Test)

Dependent Variable: Child Labour	Punjab	Sindh	NWFP	Balochistan
Labour Market Conditions				
Size of the informal sector	0.152(0.00)*	0.014(0.842)	0.07(0.067)***	0.053(0.646)
Size of the Agriculture sector	0.100(0.01)*	0.395(0.00)*	0.148(0.000)*	0.330(0.011)*
Size of the Exporting sector	0.076(0.295)	0.262(0.157)	0.002(0.987)	0.64(0.07)***
District Unemployment	-0.46(0.00)*	-0.38(0.02)**	-0.089(0.199)	-0.63(0.04)**
Household Unemployment	0.18(0.013)*	0.049(0.491)	0.025(0.695)	0.482(0.000)*
Log of District wages	0.03(0.006)*	0.023(0.279)	0.002(0.780)	-0.007(0.90)
Child Characteristics				
Child Age	0.019(0.548)	0.071(0.149)	-0.010(0.789)	-0.044(0.445)
Child if male	0.033(0.618)	0.249(0.134)	-0.033(0.627)	-0.011(0.927)
Household Characteristics				
House headed by male	-0.098(0.265)	0.061(0.918)	0.069(0.354)	0.285(0.336)
Education of the male head	-0.01(0.02)**	-0.007(0.497)	0.001(0.812)	-0.01(0.08)***
Education of the female head	-0.017(0.215)	-0.056(0.694)	0.021(0.262)	0.64(0.09)***
Education of the Spouse	-0.009(0.124)	-0.001(0.950)	-0.005(0.574)	0.019(0.232)
Household Size	0.006(0.457)	0.017(0.188)	0.002(0.603)	0.005(0.457)
Year Dummies				
Year 1999-00	-0.033(0.00) *	-0.021(0.358)	-0.001(0.968)	-0.001(0.981)
Year 2001-02	-0.015(0.165)	-0.016(0.459)	-0.002(0.845)	-0.025(0.456)
Year 2003-04	0.048(0.01) *	0.015(0.679)	-0.008(0.711)	0.019(0.641)
Year 2005-06	0.041(0.00) *	0.012(0.705)	0.04(0.037) **	0.026(0.573)
Year 2007-08	0.006(0.65)	0.014(0.696)	0.003(0.853)	0.016(0.728)
Constant	-0.158(0.664)	-1.260(0.182)	0.038(0.937)	0.124(0.857)
R-Square: within	0.35	0.53	0.20	0.50
Between	0.47	0.77	0.29	0.75
Overall	0.42	0.61	0.24	0.64
Number of obs.	306	132	168	78
Number of groups	51	22	28	13
F-test (Prob. F-test)	7.29 (0.00)	4.78 (0.00)	2.23 (0.0054)	1.83 (0.00)

*Note: *,** and *** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The estimation technique employed is fixed model. The cohort consists of four digit district codes. Based on the LFS data from 1997-98 to 2007-08.*

The significant effect of exporting sector can be found at all Pakistan level, while insignificant effect can be seen in the three out of four provinces which further leads us investigate the effect of labour market indicator across urban areas of the provinces as well (see annex A-4.12). This is because exporting industries are mostly concentrated in

urban regions although these firms usually sub-contract at small scale in semi urban and in rural areas as well but the concentration is still high in urban areas then the rest of the areas. The result indicates that except urban areas of Sindh in all the rest of the province the effect of exporting sector is significant and positive. Table also illustrates significant effect of real wages on incidence of child labour in urban areas of the three provinces except Punjab province although in the overall Punjab the effect was significant. The significant effect of real wages in the overall sample of Punjab is capturing the effect of rural wages. In summary results based on provinces predict significant variation across provinces. The effect of labour market indicators which were highly significant at all Pakistan level, affect the demand and supply condition of child labour across provinces differently. If one indicator has significant effect in one province, the other has significant effect in the second province. Study therefore concludes by deducing that policies adopted by the government to reduce the child labour incidence should take into account the provincial and regional variations too.

4.5.6 Variations across Time:

In order to incorporate the effect of time variation on child labour incidence equation 4.5 was first estimated keeping the year dummies only. The result is reported in column 1 of table 4.11. The result shows a positive trend for the year 2005-06 only, while for the rest of the periods the effect is negative. Here it is worth to note that the last two periods have insignificant effect on the incidence of child labour while the first three periods showing the downward trend is significant.

After including the labour market indicators although overall significance of the model increases from 2% to 43% (the overall R-square value of two models) but the effect of year dummies changes. Now only the dummies for the period 1999-00 and 2005-6 is significantly affecting the child labour incidence. More precisely the effect of period 1999-00 is significant and negative on child labour incidence while period 2005-06 shows significant positive effect on child labour incidence.

Table 4.11: Exploring the Time Variations

		(Fixed effect Test)
Dependent Variable: Child Labour	**Without Labour Market Indicators**	**With Labour Market Indicators**
<u>**Labour Market Conditions**</u>		
Size of the informal sector	-	0.108(0.000) *
Size of the Agriculture sector	-	0.243(0.000) *
Size of the Exporting sector	-	0.181(0.001) *
District Unemployment	-	-0.271(0.000) *
Household Unemployment	-	0.137(0.005) *
Log of District wages	-	0.017(0.021) **
<u>**Year Dummies**</u>		
Year 1999-00	-0.032(0.000) *	-0.020(0.011)*
Year 2001-02	-0.024(0.005) *	-0.009(0.226)
Year 2003-04	-0.014(0.078) **	-0.001(0.864)
Year 2005-06	0.003(0.733)	0.032(0.003) *
Year 2007-08	-0.005(0.552)	-0.005(0.51)
Constant	0.111(0.000) *	-0.082(0.001) *
R-Square: within	0.05	0.24
Between	0.00	0.54
Overall	0.02	0.43
Number of obs.	684	684
Number of groups	114	114
F-test (Prob. F-test)	6.77 (0.00)	10.17 (0.00)

Note:*,** and *** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The estimation technique employed is fixed model. The cohort consists of four digit district codes. Based on the LFS data from 1997-98 to 2007-08.

4.6 Conclusions

The arguments and the evidences provided in this chapter clearly indicate that child labour is affected by labour market conditions substantially. Labour market indicators can produce both supply side and demand driven affects. The demand for child labour arises mainly due to adult wages, adult unemployment in an area, size of the informal, agriculture and exporting sector while supply of child labour usually arises because of the high proportion of adult unemployed in the household. The main point raised and empirically tested in this study includes:

1) The negative effect of adult unemployment rate at district level shows that the higher the adult unemployed proportion in a division/district/city, the lower will be the probability for a child to find an employment as adult labour will be actively seeking employment. They will be willing to work at lower wages as

well. Hence it will be very difficult for a child to find an employment. Hence, demand for child labour decreases.

2) The significant and positive effect of adult unemployed proportion at household level shows the supply side picture. The higher the unemployed adult in a house the lower will be the income of the household thus the higher will be child labour supply. That is household will supply more child labour to overcome income loss.

3) The effect of the size of informal sector is positive and significant. As explained earlier this sector absorbs a high proportion of child labour due its nature of being not recognized or protected under the legal and regulatory frameworks. Furthermore, the skill requirements is low in this sector hence children easily get employed and sometime substitute adult unskilled labour. The growth in this sector is tremendous in the first five years of 20th century; from 65% in 2001-2 to 73% in 2005-6. Results confirm that the higher the size of this sector the higher will be the demand for child labour.

4) Presence of the export related industries in an area increases the probability of child work mainly due to the subcontracting system that exists in Pakistan. In Pakistan, like in other developing countries, to remain cost competitive in the world market producers are using subcontracting system for the production process. Children usually remain engaged in informal sector or in subsidiary sectors which provides raw material to the exporting sectors. Therefore the higher will be the export related work in a division/district/city the higher will be the probability for a child to find an employment.

5) Presence of agriculture sector also positively influences the child labour incidence. Agriculture is one sector where adult and children work side by side, mostly as unpaid family worker. Children's employment in agriculture sector also points out that the labour market in rural areas is poorly functioning. Households prefer family labour instead of hiring labour. Hence the higher the size of this sector the higher will be the demand for child labour.

6) As household wages do not show any significant effect, study concludes that in Pakistan demand side effect of wages is more prominent in Pakistan then the supply side effect. This is because of the significant effects of adult wages at division/district/city on child labour incidence. The result shows that the higher the wages in a division/district/city, the higher will be the demand for child labour. The logic behind this is that higher adult wages increase the cost of production. In Pakistan due to high energy prices, cost of production is already very high hence any increase in the adult wage rate will definitely push employer to substitute adult labour with cheap child labour. Therefore demand for child labour increases.

As far as policy implication is concerned, first supply side effect could be reduced by providing vocational training based on education with some small compensation. In Pakistan the most common reason given by parents for sending the children to work is to equip the children with skill. Realizing the fact government has already started establishing the vocational training institute. But the work is more concentrated in urban areas (mainly large cities) and is targeting unskilled adult. This may be fruitful in the long run as it will help in enhancing the skills and income of adult labour which will definitely affect child labour supply. Some NGO's are also working at the grass root level to provide skilled based education at school level with some compensation such as a tin of oil, meal for one time a day or some small amount as compensation. But the work is still in progress and the fruit is yet to be analysed.

Secondly, how to reduce the demand side effect? Our result indicates that demand is basically affected positively by size of informal, agriculture and exporting sector. Exporting sector employing children is also informal in nature, as one cannot found children in large scale manufacturing while agriculture is by nature informal. Overall these three sectors employing the children can be considered as basically informal. Now the question arises as to how to reduce the effect of informal sector on child labour? This is a very critical question. In Pakistan 74% of the economy is informal. Its role in generating employment, income and growth cannot be ignored. There is a paper by Burki and Afaqi (1996) on the role of informal sector in Pakistan economy. By considering its importance he concluded that it is necessary to develop these sectors

through inter or intra- industry technology transfer. If this is the case then technology transfer could reduce child labour demand as there is impulse evidence from the 19th century industrial revolution that technology reduced child labour demand considerably.

Finally, this study acknowledges the presence of endogeneity in some of the labour market indicators. While it does not predict the presence of endogeneity in the system this could be because of the absence of suitable instruments. In the absence of good instruments we have relied on lagged values and because of this our model is exactly identified so the over identification test cannot be performed. Hence, the validity of the instruments remains an open question. Therefore we end our discussion with a recommendation that future studies exploring the effect of labour market indicators on child labour should try to control for the presence of endogeneity as well.

Annex A- 4.1: Descriptive Statistics

Following three tables provide summary statistics of the variables of interest. Table A1.1 and A 1.3 provide overall summary statistics for the period 1997-98 onward and 1990-91 to 1994-95 respectively while Table A1.2 and A1.4 provide summary statistics by Year.

Table A-4.1.1

Descriptive Analysis (for the period 1997-98 onward)

	Mean	Std. Dev.	Min.	Max.
Child Labour	0.10	0.09	0.00	0.64
Child Age	11.95	0.17	11.34	12.57
Child if male	0.54	0.06	0.31	0.86
House headed by male	0.95	0.07	0.63	1.00
Education of the male head	4.18	1.94	0.45	10.16
Education of the female head	0.14	0.24	0.00	1.60
Education of the Spouse	1.28	1.43	0.00	7.61
Size of the informal sector	0.42	0.18	0.08	0.82
Size of the Agriculture sector	0.45	0.29	0.00	2.04
Size of the Exporting sector	0.07	0.07	0.00	0.41
District Unemployment	0.10	0.08	0.00	0.59
Household Unemployment	0.13	0.12	0.00	1.19
Log of District wages	1.25	0.35	-0.69	2.63
Household Size	8.29	1.20	5.77	15.28

Table A-4.1.2

Descriptive Analysis by Years (Recent Years)

	Mean	SD	Min	Max
Year = 1997-98				
Child Labour	0.11	0.10	0.00	0.40
Child Age	11.85	0.18	11.34	12.22
Child if male	0.55	0.07	0.38	0.82
House headed by male	0.94	0.08	0.65	1.00
Education of the male head	3.10	1.86	0.45	9.63
Education of the female head	0.10	0.18	0.00	0.93
Education of the Spouse	0.87	1.14	0.00	5.06
Size of the informal sector	0.52	0.15	0.12	0.82
Size of the Agriculture sector	0.47	0.30	0.00	1.42
Size of the Exporting sector	0.05	0.07	0.00	0.40
District Unemployment	0.08	0.06	0.00	0.38
Household Unemployment	0.10	0.10	0.00	0.66
Log of District wages	1.09	0.28	-0.28	1.58
Household Size	7.81	0.86	6.31	10.34

	Mean	SD	Min	Max
Year = 1998-99				
Child Labour	0.08	0.07	0.00	0.41
Child Age	11.98	0.18	11.55	12.45
Child if male	0.54	0.08	0.34	0.86
House headed by male	0.93	0.08	0.70	1.00
Education of the male head	3.39	1.68	0.47	10.16
Education of the female head	0.09	0.17	0.00	0.93
Education of the Spouse	0.84	1.15	0.00	6.05
Size of the informal sector	0.40	0.19	0.08	0.79
Size of the Agriculture sector	0.47	0.28	0.00	1.11
Size of the Exporting sector	0.06	0.07	0.00	0.32
District Unemployment	0.09	0.06	0.00	0.33
Household Unemployment	0.12	0.08	0.00	0.42
Log of District wages	1.15	0.31	-0.06	2.08
Household Size	7.82	0.81	5.77	10.54
Year = 2001-02				
Child Labour	0.09	0.07	0.00	0.35
Child Age	11.98	0.19	11.37	12.57
Child if male	0.54	0.07	0.31	0.75
House headed by male	0.94	0.07	0.64	1.00
Education of the male head	3.34	1.35	0.72	6.97
Education of the female head	0.09	0.19	0.00	1.37
Education of the Spouse	0.95	1.07	0.00	4.45
Size of the informal sector	0.44	0.17	0.13	0.77
Size of the Agriculture sector	0.43	0.26	0.01	0.99
Size of the Exporting sector	0.08	0.08	0.00	0.37
District Unemployment	0.10	0.06	0.00	0.36
Household Unemployment	0.14	0.09	0.00	0.48
Log of District wages	1.18	0.23	0.55	1.68
Household Size	8.29	1.27	6.00	15.28
Year = 2003-04				
Child Labour	0.10	0.08	0.00	0.41
Child Age	11.98	0.15	11.60	12.38
Child if male	0.53	0.05	0.42	0.66
House headed by male	0.99	0.02	0.89	1.00
Education of the male head	6.12	1.66	2.00	9.89
Education of the female head	0.24	0.36	0.00	1.60
Education of the Spouse	2.11	1.76	0.00	7.61
Size of the informal sector	0.45	0.17	0.12	0.78
Size of the Agriculture sector	0.43	0.26	0.00	1.03
Size of the Exporting sector	0.08	0.07	0.00	0.33
District Unemployment	0.10	0.06	0.01	0.47
Household Unemployment	0.14	0.11	0.00	0.80
Log of District wages	1.26	0.49	-0.69	2.63
Household Size	8.75	1.33	6.16	15.08

	Mean	SD	Min	Max
Year = 2005-06				
Child Labour	0.11	0.09	0.00	0.41
Child Age	11.98	0.13	11.68	12.51
Child if male	0.53	0.04	0.39	0.64
House headed by male	0.93	0.07	0.63	1.00
Education of the male head	3.92	1.50	1.48	8.56
Education of the female head	0.11	0.16	0.00	0.84
Education of the Spouse	1.15	1.21	0.00	5.71
Size of the informal sector	0.46	0.17	0.16	0.79
Size of the Agriculture sector	0.45	0.30	0.00	1.73
Size of the Exporting sector	0.08	0.07	0.00	0.41
District Unemployment	0.11	0.10	0.01	0.52
Household Unemployment	0.14	0.14	0.02	0.90
Log of District wages	1.33	0.27	0.47	1.80
Household Size	8.56	1.30	6.46	14.10
Year = 2007-08				
Child Labour	0.11	0.10	0.00	0.64
Child Age	11.93	0.13	11.45	12.33
Child if male	0.54	0.05	0.43	0.68
House headed by male	0.96	0.04	0.79	1.00
Education of the male head	5.20	1.47	2.60	9.08
Education of the female head	0.21	0.29	0.00	1.13
Education of the Spouse	1.75	1.62	0.06	7.07
Size of the informal sector	0.46	0.17	0.15	0.80
Size of the Agriculture sector	0.47	0.34	0.00	2.04
Size of the Exporting sector	0.08	0.07	0.00	0.33
District Unemployment	0.12	0.11	0.00	0.59
Household Unemployment	0.15	0.16	0.01	1.19
Log of District wages	1.46	0.33	0.34	2.12
Household Size	8.52	1.18	6.73	11.49

Table A-4.1.3

Descriptive Analysis (Overall for the period 1990-91 to 1994-95)

	Mean	SD	Min	Max
Child Labour	0.11	0.08	0.00	0.37
Child Age	11.95	0.17	11.18	12.74
Child if male	0.56	0.06	0.33	0.77
House headed by male	0.93	0.08	0.54	1.00
Education of the male head	3.21	1.63	0.32	8.27
Education of the female head	1.12	1.83	0.00	12.00
Education of the Spouse	0.68	0.87	0.00	4.13
Size of the informal sector	0.86	0.14	0.21	1.22
Size of the Agriculture sector	0.44	0.27	0.00	1.01
Size of the Exporting sector	0.07	0.07	0.00	0.40
District Unemployment	0.06	0.04	0.00	0.29
Household Unemployment	0.04	0.06	0.00	0.50
Log of District wages	0.91	0.26	0.24	1.68
Household Size	8.20	0.93	5.77	11.48

Table A-4.1.4

Descriptive Analysis by Year (Earlier Years)

	Mean	SD	Min	Max
Year = 1990-91				
Child Labour	0.11	0.08	0.00	0.37
Child Age	11.98	0.18	11.59	12.74
Child if male	0.56	0.08	0.33	0.77
House headed by male	0.94	0.07	0.66	1.00
Education of the male head	3.15	1.53	0.88	6.89
Education of the female head	1.05	1.77	0.00	8.00
Education of the Spouse	0.61	0.79	0.00	3.42
Size of the informal sector	0.85	0.15	0.32	1.21
Size of the Agriculture sector	0.45	0.26	0.01	0.89
Size of the Exporting sector	0.08	0.06	0.00	0.38
District Unemployment	0.07	0.05	0.01	0.29
Household Unemployment	0.05	0.06	0.00	0.42
Log of District wages	0.89	0.28	0.26	1.68
Household Size	8.22	0.95	5.92	10.45
Year = 1991-92				
Child Labour	0.09	0.07	0.00	0.32
Child Age	11.94	0.17	11.18	12.26
Child if male	0.55	0.06	0.38	0.70
House headed by male	0.94	0.07	0.59	1.00
Education of the male head	3.21	1.77	0.62	8.27
Education of the female head	1.08	1.82	0.00	10.00

	Mean	SD	Min	Max
Education of the Spouse	0.78	0.95	0.00	4.13
Size of the informal sector	0.87	0.11	0.58	1.22
Size of the Agriculture sector	0.44	0.28	0.00	1.01
Size of the Exporting sector	0.06	0.06	0.00	0.32
District Unemployment	0.06	0.05	0.00	0.27
Household Unemployment	0.03	0.06	0.00	0.50
Log of District wages	0.90	0.24	0.42	1.49
Household Size	8.19	0.92	6.39	11.14
Year = 1992-93				
Child Labour	0.11	0.08	0.00	0.37
Child Age	11.92	0.17	11.44	12.25
Child if male	0.55	0.05	0.45	0.68
House headed by male	0.93	0.09	0.54	1.00
Education of the male head	3.13	1.59	0.32	7.17
Education of the female head	1.19	1.92	0.00	12.00
Education of the Spouse	0.65	0.85	0.00	3.82
Size of the informal sector	0.87	0.15	0.21	1.11
Size of the Agriculture sector	0.45	0.27	0.01	0.90
Size of the Exporting sector	0.08	0.07	0.00	0.34
District Unemployment	0.07	0.04	0.00	0.20
Household Unemployment	0.04	0.06	0.00	0.36
Log of District wages	0.93	0.24	0.24	1.50
Household Size	8.18	0.98	5.77	11.48
Year = 1994-95				
Child Labour	0.11	0.09	0.00	0.36
Child Age	11.94	0.17	11.48	12.32
Child if male	0.56	0.05	0.40	0.73
House headed by male	0.93	0.08	0.59	1.00
Education of the male head	3.33	1.63	0.37	6.63
Education of the female head	1.12	1.80	0.00	10.00
Education of the Spouse	0.69	0.89	0.00	3.42
Size of the informal sector	0.86	0.14	0.26	1.10
Size of the Agriculture sector	0.44	0.27	0.01	0.92
Size of the Exporting sector	0.07	0.07	0.00	0.40
District Unemployment	0.06	0.04	0.00	0.20
Household Unemployment	0.04	0.06	0.00	0.33
Log of District wages	0.91	0.26	0.30	1.53
Household Size	8.23	0.90	6.49	11.20

Annex A- 4.2: Correlation Matrix

	Child Labour	Child Age	Child if male	House headed by male	Education of the male head	Education of the female head	Education of the Spouse	Size of the informal sector	Size of the Agriculture sector	Size of the Exporting sector	District Unemployment	Household Unemployment	Log of District wages	Household Size
Child Labour	1.00													
Child Age	-0.11	1.00												
Child if male	0.13	-0.14	1.00											
House headed by male	0.20	-0.18	0.12	1.00										
Education of the male head	-0.36	0.24	-0.19	0.24	1.00									
Education of the female head	-0.26	0.20	-0.18	-0.26	0.42	1.00								
Education of the Spouse	-0.34	0.21	-0.22	0.07	0.79	0.60	1.00							
Size of the informal sector	-0.28	0.06	-0.16	-0.07	0.32	0.33	0.48	1.00						
Size of the Agriculture sector	0.57	-0.24	0.23	0.09	-0.52	-0.36	-0.64	-0.66	1.00					
Size of the Exporting sector	-0.12	0.16	-0.29	-0.05	0.32	0.34	0.55	0.49	-0.54	1.00				
District Unemployment	0.04	0.08	0.04	-0.16	0.05	0.04	0.00	0.06	0.14	-0.03	1.00			
Household Unemployment	0.27	0.02	0.07	-0.04	-0.03	-0.04	-0.07	-0.03	0.29	-0.02	0.79	1.00		
Log of District wages	-0.20	0.03	0.04	0.09	0.44	0.22	0.38	0.04	-0.27	0.08	0.15	0.09	1.00	
Household Size	0.04	0.03	-0.07	0.11	0.09	-0.16	-0.08	0.03	-0.12	0.02	0.23	0.13	0.05	1.00

Annex A- 4.3: Definitions and effect hypothesized

Variable	Definition/ Measurement	Effect hypothesized
Child Age	Number of years	+
Child if male	Dummy Variable if male =1 otherwise zero	+
House headed by male	Dummy Variable if household head is male =1 otherwise zero	+
Education of the male head	Number of years of education	-
Education of the female head	Number of years of education	-
Education of the Spouse of the male head	Number of years of education	-
First and second born are with different gender	Dummy variable if the first two born have different gender =1 otherwise zero	-
Proportion of Adult employed LF in informal sector	Adult labour force working in the informal sector as proportion of total employed adult in a division/district/city	+
Proportion of Adult employment in Exporting sector	Adult labour force working in the Exporting sector as proportion of total employed adult in a division/district/city	+
Proportion of Adult employment in Agriculture sector	Adult labour force working in the Agriculture sector as proportion of total employed adult in a division/district/city	+
Proportion Adult unemployed LF at Division/District/City level	Adult unemployed Labour Force as proportion to total Adult labour force in a division/district/city	-
Proportion Adult unemployed LF at Household level	Adult unemployed Labour Force as proportion to total Adult labour force in a household	+
Real Adult Wages at District Level	Median wages of Adult labour force in a division/district/city	+
Real Adult wages at Household Level	Predicted wages at Household level. Where wages are assumed as a function of age, age square, gender, household size, household head gender and education level.	-
Real Wages of Skilled labour	Median wages of Adult labour force with matriculation in the division/district/city	+
Real Wages of Unskilled Labour	Median wages of illiterate Adult labour force in the division/district/city	+

Annex A- 4.4: Child Own Characteristics

Table A4.1 to A4.6 provides some characteristics of the children included in the analysis. The tables are based on the individual information.

Table A-4.4.1

Incidence of Child Labour by Gender

	Not in LF	In LF	Total
Male	56,696 (86)	9,411 (14)	66,107
Female	54,954 (95)	2,864 (5)	57,818
Total	111,650	12,275	123,925

Table A-4.4.2

Incidence of Child Labour by Age

Age	Not in LF	In LF	Total
10	27,849 (95)	1,405 (5)	29,254
11	16,138 (94)	948 (6)	17,086
12	28,939 (89)	3,428 (11)	32,367
13	18,901 (89)	2,427 (11)	21,328
14	19,823 (83)	4,067 (17)	23,890
Total	111,650	12,275	123,925

Table A-4.4.3

Education Status of working Children

	Not in LF	In LF	Total
Currently not enrolled	43766 (80)	11171 (20)	54937
Nursery or KG	1 (100)	0 (0)	1
Primary	28,372 (98)	437 (2)	28,809
Middle	39,511 (98)	667 (2)	40,178
Total	111,650	12,275	123,925

Table A-4.4.4

Employment Status of Working Children

	Frequency	Percent
Regular paid employee with fixed wage?	682	6
Casual paid employee	900	7
Paid worker by piece rate or service performed	794	6
Paid non-family apprentice	372	3
Employer	2	0
Own account worker – non- agriculture	552	5
Own account worker agriculture	144	1
Owner cultivator	84	1
Share cropper	26	0
Contract cultivator	868	7
unpaid family worker	5445	44
Unpaid family worker agriculture*	1892	15
Unpaid family worker non – agriculture*	491	4
Other	23	0
Total	12275	100

Note: * For few survey Years Unpaid Family workers are reported as Unpaid Family worker agriculture and Non agriculture.

Table A-4.4.5

Average Hours of Child Work

Age	1997-98	1999-00	2001-02	2003-04	2005-06	2007-08	Overall average
10	37	41	39	40	34	36	36
11	35	40	40	40	33	35	35
12	40	41	42	40	37	38	38
13	40	42	41	39	38	39	39
14	43	45	43	43	41	40	42
Overall average	40	43	42	41	38	38	39

Table A-4.4.6: Nature of Activity performed by Children

	In LF	Percent
Activities not Adequately Defined	1	0.01
Agriculture, Livestock and Hunting	8220	66.97
Forestry and Logging	32	0.26
Fishing	15	0.12
Coal Mining	1	0.01
Crude Petroleum and Natural Gas Production	2	0.02
Crude Metal Ore Mining & Other Mining	1	0.01
Manufacture of Food, Beverage and Tobacco	113	0.92
Manufacture of Textile, Wearing Apparel and Leather Industry	736	6.00
Manufacture of Wood and Wood Products including Furniture	125	1.02
Manufacture of Paper and Papers Products, Printing and Publication	23	0.19
Manufacture of Chemicals and Chemical Petroleum, Coal, Rubber	20	0.16
Manufacture of Non-metallic Mineral Products except of Petroleum	148	1.21
Basic Metal Industries	12	0.10
Manufacture of Fabricated Metal Products, Machinery and Equipment	81	0.66
Other Manufacturing Industries and Handicrafts	102	0.83
Building Construction	266	2.17
Construction, Repair, Maintenance of Streets, Roads, Highway	4	0.03
other Construction, Repair and Maintenance projects	2	0.02
Wholesale Trade	35	0.29
Retail Trade	983	8.01
Restaurants and Hotels	226	1.84
Transport and Storage	275	2.24
Communication	10	0.08
Financial Institutions	1	0.01
Insurance	1	0.01
Real Estate and Business Services	5	0.04
Public Administration and Defense Services	7	0.06
Sanitary and Similar Services	10	0.08
Social and Related Community Services	27	0.22
Recreation and Cultural Services	17	0.14
Personal and Household Services	774	6.31
Total	12275	100

Annex A- 4.5: Diagnostic Tests

a) <u>**AIC and BIC Test for Model Selection:**</u>

In order to check the robustness of with and without log models, AIC and BIC tests were performed with the hypothesis that the lower the AIC and BIC values, the better will be the model. AIC and BIC values indicate that the model with log wages are more robust than the alternative model (without log wages).

Table A-4.5.1

	Without Log Wages	With Log Wages
ll(null)	1027.7	1027.7
ll(model)	1138.1	1139.8
Degrees of Freedom	19	19
AIC	-2238.3	-2241.6
BIC	-2152.3	-2155.6

b) <u>**Variance Inflation Factors for the Independent variables**</u>

Table A-4.5.2

Variable	VIF	1/VIF
Education of the male head	4.860	0.206
Education of the Spouse	5.210	0.192
Size of the Agriculture sector	4.740	0.211
Size of the Informal sector	3.890	0.257
District Unemployment	3.260	0.307
Household Unemployment	3.130	0.319
Year 2005-06	3.190	0.313
Year 2003-04	2.920	0.343
Year 2007-08	2.400	0.417
Education of the female head	2.010	0.497
Year 2001-02	2.070	0.483
Year 1999-00	2.070	0.484
Size of the Exporting sector	1.990	0.502
House headed by male	1.610	0.622
Log of wages	1.540	0.648
Household Size	1.460	0.686
Age of the child	1.260	0.791
Child if Male	1.170	0.858
Mean VIF	2.710	

c) Breusch and Pagan Lagrangian multiplier test for random effects

Child labour [Cohort,Year] = Xb + u[Cohort] + e[Cohort, Year]

Estimated results:

	Var.	Sd.=Sqrt. (Var.)
Child labour	.0075075	.0866458
e	.0026057	.0510461
u	.0008894	.0298232

Test: Var. (u) = 0:
          chi2. (1) =   114.75, Prob.> chi2 =   0.0000

d)   Testing for heteroskedasticity

Modified Wald test for group wise heteroskedasticity in fixed effect regression model

H0: sigma (i) ^2 = sigma^2 for all i:

        chi2 (114) =   13433.29, Prob.>chi2 = 0.0000

Above we reject the null and conclude heteroskedasticity hence option 'robust' is used to control for heteroskedasticity

e)   Testing for time-fixed effects

 (1) Year 1999-00 = 0
 (2) Year 2001-02= 0
 (3) Year 2003-04= 0
 (4) Year 2005-06= 0
 (5) Year 2007-08= 0

    F (5,   552) =   9.2
    Prob. > F =   0.000

We reject the null that all years coefficients are jointly equal to zero therefore time fixed effects are needed.

f)   Test of cross sectional independence

Pesaran's test of cross sectional independence   =   -0.534, Prob. = 0.5934
Average absolute value of the off-diagonal elements   =   0.390

g) <u>**Hausman Test for FE and RE**</u>

b= consistent under Ho and Ha; obtained from xtreg (FE)
B = inconsistent under Ha, efficient under Ho; obtained from xtreg (RE)

Test: Ho: difference in coefficients not systematic

chi2 (18) = (b-B)'[(V_b-V_B) ^ (-1)] (b-B)   =   108.17
                    Prob. > chi2   =   0.0000

Indicate that estimates of Fixed Effect test is preferred over Random Effect

Annex A- 4.6: Number of Children Aged 10-14 within each Cohort

Cohorts				Survey Periods				# Obs.
Divisions/Districts/Cities	Codes	1997-8	1998-9	2001-2	2003-4	2005-6	2007-8	Per Cohort
Lahore City	1001	448	477	324	362	660	630	2901
Faisalabad City	1002	226	234	232	218	421	375	1706
Rawalpindi City	1003	154	215	206	163	329	287	1354
Multan City	1004	127	200	153	163	268	269	1180
Gujranwala City	1005	180	161	147	142	238	235	1103
Sargodha City	1006	139	114	118	134	224	203	932
Sialkot City	1007	132	116	86	79	207	206	826
Islamabad City	1009	80	231	164	145	195	209	1024
Karachi City	1010	909	877	816	805	1438	1572	6417
Hyderabad City	1011	294	272	296	294	445	625	2226
Peshawar City	1013	266	273	284	260	638	668	2389
Quetta City	1014	203	218	272	305	443	494	1935
Rawalpindi Division	1016	176	213	156	126	206	204	1081
Gujranwala Division	1017	317	283	319	328	469	426	2142
Sargodha Division	1018	134	125	127	163	230	238	1017
Faisalabad Division	1019	220	222	150	167	235	250	1244
Lahore Division	1020	187	293	220	244	408	408	1760
Multan Division	1021	261	257	246	220	382	322	1688
DG Khan Division	1022	148	182	134	130	238	220	1052
Bahawalpur Division	1023	207	262	289	299	347	330	1734
Sukkur Division	1024	292	287	328	326	419	631	2283
Larkana Division	1025	155	195	134	188	235	312	1219
Hyderabad Division	1026	190	201	229	214	220	235	1289
Mirpurkhas Division	1027	115	100	97	129	202	236	879
Malakand Division	1028	120	81	134	73	182	184	774
Peshawar Division	1029	151	164	127	129	156	198	925
Kohat Division	1030	154	168	88	111	161	303	985
DI Khan Division	1031	89	134	169	136	243	321	1092
Hazara Division	1032	140	145	126	139	138	207	895
Bannu Division	1033	34	57	83	101	78	149	502
Mardan Division	1034	162	185	192	167	91	206	1003
Quetta Division (Urban)	1035	93	120	74	93	168	392	940
Sibbi Division (Urban)	1036	77	80	83	98	132	286	756
Kalat Division (Urban)	1037	86	115	82	91	258	436	1068
Makran Division (Urban)	1038	84	72	61	81	109	228	635
Zhob Division (Urban)	1039	26	26	76	108	145	218	599
Nasirabad Division (Urban)	1040	66	61	96	97	195	364	879
Quetta Division (Rural)	10351	170	194	389	453	414	713	2333
Sibbi Division (Rural)	10361	70	175	179	221	250	558	1453
Kalat Division (Rural)	10371	77	160	212	219	496	769	1933
Makran Division (Rural)	10381	112	116	81	101	149	372	931
Zhob Division (Rural)	10391	112	177	170	240	404	588	1691
Nasirabad Division (Rural)	10401	99	124	203	203	431	865	1925
Islamabad District	1041	68	110	172	138	317	316	1121
Attock District	1042	43	54	102	109	146	154	608
Rawalpindi District	1043	94	93	122	93	200	187	789
Jehlum District	1044	49	39	39	48	79	116	370

Cohorts		Survey Periods						# Obs. Per Cohort
Divisions/Districts/Cities	Codes	1997-8	1998-9	2001-2	2003-4	2005-6	2007-8	
Chakwal District	1045	44	38	94	76	132	126	510
Sargodha District	1046	110	126	136	172	333	289	1166
Khushab District	1047	41	35	51	42	116	101	386
Mianwali District	1048	23	30	31	44	77	76	281
Bhakar District	1049	20	22	56	87	104	113	402
Faislabad District	1050	169	158	219	199	382	364	1491
TT Singh District	1051	145	152	129	188	255	297	1166
Jhang District	1052	121	131	125	140	267	303	1087
Gujranwala District	1053	139	122	121	116	290	270	1058
Gujrat District	1054	102	106	109	105	209	198	829
Sialkot District	1055	161	167	166	203	353	341	1391
Hafizabad District	1056	40	47	52	51	155	147	492
Mandi Bahuddin District	1057	87	107	98	96	168	165	721
Narowal District	1058	135	94	141	126	166	195	857
Lahore District	1059	57	43	115	113	231	217	776
Kasur District	1060	136	167	152	167	291	309	1222
Sheikhupura District	1061	95	141	156	149	375	382	1298
Okara District	1062	132	138	131	170	263	245	1079
Vehari District	1063	144	171	147	163	280	267	1172
Sahiwal District	1064	69	90	96	116	203	191	765
Multan District	1065	75	109	168	156	265	231	1004
Khanewal District	1066	76	105	100	113	272	253	919
Pakpattan District	1067	93	110	102	123	130	123	681
Lodhran District	1068	46	50	55	44	181	165	541
DG Khan District	1069	77	78	92	93	291	356	987
Rajanpur District	1070	28	37	38	43	189	208	543
Muzffargarh District	1071	82	79	154	179	283	268	1045
Layyah District	1072	42	53	133	118	148	188	682
Bahwalpur District	1073	82	79	150	187	263	287	1048
Bhawalnagar District	1074	56	99	94	106	290	271	916
Rahim Yar Khan District	1075	105	151	206	200	378	384	1424
Khairpur District	1076	96	94	104	157	334	305	1090
Sukkur District	1077	32	37	42	40	152	256	559
Nawabshah District	1078	85	85	65	92	165	251	743
Nowshero Feroz District	1079	63	73	127	114	209	269	855
Ghotki District	1080	62	85	72	75	126	280	700
Jaccobabad District	1081	71	69	71	105	278	613	1207
Shikarpur District	1082	83	73	40	49	166	242	653
Larkana District	1083	65	86	158	144	397	424	1274
Dadu District	1084	171	142	146	177	301	377	1314
Hyderabad District	1085	85	128	124	153	242	372	1104
Badin District	1086	64	64	95	97	193	281	794
Thatta District	1087	61	79	192	140	243	298	1013
Tharparker District	1088	50	71	51	97	120	212	601
Sanghar District	1089	78	68	52	96	308	399	1001
Mirpurkhas District	1090	55	67	160	115	206	351	954
Karachi District	1091	86	87	26	135	164	250	748
Swat District	1092	201	174	230	209	267	343	1424
lower dir District	1093	188	158	105	142	343	336	1272
Chitral District	1094	42	50	47	60	112	123	434

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| Cohorts | | Survey Periods | | | | | | # Obs. Per Cohort |
Divisions/Districts/Cities	Codes	1997-8	1998-9	2001-2	2003-4	2005-6	2007-8	
Bonair District	1095	68	63	65	66	158	178	598
Malakand District	1097	39	47	47	78	145	160	516
Charsada District	1098	113	109	117	144	286	327	1096
Nowshero District	1099	96	64	59	67	191	281	758
Peshawar District	1100	68	90	123	151	307	287	1026
Kohat District	1101	49	51	157	122	330	417	1126
Karak District	1102	51	36	93	92	137	156	565
DI Khan District	1105	83	43	47	70	204	268	715
Manshera District	1106	134	162	182	177	119	183	957
Abbottabad District	1107	92	113	116	129	106	172	728
Harripur District	1108	120	99	105	124	94	129	671
Batagram District	1109	22	47	45	59	123	131	427
Kohistan District	1110	64	66	57	63	138	148	536
Mardan District	1111	102	100	129	144	309	308	1092
Swabi District	1112	96	121	116	106	109	193	741
Bannu District	1113	51	42	68	60	135	195	551
Lakki Marwat District	1114	54	53	72	73	152	151	555
		13408	14689	15709	16660	28748	34711	123925

Annex A- 4.7: Correlation with labour Market Indicators

Following figures provided simple correlation among the indicators representing Labour Market Conditions and proportion of Child Labour across Division/District/Cities and time.

Figure A-4.7.1: Child labour and Size of the Informal Sector
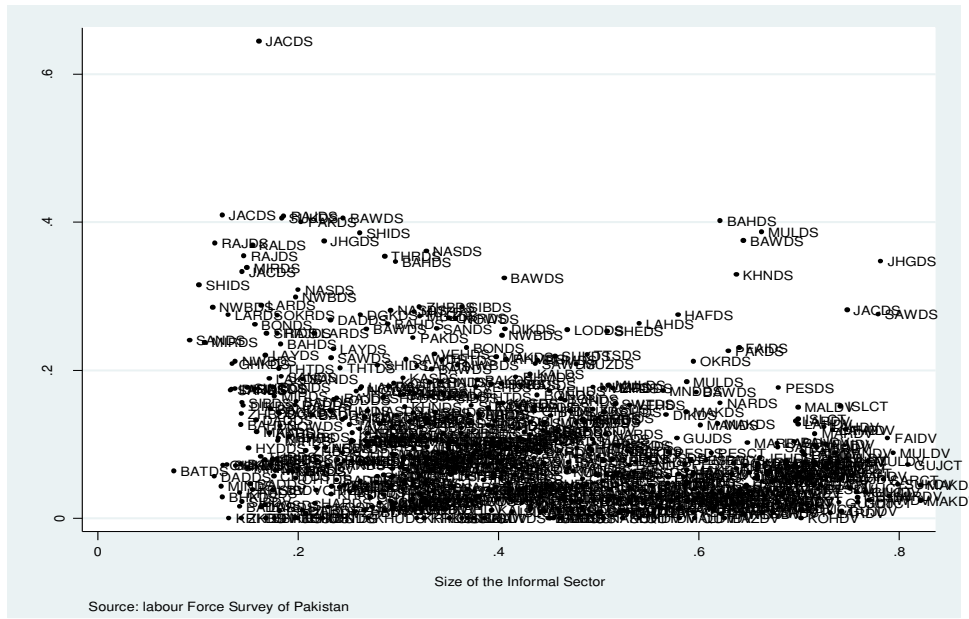
Figure A-4.7.2: Child labour and Size of the Exporting Sector
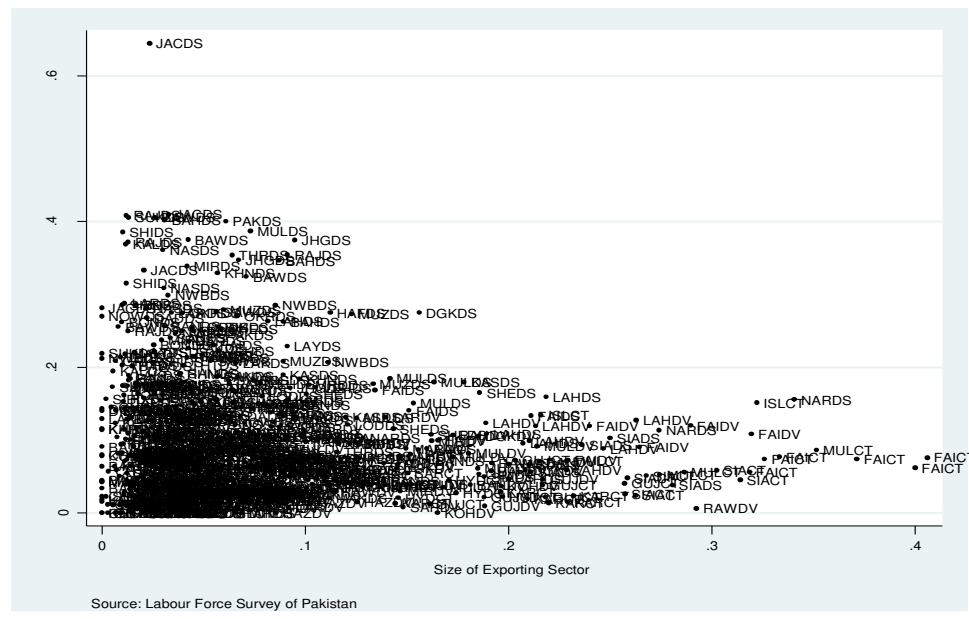
Figure A-4.7.3: Child labour and Size of the Agriculture Sector

Source: Labour Force Survey of Pakistan
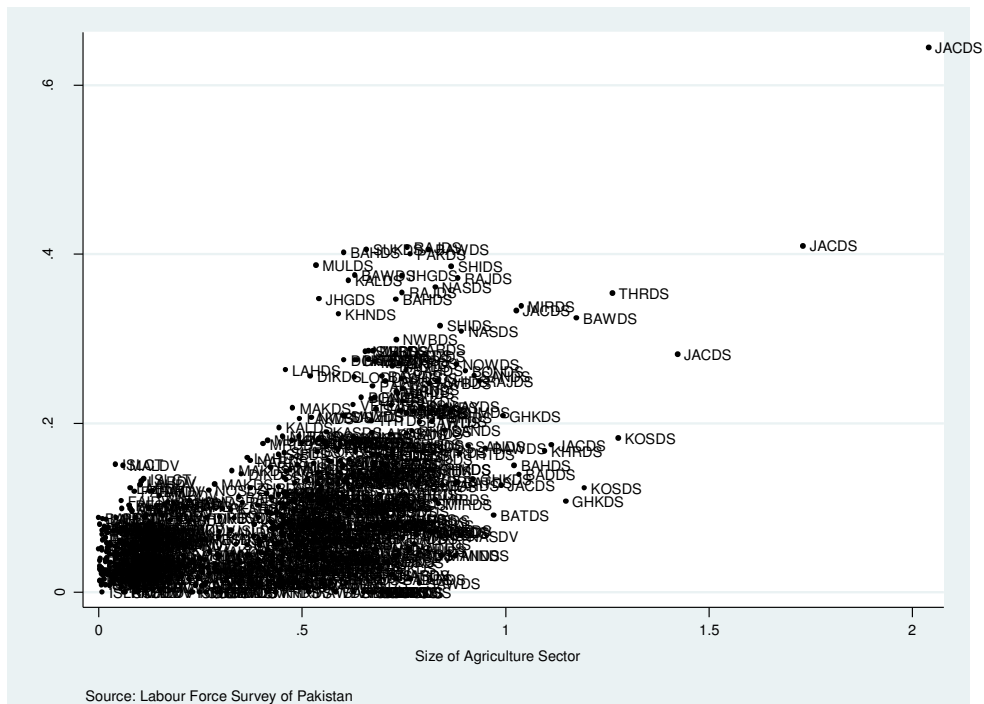
Figure A-4.7.4: Child labour and Adult Unemployment in an Area

Source: Labour Force Survey of Pakistan

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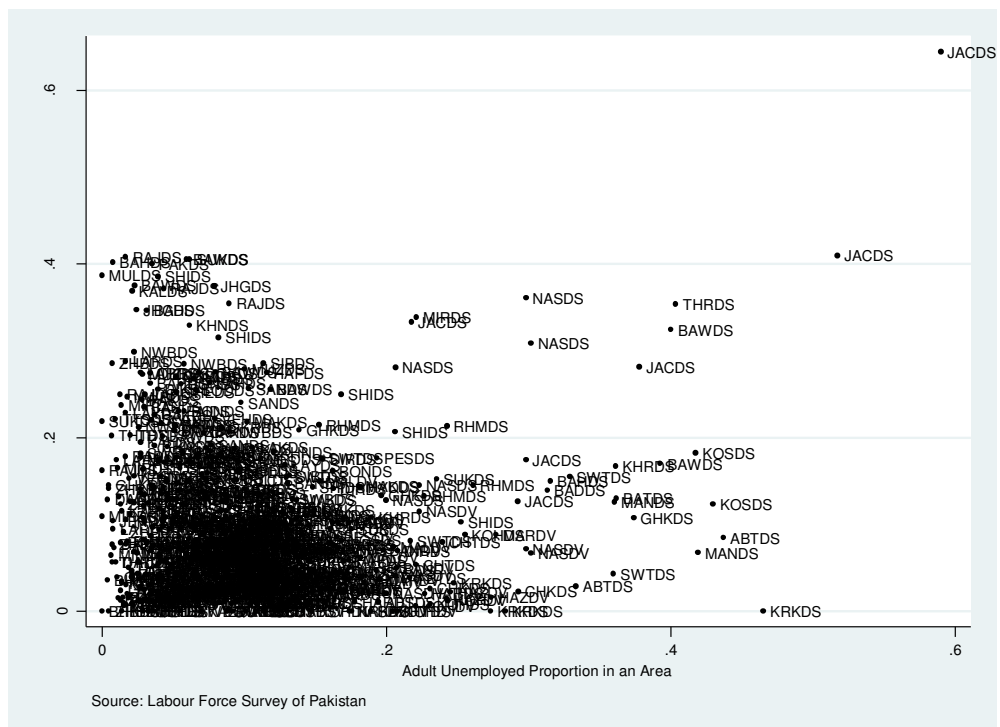
Figure A-4.7.5: Child labour and Household Unemployed proportion

Source: Labour Force Survey of Pakistan
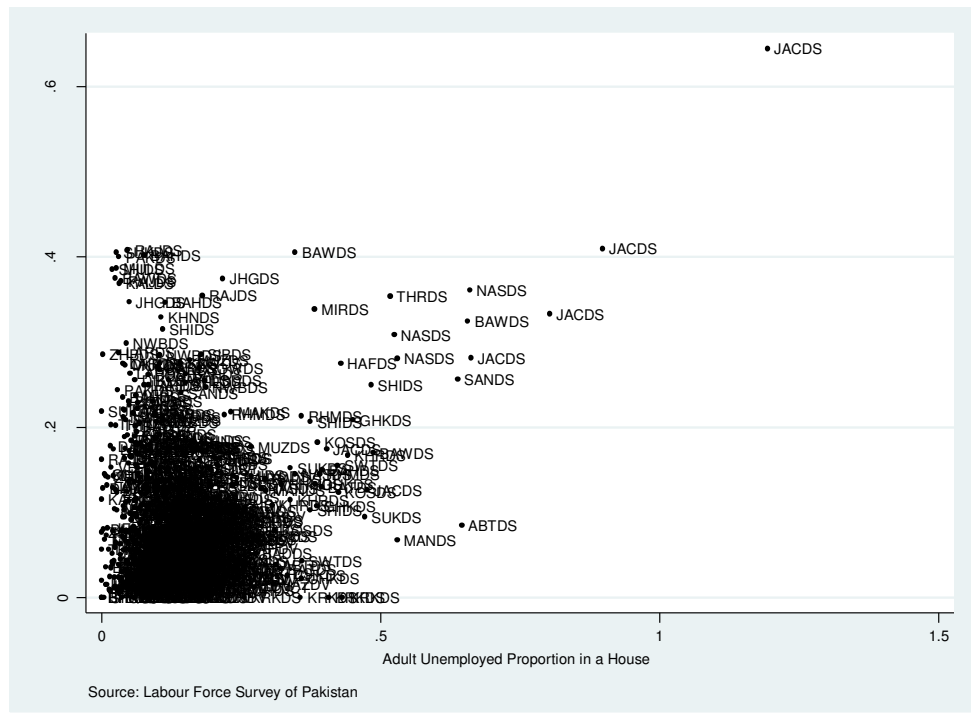
Figure A-4.7.6: Child labour and Real Wages in an Area

Source: Labour Force Survey of Pakistan
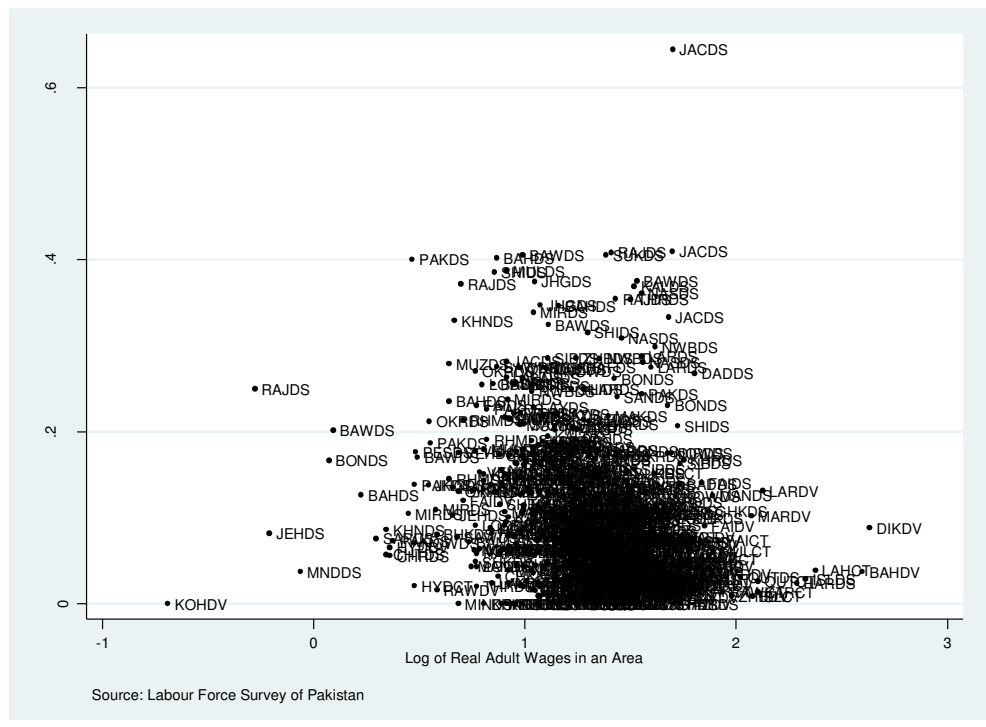
Annex A- 4.8: Dropping the Jacobabad District

In all the above figures Jacobabad districts seems to be the outlier, having high proportion of child labour. The proportion of child labour in Jacobabad district increased gradually from around 28% in the year 1997-98 to 64% in the year 2007-08 (see table A 8.1).

Table A-4.8.1

Child Labour Proportion in Jacobabad District across Time

Year	Averages
1997-98	0.282
1999-00	0.174
2001-02	0.127
2003-04	0.333
2005-06	0.410
2007-08	0.644

The high proportion of child labour in just one cohort could affect the overall analysis. Keeping this in mind and considering the high percentage as outlier, study tries to explore the effects of labour market indicators after dropping the cohort from the analysis. The result does not change much except that household unemployment rate in the rural areas is affected by dropping the district. The household unemployment rate which was significant earlier is now insignificant. Result at all Pakistan level is picking up this effect as well. The household unemployment rate which was significant at 1% significance level now shows some significance at 13% significant level. As all the other labour market indicators remain unchanged, study precedes the analysis by having Jacobabad district in the model.

Table A-4.8.2: Labour Market Conditions and Child Labour Incidence after dropping Jacobabad District

			(Fixed effect Test)
Dependent Variable: Child Labour	**All Pakistan**	**Urban**	**Rural**
Labour Market Conditions			
Size of the informal sector	0.105(0.0)*	0.061(0.08) ***	0.115(0.008) *
Size of the Agriculture sector	0.201(0.0) *	0.066(0.07) ***	0.223(0.00) *
Size of the Exporting sector	0.140(0.01) *	0.155(0.007) *	0.186(0.09) ***
District Unemployment	-0.22(0.006) *	-0.042(0.53)	-0.258(0.009) *
Household Unemployment	0.088(0.13)	0.113(0.04) **	0.071(0.298)
Log of District wages	0.021(0.008) *	0.009(0.11)	0.027(0.02) **
Child Characteristics			
Child Age	0.018(0.44)	-0.011(0.6)	0.022(0.43)
Child if male	0.091(0.18)	0.070(0.18)	0.091(0.31)
Household Characteristics			
House headed by male	0.012(0.82)	-0.003(0.96)	0.006(0.93)
Education of the male head	-0.006(0.09) ***	-0.001(0.61)	-0.009(0.12)
Education of the female head	-0.007(0.41)	-0.001(0.92)	-0.005(0.79)
Education of the Spouse	-0.009(0.015) **	-0.008(0.02) **	-0.014(0.09) ***
Household Size	0.005(0.11)	0.002(0.45)	0.005(0.25)
Year Dummies			
Year 1999-00	-0.020(0.006) *	-0.005(0.39)	-0.025(0.05) **
Year 2001-02	-0.012(0.09) ***	-0.008(0.11)	-0.009(0.44)
Year 2003-04	0.021(0.07) ***	0.014(0.27)	0.035(0.08) ***
Year 2005-06	0.032(0.002) *	0.018(0.05) **	0.042(0.02) **
Year 2007-08	0.009(0.39)	0.003(0.79)	0.021(0.24)
Constant	-0.344(0.23)	0.067(0.78)	-0.412(0.26)
R-Square: within	0.23	0.33	0.25
Between	0.48	0.15	0.56
Overall	0.38	0.22	0.39
Number of obs.	678	222	456
Number of groups	113	37	76
F-test (Prob. F-test)	8.62 (0.00)	5.61 (0.00)	6.93 (0.00)

Note: *,** and *** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The estimation technique employed is fixed model. The cohort consists of four digit district codes.

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Annex A- 4.9: Random Effect and Pooled OLS Estimates

Dependent Variable: Child Labour	Random Effect	Pooled OLS
Labour Market Conditions		
Size of the informal sector	0.103(0.000) *	0.109(0.000) *
Size of the Agriculture sector	0.215(0.000) *	0.216(0.000) *
Size of the Exporting sector	0.219(0.000) *	0.190(0.000) *
District Unemployment	-0.296(0.000) *	-0.342(0.000) *
Household Unemployment	0.166(0.000) *	0.210(0.000) *
Log of District wages	0.015(0.033) **	0.003(0.694)
Child Characteristics		
Child Age	0.035(0.063) ***	0.060(0.002) *
Child if male	0.062(0.327)	0.022(0.737)
Household Characteristics		
House headed by male	0.114(0.008) *	0.219(0.000) *
Education of the male head	-0.009(0.001) *	-0.013(0.000) *
Education of the female head	-0.016(0.092) ***	-0.015(0.128)
Education of the Spouse	0.003(0.386)	0.010(0.003) *
Household Size	0.008(0.004) *	0.010(0.000) *
Year Dummies		
Year 1999-00	-0.022(0.005) *	-0.022(0.018) **
Year 2001-02	-0.018(0.02) **	-0.021(0.023) **
Year 2003-04	0.006(0.573)	-0.001(0.916)
Year 2005-06	0.027(0.017) **	0.028(0.021) **
Year 2007-08	0.002(0.835)	0.002(0.867)
Constant	-0.658(0.007) *	-1.030(0.000) *
R-Square: overall	0.49	0.50
Number of obs.	684	684
Number of groups	114	-
F-test (Prob. F-test)	-	29.18(0.00)
Wald chi2 (Prob. > chi2)	989.02(0.00)	-

*Note: *,** and **** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The cohort consists of four digit district codes. Based on the LFS data from 1997-98 to 2007-08.*

Annex A- 4.10: Regressions Based on Household enterprise and farm ownership

	With Household Own Enterprises or Farm
Labour Market Conditions	
Household own farm	0.174(0.643)
Household own enterprise	-0.167(0.541)
Size of the informal sector	0.096(0.001) *
Size of the Agriculture sector	0.217(0.000) *
Size of the Exporting sector	0.152(0.008) *
District Unemployment	-0.245(0.000) *
Household Unemployment	0.121(0.010) *
Log of District wages	0.023(0.002) *
Child Characteristics	
Child Age	0.018(0.386)
Child if male	0.092(0.135)
Household Characteristics	
House headed by male	0.018(0.734)
Education of the male head	-0.006(0.079) ***
Education of the female head	-0.008(0.427)
Education of the Spouse	-0.009(0.012) *
Household Size	0.006(0.077) ***
Year Dummies	
Year 1999-00	-0.021(0.005) *
Year 2001-02	-0.013(0.087) ***
Year 2003-04	0.020(0.079) ***
Year 2005-06	0.029(0.006) *
Year 2007-08	0.009(0.357)
constant	-0.370(0.168)
R-Square: within	0.28
between	0.53
overall	0.43
Number of obs.	684
Number of groups	114
F-test (Prob. F-test)	8.44 (0.00)

Note: *,** and **** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The estimation technique employed is fixed model. The cohort consists of four digit district codes. Based on the LFS data from 1997-98 to 2007-08.

Annex A- 4.11: Testing endogeneity among the Variables

Dependent Variable: Child Labour	Xtivreg, fe
Labour Market Conditions	
Size of the informal sector	0.084(0.473)
Size of the Agriculture sector	0.215(0.04) **
Size of the Exporting sector	0.130(0.197)
District Unemployment	-0.572(0.152)
Household Unemployment	0.593(0.082) ***
Log of District wages	0.081(0.25)
Child Characteristics	
Child Age	-0.005(0.92)
Child if male	0.103(0.127)
Household Characteristics	
House headed by male	0.075(0.476)
Education of the male head	-0.006(0.676)
Education of the female head	-0.036(0.312)
Education of the Spouse	-0.009(0.582)
Household Size	-0.011(0.819)
Year Dummies!	
Year 1999-00	-0.021(0.552)
Year 2001-02	-0.009(0.652)
Year 2003-04	0.027(0.172)
Constant	-0.106(0.904)
R-Square: within	0.046
between	0.467
overall	0.399
Number of obs.	438
Number of groups	114
Wald chi2	1359.08 (0.00)

Note:! Year dummies for 2005-6 and 2007-8 drop due to collinearity problem. *, ** and *** represents significant effect at 1%, 5% and 10% respectively. #'s in parenthesis are p-values. The estimation technique employed is mentioned at the top row. The cohort consists of four digit district codes. Household size is instrumented by the gender of the first two while real wages, unemployment rate at household and district level is instrumented by the first lag of the variables. A Test of endogeneity is also done after running xtivreg. The test statistics rejects the presence of endogeneity among the variables. Hence in the main analysis all the variables are treated as exogenous. Based on the LFS data from 1997-98 to 2007-08.

Endogeneity Tests:

Davidson-MacKinnon test[42]: 0.666; F (5,320); P-value = 0.62

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[42]Davidson-MacKinnon exogeneity test (dmexogxt) computes a test of exogeneity for a panel regression estimated via instrumental variables, the null hypothesis for which states that an ordinary least squares estimator of the same equation would yield consistent estimates. A rejection of the null would have indicated that endogenous regressors' effects on the estimates are meaningful. Davidson and MacKinnon test is similar to the (Durbin-Wu) Hausman test. Here insignificant p-value except the null. It indicates that the effects of endogenous regressors are not meaningful.

Annex A- 4.12: Labour Market Conditions and Child Labour in the Urban Areas across Province

<div align="right">(Fixed effect Test)</div>

Dependent Variable: Child Labour	Punjab	Sindh	NWFP	Balochistan
Labour Market Conditions				
Size of the informal sector	0.189(0.00)*	-0.108(0.41)	0.223(0.01)*	-0.13(0.31)
Size of the Agriculture sector	0.1(0.07)***	-0.074(0.74)	0.140(0.22)	0.04(0.72)
Size of the Exporting sector	0.15(0.009)*	-0.033(0.82)	0.2(0.09)***	0.4(0.09)***
District Unemployment	0.034(0.696)	-0.5(0.10)***	-0.134(0.29)	0.14(0.524)
Household Unemployment	-0.012(0.85)	0.147(0.21)	0.196(0.13)	-0.19(0.296)
Log of District wages	0.006(0.52)	0.05(0.03)**	0.03(0.07)***	-0.08(0.07)***
Child Characteristics				
Child Age	0.019(0.43)	-0.13(0.111)	-0.047(0.45)	0.028(0.438)
Child if male	-0.001(0.98)	0.129(0.475)	0.18(0.08)***	0.151(0.169)
Household Characteristics				
House headed by male	0.055(0.583)	-1.1(0.06)***	0.061(0.57)	-0.076(0.88)
Education of the male head	-0.005(0.26)	-0.012(0.36)	0.003(0.64)	-0.01(0.06)***
Education of the female head	-0.001(0.91)	-0.116(0.38)	-0.005(0.85)	0.14(0.419)
Education of the Spouse	-0.005(0.37)	0.004(0.69)	0.001(0.93)	0.009(0.436)
Household Size	-0.008(0.13)	0.021(0.24)	0.006(0.51)	-0.003(0.484)
Year Dummies				
Year 1999-00	-0.001(0.87)	0.016(0.47)	-0.003(0.85)	0.009(0.64)
Year 2001-02	-0.009(0.16)	-0.0001(0.9)	-0.009(0.56)	0.006(0.77)
Year 2003-04	0.015(0.20)	0.09(0.02) **	-0.030(0.27)	0.044(0.04)**
Year 2005-06	0.05(0.002) *	-0.014(0.78)	0.048(0.16)	0.008(0.792)
Year 2007-08	-0.006(0.55)	0.038(0.23)	-0.035(0.19)	0.07(0.005) *
Constant	-0.29(0.37)	2.5(0.07) ***	0.201(0.77)	-0.108(0.87)
R-Square: within	0.64	0.78	0.48	0.60
Between	0.23	0.30	0.11	0.62
Overall	0.38	0.41	0.31	0.56
Number of obs.	96	36	48	42
Number of groups	16	6	8	7
F-test (Prob. F-test)	6.69(0.00)	9.75(0.00)	1.91(0.075)	1.93(0.092)

*Note: *,** and **** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The estimation technique employed is fixed model. The cohort consists of four digit district codes. Based on the LFS data from 1997-98 to 2007-08.*

Annex A- 4.13: Effect of Skilled and Unskilled Wages

(Fixed effect Test)

Dependent Variable: Child Labour	All Pakistan Level
Labour Market Conditions	
Size of the informal sector	0.069(0.015) **
Size of the Agriculture sector	0.223(0.000) *
Size of the Exporting sector	0.186(0.001) *
District Unemployment	-0.234(0.000) *
Household Unemployment	0.125(0.008) *
Log of Skilled Wages	0.014(0.393)
Log of Unskilled Wages	-0.004(0.784)
Child Characteristics	
Child Age	0.020(0.345)
Child if male	0.098(0.105) ***
Household Characteristics	
House headed by male	0.018(0.720)
Education of the male head	-0.004(0.189)
Education of the female head	-0.005(0.628)
Education of the Spouse	-0.009(0.016) **
Household Size	0.004(0.238)
Year Dummies	
Year 1999-00	-0.023(0.002) *
Year 2001-02	-0.015(0.062) ***
Year 2003-04	0.017(0.150)
Year 2005-06	0.025(0.022) **
Year 2007-08	0.010(0.347)
Constant	-0.360(0.179)
R-Square: within	0.28
Between	0.54
Overall	0.44
Number of obs.	677
Number of groups	114
F-test (Prob. F-test)	8.47 (0.00)

*Note: *,** and **** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The estimation technique employed is fixed model. The cohort consists of four digit district codes. Based on the LFS data from 1997-98 to 2007-08.*

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Annex A- 4.14: Exploring Non Linearity in Adult Real Wages

(Fixed effect Test)

Dependent Variable: Child Labour	All Pakistan
Labour Market Conditions	
Size of the informal sector	0.098(0.001) *
Size of the Agriculture sector	0.218(0.000) *
Size of the Exporting sector	0.144(0.011) *
District Unemployment	-0.249(0.000) *
Household Unemployment	0.123(0.009) *
Log of District wages	0.035(0.047) **
Square of the log of District Wages	-0.006(0.397)
Child Characteristics	
Child Age	0.019(0.379)
Child if male	0.092(0.136)
Household Characteristics	
House headed by male	0.013(0.796)
Education of the male head	-0.006(0.082) ***
Education of the female head	-0.008(0.403)
Education of the Spouse	-0.009(0.021) **
Household Size	0.006(0.078) ***
Year Dummies	
Year 1999-00	-0.021(0.005) *
Year 2001-02	-0.013(0.094) ***
Year 2003-04	0.021(0.073) ***
Year 2005-06	0.030(0.005) *
Year 2007-08	0.010(0.324)
Constant	-0.378(0.161)
R-Square: within	0.28
Between	0.53
Overall	0.43
Number of obs.	684
Number of groups	114
F-test (Prob. F-test)	8.66 (0.00)

*Note: *,** and **** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The estimation technique employed is fixed model. The cohort consists of four digit district codes. Based on the LFS data from 1997-98 to 2007-08.*

Annex A- 4.15: Exploring the effect of Household Adult Real Wages

(Fixed effect Test)

Dependent variable: Hours Worked/Child Labour (10-14)	Child Labour 10-14		
	All Pakistan	Urban	Rural
Labour Market Conditions			
Size of the informal sector	0.095(0.001) *	0.060(0.05) **	0.136(0.004) *
Size of the Agriculture sector	0.213(0.000) *	0.068(0.08) ***	0.241(0.000) *
Size of the Exporting sector	0.151(0.007) *	0.154(0.001) *	0.203(0.066) ***
District Unemployment	-0.242(0.000) *	-0.031(0.608)	-0.247(0.002) *
Household Unemployment	0.120(0.012) *	0.102(0.03) **	0.104(0.058) **
Log of District wages	0.022(0.002) *	0.009(0.16)	0.028(0.008) *
Log of Household Wages	-0.007(0.274)	-0.013(0.265)	-0.008(0.292)
Child Characteristics			
Child Age	0.021(0.323)	-0.007(0.766)	0.025(0.331)
Child if male	0.095(0.123)	0.068(0.141)	0.097(0.228)
Household Characteristics			
House headed by male	0.006(0.912)	-0.005(0.936)	-0.01(0.871)
Education of the male head	-0.005(0.119)	-3.E-04(0.916)	-0.008(0.124)
Education of the female head	-0.010(0.328)	-0.001(0.929)	-0.007(0.738)
Education of the Spouse	-0.010(0.01) *	-0.008(0.037) **	-0.013(0.09) ***
Household Size	0.006(0.089) ***	0.003(0.342)	0.006(0.215)
Year Dummies			
Year 1999-00	-0.023(0.003) *	-0.006(0.301)	-0.024(0.061) **
Year 2001-02	-0.016(0.05) **	-0.012(0.116)	-0.011(0.388)
Year 2003-04	0.025(0.045) **	0.019(0.106) ***	0.042(0.040) **
Year 2005-06	0.026(0.017) **	0.013(0.219)	0.041(0.017) **
Year 2007-08	0.010(0.304)	0.002(0.836)	0.025(0.131)
Constant	-0.376(0.159)	0.042(0.874)	-0.452(0.172)
R-Square: within	0.277	0.339	0.304
Between	0.525	0.099	0.606
Overall	0.426	0.183	0.455
Number of obs.	684	222	462
Number of groups	114	37	77
F-test (Prob. F-test)	9.04(0.00)	5.07(0.00)	7.04(0.00)

*Note: *,** and **** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The estimation technique employed is fixed model. The cohort consists of four digit district codes.*

(Fixed effect Test)

Dependent Variable: Child Labour	Without LM Indicators[!]	With LM Indicators
Labour Market Conditions		
Size of the informal sector	-	0.108(0.000) *
Size of the Agriculture sector	-	0.243(0.000) *
Size of the Exporting sector	-	0.181(0.001) *
District Unemployment	-	-0.271(0.000) *
Household Unemployment	-	0.137(0.005) *
Log of District wages	-	0.017(0.021) **
Year Dummies		
Year 1999-00	-0.032(0.000) *	-0.020(0.011)
Year 2001-02	-0.024(0.005) *	-0.009(0.226)
Year 2003-04	-0.014(0.078) **	-0.001(0.864)
Year 2005-06	0.003(0.733)	0.032(0.003) *
Year 2007-08	-0.005(0.552)	-0.005(0.511)
Constant	0.111(0.000) *	-0.082(0.001) *
R-Square: within	0.05	0.24
Between	0.00	0.54
Overall	0.02	0.43
Number of obs.	684	684
Number of groups	114	114
F-test (Prob. F-test)	6.77 (0.00)	10.17 (0.00)

Note: ! LM refers to Labour Market Indicators.*,** and *** represents significant at 1%, 5% and 10% significance level respectively. #'s in parenthesis are p-values. The estimation technique employed is fixed model. The cohort consists of four digit district codes. Based on the LFS data from 1997-98 to 2007-08.

Annex A- 4.17: Identification of Export Related Industries in Pakistan

As explained earlier, children are hard to find in large scale manufacturing sectors of Pakistan. Children mostly work in the informal sector/subsidiary sectors supplying raw material to the large scale manufacturing sector. Therefore analysing the effect of exporting sector in generating the demand for child labour is problematic. In order to overcome this difficulty, as a first step, it was decided that instead of identifying the exporting sector employing children, the size of the sector, measure in terms of adult employment share (it also help in avoiding the endogeneity problem as well), within a region (division/district/city) will be estimated. Secondly export related industries will be identified. This is because the Labour Force Survey of Pakistan although provides information about the employment status of individual by industry, but it does not provides information

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whether individuals are employed in exporting firms or not. This is not relevant as well, because children work in export related industries that are concerned with providing raw materials. Therefore any activity that could produce export related goods can be used to measure the size of the industry operating in an area. Thirdly major industries, where children are usually engaged, will be identified. Finally among those industries the major exporting industries will then be identified. Finally the size will be measured in terms of adult employed proportion in only those industries.

In order to identify the major activity children perform Pakistan National Survey of Child Labour Force (1996) was used. It indicate that during 1996-97 about 67 percent of the employed children were engaged in agricultural activity; 11% were employed in manufacturing sector; 9% employed in wholesale and retail trade sector while 8% were engaged in community, social and personal services. The detail industrial classification that emerges from the pseudo panel formed (from the year 1997-98 to 2007-08 – see Table A-4.4.6) further indicates that among the manufacturing sectors; textile, wearing apparel and leather industry employee 6% of the children; non-metallic mineral products industry engaged almost 1.2% children; wood and wood products industry employee 1.02% children; food, beverage and tobacco industry and Other Manufacturing Industries (includes, sports goods, surgical instrument, jewelry, handicrafts, musical instruments etc.) employee around 1% children. Among these only three industries identified as export related; textile, wearing apparel and leather industry (57% of total exports); food, beverage and tobacco industry (17% of total exports) and Other Manufacturing Industries (14.9% of total exports). Considering that these industries performing major export related activities and children employed among these industries are also high, the size of these industries was measure in terms of adult employment share. The estimated size was then used as a measure of the size of export related activity in an area affecting child labour demand.

Table A-4.17: Export Performance of Pakistan by Major Industries

Major Exporting Industry	% Share
Food Group	**17.2**
Rice	11.4
Fish & Fish Preparation	1.1
Fruits	1.3
Meat & Meat Preparation	0.5
All other Food Items	2.5
Textile Manufactures	**53.3**
Raw Cotton	1.2
Cotton Yarn	7.6
Cotton Cloth	9.2
Knitwear	9
Bed Wear	8.8
Towels	3.5
Readymade Garments	6.7
Made-up Articles	2.8
Other Textile Materials	4.5
Petroleum Group	**4.9**
Petroleum Products	2.9
Petroleum Top Naphtha	2
Other Manufactures	**18.8**
Carpets. Rugs & mats	0.7
Sports Goods	1.5
Leather Tanned	1.6
Leather Manufactures	2.3
Surgical G. & Medical Instrument	1.2
Chemicals & Pharmaceutical Production.	3.9
Engineering Goods	1.2
Jewellery	2.5
Cement	2.5
All other manufactures	1.3
All Other Items	**5.9**
Total Exports (Million $)	**15,884.1**

Source: Economic Survey of Pakistan 2009-10.

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'An understanding of the [intra-household] allocation of resources and responsibilities is essential to predict the consequences of policy decisions and the impact of development projects.' (Rogers, 1983 cited in Bolt and Bird, 2003)

5. The Influence of Mother's Decision making Power on her child's Labour and Schooling: Evidence from Pakistan

5.1 Introduction

The traditional approach of modelling household on the basis that its members' preference can be categorized by single utility function, has been challenged in recent years. Now the utility function of the household models incorporates divergence and even conflicting preferences among the family members. This chapter is an attempt to identify this intra- household relationship among its members and its effects on child welfare. This chapter is specifically designed to look at the effects of a mother's decision making power on her child's labour and schooling. This collective model of the household is explored by using the Living Standard Measurement Survey data (largest data set) of Pakistan (PSLM hereafter).

As the foundation is based on the collective household model approach, this chapter begins by providing a brief history about household models - beginning from the unitary model to co-operative collective model. Intra-household allocation is relevant in all parts of the world but particularly so in countries such as Pakistan. Amin (1995) and Hakim and Aziz (1998) have rejected the collective model approach for Pakistan. Because of the prevailing traditional and cultural norms that restrict women's position in the household and the male head considered as the household decision- maker, they argue that it is reasonable to assume that the unitary model dominates in Pakistan. But as in recent years Pakistan has experienced some changes in women's roles both within and outside household. Realizing the fact, Hou (2011) using the PSLM data of 2005 has rejected the existence of unitary model for Pakistan. Hou (2011) has examined the effect of women decision making power on the budget share, caloric intake and children's school enrollment. He found out that when women have more decision making power at home, household tends to spend more on women's preferred goods such as clothing, education, non-grain items and children's education particularly girls who are more likely to be enrolled in the school.

The evidence from around the world also suggests that when women have more decision- making power they spend more on food. For example; Hoddinott and Haddad (1995) found that women's income is positively related to food items while negatively related to alcohol and cigarettes. However, Lancaster et.al., (2006) working on an Indian data set found out that the budget share and women's decision making power is U-shape. Basu (2006), using a theoretical framework of intra-household model, predicts that if a woman has more decision- making power she will have access to a greater share of the income produced by child labour and thus may benefit from child labour. School enrollment might therefore decline as a result of increased child labour. Maitra and Ranjan (2006) found that, in South Africa, there is no clear evidence that the identity of income earners affects household expenditures; and Felkey (2005) suggests that, in Bulgaria, the relationship between women's bargaining power and household well-being is nonlinear and non-monotonic.

Hence, the objective of this chapter is not only to explore the effects of a mother's decision- making power on her child's schooling and labour decision, but also to confirm the non-linear and non-monotonic relation for Pakistan. More specifically this study will look for the answers of following questions: what are the principal determinants of power of mothers in making decisions or what is an appropriate way to measure decision- making power? How does this decision- making power of mothers in the household affects child welfare? Is this effect non-linear and non-monotonic as predicted by all recent literature? If the answer turns out to have significant effects then it would have considerable policy implications. Therefore, the paper tries to explore the answers of all these questions.

The rest of the chapter is sub-divided into following sections: section 5.2 provides the brief history of the household decision- making models, section 5.3 provides a review of literature on the effect of a mother's decision making power on child related outcome, section 5.4 provides detail on the data set employed, methodology used to measure the decision- making power and outlines the econometric specification, section 5.5 discusses the main findings while section 5.6 presents a conclusion.

5.2   Review of Household Decision making Models

There have been three major developments in the household base analysis after 1970 [Chen and Dunn, (1996) cited in Bolt and Birds, (2003)]. Firstly, models of the household based on sharing, altruism and co-operation, changes to models that include negotiation, bargaining and even conflict. Secondly there has been "a shift from the analysis of the household as a bounded unit towards a view which stresses its permeability" [Moore, (1994) cited in Bolt and Bird, (2003)]. Thirdly, there has been recognition of the enormous variability in household composition and structure both between and within societies as well as over time. Bolt and Bird (2003) have provided the extensive review of these household models. This section is substantially based on their review.

Bolt and Bird (2003) consider the household as an important but complex unit of analysis that can be defined in numerous ways. If the individuals share a common residence; or share a joint function such as consumption, production, investment or ownership, the family is considered as a nuclear family [Chen & Dunn, (1996)]. Another definition identifies the household as a place of exchange while Becker (1965) considers a household as a place where commodities are produced and utility is generated. The United Nations, defines a household as 'a group of people who live and eat together'. This definition is widely accepted all over the world with some variations. The household is mostly defined as a place where members share a common source of income and food, and sleep under the same roof. Federal Bureau of Statistics in Pakistan also defines a household as a group of persons living together and sharing income and food. These persons individually may vary in abilities and preferences.

Chen & Dunn, (1996) argued that instead of developing formal models of household behaviour traditional neo-classical economists have applied a unitary model approach to household decision-making. In the unitary approach the household is considered as a collection of individuals behaving like they are in an agreement on how to combine their time, goods purchased and goods produced at home to produce commodities that maximize common utility [Quisumbing & Maluccio, (2000)]. The unitary approach is also sometimes referred to as the benevolent dictator model. Benevolent dictator in the sense that some time a single (presumably male) decision-maker takes all the decisions

for the goods that entire household consumes. Kabeer (1994) criticized the unitary models by presenting it as a "black box" of household collectivity.

According to Quisumbing & Maluccio, (2000) the existence of a single household welfare function reflecting the preferences of all other members is an inoffensive assumption if all the members have common preferences. However, if individual members have different preferences, then these preferences must be taken into consideration. Therefore, instead of assuming unity within the household, one must consider the existence of multiple voices, gender interests, and an unequal distribution of resources within the households [Wolf, (1997)]. The alternative models that allow for preference difference among the members are Collective models. These assume that households allocate resources in such a way that the outcomes are Pareto optimal or Pareto efficient. Chiappori (1992) indicated that collective models have two common features: firstly, they allow different decision makers to have different preferences, and, secondly, they do not require a unique household welfare index. Thereby the index is dependent on the prices and incomes as well as "tastes". Doss (1996) considers the household as a site of conflict as well as co-operation.

Chart 5.1: Household Decision Making Models
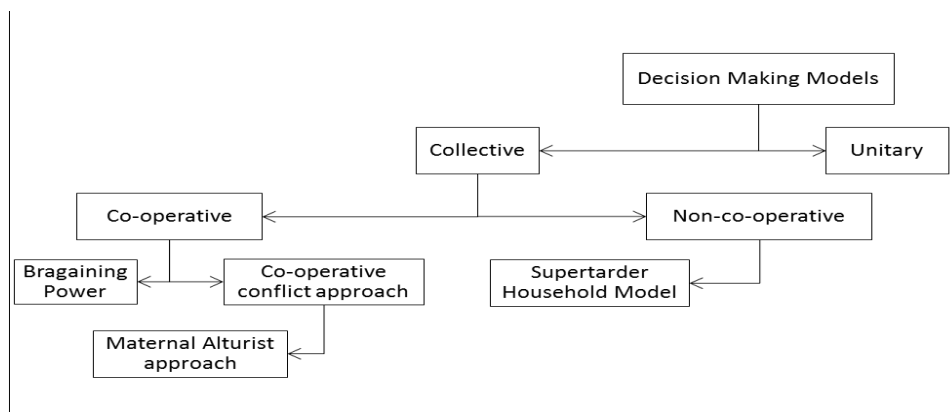
Source: Adopted from Bolt and Bird (2003).

Quisumbing & Maluccio, (2000) divides the collective model into two sub-groups; co-operative and non-cooperative. Co-operative model put emphasis on the decision making process. In this model individuals are assumed to have free choices, with utility as the basis of the decision. Within this category there are again two models. The first presents decisions as the outcome of a bargaining power. Bargaining power is a process with the help of which individuals push for their preferences, but compromising with

the 'fall-back' position if the agreement were not reached upon and break-up of the household and division of the household assets arise. Haddad (1994) analyses the situation as; once a household is formed, decisions within the household are therefore made on the basis of who would gain, and who would have the most to lose if the household broke up.

Co-operative conflict model claims that these differences in preferences are based on the perceived role and obligation within the family. These perceptions fundamentally lead to conflict resolution (Ellis, 1988). An example of this model is the Maternal Altruist approach which sees women as being often under more social pressure than men to subordinate their basic needs to those of other family members, resulting in displays of 'maternal altruism' [Bolt and Bird (2003)].

Non-co-operative models can be represented by Becker's Super-trader household model [Becker, (1981)]. In this model individuals never enter into binding and enforceable contracts with each other, and are not constrained by social norms. They 'trade' i.e. they bargain, barter and negotiate using implicit prices to determine resource allocation, with their actions conditional on the actions of others [Bolt and Bird (2003)]. With this review on the household decision making models, we now proceed to the review of literature that examines the effects of a mother's decision making power on the child related outcomes.

5.3   Mother's Decision Making Power and Child related outcomes - Review

The theoretical literature on child labour is usually based on the assumption that parents have common preferences and are altruistic. For example theoretical foundation of Baland and Robinson (2000); Bell and Gersbach (2000); Dessy (2000); Emerson and Souza (2003); Basu and Van (1998) are all based on unitary model. Empirical literature therefore have also explored child labour outcome on the basis of unitary model [see for example Emerson and Souza (2003); Ranjan R. (2000); Grootaert and Patrinos (1999) and Jensen and Nielsen (1997)]. The unitary model provides a good starting point to focus on the effects of poverty on child labour, but it does not take into account other potentially important factors [Emerson and Souza (2007)]. In order to understand what motivates parents to send their children to work, recent studies have started examining the effect of complex structure of the household (intrahousehold decision making

behaviour) on child related outcomes. This is implemented by exploiting the collective model approach.

For example, Basu (2006) extended the intrahousehold behaviour to child labour supply decision. Basu (2006) suggested that the impact of father's and mother's behaviour is very different on the child labour supply and that depends on their relative bargaining power. According to him the relation between a woman's bargaining power and the amount of child labour is U-shaped. He argues that a parent who has relatively more power in the house would be more attractive to child labour because of the extra income that child work brings. He/she can spend this extra income on the consumption of his/her favourite goods. His finding let him conclude that:

"The response of child labour to the changes in the balance of power may not be merely nonlinear but non-monotonic. Theory does not give any unequivocal prediction *of the nature of this relation. It just provides "conditional" propositions. This* underlines the importance of empirical work in this area. In order to design policies that control child labour by influencing the balance of power within the household, it is important to conduct empirical research to get a finer view of the broad and *conditional hypotheses that theory gives us"* [Basu (2006)].

Lancaster et.al (2006), working on an Indian data set provides some interesting facts about the share of male bargaining power and its effect on household expenditure on items like food, transport, child education etc. They rejected the concept that the identity of the income recipient is not relevant in determining the household expenditure outcomes. According to them there exists an inverted U-shaped relationship between bargaining power and household expenditure on goods that are necessary, i.e. Food and Fuel and Light, and a U-shaped relationship in case of the 'luxury' items, i.e. Transport and Education. They explain that when male bargaining power first increases to moderate values, preferences moves from the luxury goods to the necessary goods but a further increase would bring males in superior bargaining power over their wives and household preferences again shift from 'necessity' to 'luxury' goods.

They explain this relationship by arguing that both partners have preference for 'luxury' over 'necessities'. Therefore, at their extreme values of bargaining power, they move

the household preferences towards the luxury items that she/he likes to consume leading to a fall in the spending on necessary items. In the middle range of bargaining power both partners compromise in favour of necessary goods. Hence in the middle range of bargaining power the budget share of necessities tends to rise. Their results also point to the non-monotonic relationships between budget share of such items and bargaining power. As the bargaining power rises, the household's preferences initially switch from luxuries to necessities and then back to the former. Therefore, it is not the case that household where female partners dominate in decision-making, will direct its purchases towards items that are necessities. Instead in a household where power is more evenly spread between the spouses are more likely to experience such an outcome i.e. spending more on necessity and less on luxuries [Lancaster et.al, (2006)].

Felkey (2005) provides both theoretical and empirical support to the point that the effect of additional female power on household outcomes depend on initial level of bargaining power and it is not always positive. She demonstrates that the first order bargaining power term has a positive effect on children's education expenditures (consider as good) and the effect of the quadratic term is negative. This implies that the positive effect of bargaining power decreases as the power rises. In her analysis, Tobacco and alcohol consumption (consider as bad) is negatively affected by first order bargaining power term but positively affected by quadratic term. According to her the non-monotonic relationship between bargaining power and consumption of items that are considered as good provides evidence that it is due to bargaining rather than differing preferences between men and women. Over all her study has provided evidence of concavity and non-monotonicity in the relationship between female decision making power and the consumption of items that are good and this relationships according to her is the result of household bargaining power rather than preference differences between men and women.

Gitter and Barham (2008) are of the view that more female power generally leads to higher school enrolment and greater spending on education and is consistent with emerging literature, for households with extremely powerful women, more female power begins to reduce schooling or at least have no additional marginal impact. Furthermore, running the enrolment regressions separately for girls and boys their study reveals that the mother's relative education level always has a positive impact on boys'

education outcomes. The results for girls are consistent with non-linear relation as suggested by Basu (2006) i.e. whenever women's power passes a certain threshold, girls' enrolment falls. As explained earlier, Basu (2006) hypothesizes that parental power may influence the percentage of benefits received by each adult from child labour. This percentage may also depend on the child's gender. Gitter and Barham (2008) realized that the non-monotonic relation hold for the girls sample but not for the boys sample. They suggested that when girls leave school, the percentage of benefit received by female head of the household is larger than it is for boys. Therefore the relationship is non-monotonic in case of girls but not in case of boys.

Among the literature that does not consider the non-linearity; Galasso (1999) using data from Indonesia analyses the impact of the intra-household bargaining power on child labour. She finds that an increase in a mother's bargaining power is associated with a lower probability of child labour [Galasso (1999) cited in Reggio (2010)]. Emerson and Souza (2007) working on the Brazilian data conclude that the father's education has a greater negative impact than the mother's education on the labour status of sons. Reggio (2010) working on Mexican data concluded that one should carefully consider the distribution of bargaining power within the household while analysing household's decisions. Reggio found out that an increase in the mother's bargaining power is associated with fewer hours of work for her daughters but not for her sons [Reggio (2010)].

Literature on effect of gender differences on child related outcome (not explicitly addressing child labour) has shown that sons are often favoured in the intrahousehold allocation of nutrients [Behrman (1988) and Sen (1984)]. Sen (1990) has reported that males significantly out- number females in Asia and North Africa, while an opposite pattern is observable in North America and Europe. Thomas (1994) working on Brazil, Ghana and United State found out that children's health achievement is associated with educational attainment and non-labour income of parent of the same sex as the child is [Thomas (1994) cited in Emerson and Souza (2007)]. Thomas (1990) has shown that unearned income controlled by mothers has stronger impacts on family's health than income under fathers' control. Lundberg, Pollak, and Wales (1997) exploiting changes in the UK Child Benefit policy in 1977, that transferred resources from fathers to mothers conclude that a higher income held by the mother leads to an allocation of

household resources beneficial to the children. Rangel (2006) working on the data from Brazil, concluded that women's decision making power is positively related to the human capital formation of their children, especially for first-born girls. Analysing the impact of group-based participation in credit programs in rural Bangladesh Chowdhury et.al (2003) concluded that women's credit has statistically significant impact while credit provided to men has no impact on children's health.

5.4   Data and Methodology

In order to measure the decision making power of individual mothers within the household, literature often focuses on control over economic resources as proxy of power. For example, Lundberg, Pollak and Wales (1997) and Rubaclava and Thomas (1997) have used public provision of resources to women and exogenous policy changes affecting intrahousehold distribution to generalize the effect; Hoddinott and Haddad (1995) used the share of income earned by women; Thomas (1990) and Schultz (1990) used the unearned income share; Quisumbing (1994) used the inherited assets; Thomas, Frankenberg and Contreras (1997) used assets at the time of marriage; and Doss (1996) used current assets.

The choice of proper approach among other things also depends on availability of the data. Here, the data of Pakistan Social and Living Standards Measurement Survey (PSLM) 2007-08 is used to analyse the effect of mother's decision- making power on her child's labour and schooling. The limitation of the PSLM data set is that it does not specifically inquire about individual ownership of assets although it contains a detailed module on household ownership of the assets. Therefore, indicators based on control over resources cannot be used for this specific study. Nevertheless PSLM is a national level household survey having information on a range of social issues, such as education, health, immunization, women's decision making, pre/post natal care, and household consumption. A separate module in PSLM on women decision making status provides a good opportunity to investigate the effects of a mother's decision making power. But another setback in using this data set is that this module is based on a sub-sample of women who are married and are 15 to 49 years old[43]. Moreover, we are interested in knowing the effects of a mother's decision- making power on her child's

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[43] For measuring the decision making power it is also considered necessary to include only those mothers who have partner living in the house. The sample therefore does not consist of mothers who are divorced and widower.

labour and schooling and the most common definition of child labour used in the literature is economically active children aged between 10 to 14 years. We further restrict the sample to all those women who have children aged between 10 to 14 years. Hence this study is based on a subset of the PSLM data. The women's decision making module[44] has 5 questions related to employment, purchases of household food and clothing, taking medical treatment and recreation decision. Women were specifically asked about:

    i)   Who takes the decision whether you can seek or remain in employment?

    ii)   Who takes the decision about purchase of the following items:

        a. Food

        b. Clothing

        c. Medical Treatment

        d. Recreation and Travel

The answers to these questions were categorized as:

    i)   Women alone decide

    ii)   Both Women and Husband decide

    iii)   Husband or other members of the household Decide

A mother is considered to have decision making power on a particular issue if she jointly or by herself takes s the decision. Specifically 3 points are assigned to all the decisions that are taken by the mother herself while 2 points are assigned to all the activities in which joint decision takes place. This is because a mother is considered to have some degree of power if she jointly decides with her husband about certain decisions for example in issues such as getting into an employment and decision regarding recreation and travel. Such decisions cannot be taken by mother alone. 1 point is assigned to all the decisions taken solely by the husbands or the elders of the house. A composite score is thus constructed on the bases of all 5 decisions. A scale hence consists of score ranges from 1 to 3 in each decision category.

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[44]Although PSLM also includes questions regarding the women own education decision, use of birth control and decision about having more children. But as education decision is mostly taken by the parents of the mothers at a very early age, where one cannot influence the decision hence it is highly unlikely that this will affect the decision making power of her today while, the decision about birth control and having more children concern religious, social and cultural norms. Hence these factors are not considered relevant here.

After applying an appropriate scale to all categories, principal component analysis (PCA) is used to determine the weights that each decision category should carry. Applying PCA after making a scale from 1 to 3 for all the decisions is due to the fact that PCA is not applicable to the variables that are categorical. The literature often points out that creating dummy variables from categorical variables can solve the problem. But here to avoid creating a number of dummies, a scale ranges from 1 to 3 were assigned to all indicators. In this way we come up with a set of indicators that represent that, the higher the value the higher will be the decision making power. Each indicator differs in terms of the small and large decisions i.e. purchasing food is mainly done by women in Pakistan and in this category a woman has the highest decision-making power over rest of the members while travelling and going for recreation decisions are mostly done jointly by household or elders of the household, hence in such decisions women would have low decision- making power. Keeping the fact that all these indicators of decisions vary in terms of small and big decisions, PCA is applied to assign the weights across different indicators of decision making.

PCA is a famous statistical technique commonly used for data reduction process i.e. it reduces large number of variables of a data set to a set of smaller number of variables. For example, from a set of correlated variables to uncorrelated components often termed as indices. Each component is a linear weighted combination of initial variables that captures the common patterns. The strategy followed is very simple: we have 5 decisions and 3 categories about who takes the decision (mothers alone, jointly by both parents and by husband or other family members), that are all together used to determine mother's decision making power; their linear combination would then be written as:

$$MDM_1 = b_{11}X_1 + b_{12}X_2 + b_{13}X_3 + b_{14}X_4 + b_{15}X_5$$
$$MDM_2 = b_{21}X_1 + b_{22}X_2 + b_{23}X_3 + b_{24}X_4 + b_{25}X_5$$
$$MDM_3 = b_{31}X_1 + b_{32}X_2 + b_{33}X_3 + b_{34}X_4 + b_{35}X_5$$
$$MDM_4 = b_{41}X_1 + b_{42}X_2 + b_{43}X_3 + b_{44}X_4 + b_{45}X_5$$
$$MDM_5 = b_{51}X_1 + b_{52}X_2 + b_{53}X_3 + b_{54}X_4 + b_{55}X_5$$

Where X_k denotes who takes the decision in the kth category. In our case, $k = \{1, 2 \dots 5\}$ and $X \in \{1, 2, 3\}$. For example if only mothers takes the decision regarding her employment then X_1 will takes the value of 3. Otherwise X_1 will take the value of 2 if

the decision is jointly taken and it will take the value of 1 if husband and other family decide about her employment.

The eigenvectors of the co-relation matrix is used to determine weights for the principal component. The eigen values of the corresponding eigenvector is the variance σ for each principal component. The components are ordered such that the first principal component explains the largest variation in the data. This is subject to the constraint that the sum of the squared weights $(b_{11}^2 + b_{12}^2 + \cdots + b_{15}^2)$ is equal to one. The number of variables in the initial data set is equal to the sum of eigenvalues. The proportion of total variation in original data set is given by σ_i/n. The first and second components are uncorrelated and second component explains the additional variation which is less than what the first component has explained. The same way, each subsequent component is un-correlated with the previous one and captures additional variation in the data. Every additional component explains smaller variations as compared to the preceding one. The higher the degree of correlation among the variables the fewer will be the components extracted.

Hence, the first principal component is used to measure mother's decision making power. The first principal component explains about 64% of the variability in data. Hence consider as suitable to represent decision- making power of women. Annex A-5.2 provides the summary of index and detail about the first principal component, in the sample. As each decision category takes a value of 1, 2 or 3, depending on who is taking the decision hence, if a category moves from 1 to 2 (or 2 to 3) the index increases by the amount of its weight.

Furthermore, women share in household income[45] used by earlier studies, to capture mothers decision making power is not considered here because the female labour force participation rate is very low (roughly 20 percent) in Pakistan, hence using the earning share as a measure is not possible.

5.4.1 Issue of Endogeneity in Decision Making Index

Recent economic literature working on relative income share of females and the ratio of years of female to male schooling has predicted the presence of endogeneity in the two. For example Emerson and Souza (2007) argue that male and female may have different

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[45] See for example, Hoddinott and Haddad (1995)

preferences for the outcomes for their children. Their preference depends on many factors such as gender of the child. Hence allocation of resources within a household may be seen as the result of some kind of resolution of the preference differences. This resolution further depends on their relative bargaining power. This power again depends on many factors and hence considered as endogenous. For example, women who bring more income to households are most likely to have greater decision- making power. Roushdy and Namoro (2007) also argue that the extent to which male and female preferences affect the decision making process that in turn determines child welfare is itself endogenously determined. According to them male and female relative decision-making power depends on their individual and some common household or social characteristics that may again be determined within the model. Moreover, according to Basu (2006) the literature modelling the impact of intra-household balance of power on decision- making also tends to ignore the opposite relation i.e., the effect of household decisions on balance of power.

In short, in order to generalize the effect of a mother's decision making power on child labour and schooling, first presence of endogeneity is checked. After checking the endogeneity, mother's decision- making power is estimated and then the predicted values from the mother's decision making model are used to estimate the child labour and schooling function. More specifically after checking the endogeneity problem in the mother's decision making power for the two decisions, first mother's decision- making power is estimated as the linear function of the distribution factors (that affect the decision through bargaining power) and the factors that affect the decision directly (such as household size, gender of the head, living conditions and durable asset index). In the second stage the estimated values of decision making power are used to predict child labour and schooling.

The distribution factors are the variables that affect distribution of power within the household but have no direct effect on individual preferences. Following Reggio (2010) two variables are considered as affecting the distribution of power in the household (i) difference between husband and wife's ages; if the wife is younger than the husband she will have less power (ii) Difference between education attainment level between women and men; the higher the difference the lower will be the women's decision-making power. The model also includes the square terms of each distribution factor as

well. Reggio (2010) has also used sex ratio (proportion female vs male) as distribution factor. Following Reggio we have also included it as a factor influencing the distribution of power but as it does not pass the over- identification restriction it was dropped from the model.

The mother's decision- making power is computed under the framework of instrumental variable regression. The factors that influence decision- making power of mothers directly include household size, gender of household head, and ownership of agriculture land, household living standard, durable asset index and provincial dummies. The provincial variations are included because in Pakistan, in some areas due to development, women are now more empowered than the women who are living in remote areas such as rural areas of Balochistan (most deprived province of Pakistan).

$$MDM = \alpha + \beta_1 Z + \beta_2 X + \mu \qquad (5.2)$$

Where; MDM represents mother's decision making power, Z represents distributional factors while X are the factors that affect decision- making directly (such as household size, gender of the household head, living conditions, durable asset index, provincial dummies etc.).

5.4.2 Mother's Decision making Power as a Determinant of Child labour and schooling

In the second stage the decision with regards to child's schooling and labour supply is estimated. The estimated values of mother's decision- making power from the first stage regression are regressed on the child's schooling and labour decision after checking the endogeneity.

$$CL\_ST = \beta_0 + \beta_1 MDM + \beta_2 PEDU + \beta_3 CHLD + \beta_4 HEAD + \beta_5 HHD$$
$$+ \beta_6 PROV + \pi \qquad (5.3)$$

Where, MDM represents mother's decision making index, $PEDU$ represents sum of parents years of schooling, $CHLD$ represents child characteristics, $HEAD$ represents household head gender, HHD represents household characteristics and $PROV$ are provincial dummies. CL_ST here refers status of the children age 10-14 i.e. either in

school or economically active[46] (both in paid or unpaid work). Effect of the mother's decision- making power on the two decisions (i.e. in labour or in school) is estimated separately using the probit model. Probit model is applied as the dependent variables are binary in nature. Furthermore there could be a substantially different influence of the mother's decision making power on children that are working as unpaid family helpers or on those who are in paid employment. Out of the 849 economically active children sampled, 28% are found to be in paid employment. A child usually enters into paid employment when the household income level drops to support the subsistence level of living. In such case the mother's decision making power may not have significant influence. Keeping this in mind a separate analysis is performed on the basis of children in paid and unpaid employment. The dependent variables are again binary in nature; children work in paid employment equal 1 otherwise zero or children working as unpaid family worker equal 1 otherwise zero hence once again probit model is applied.

Among the independent variable, first child's own characteristics i.e. his/her age, gender and birth order is explored. The birth order here is measured in ascending order i.e. the first born is with the value of one. The main hypothesis is that the incidence of child labour is more common among the first born than the subsequent siblings. This is because of the fact that in the presence of income constraints, parents are unable to invest in older children but can invest in younger children with the aid of income earned by first born. Therefore, the higher the birth order, the lower will be the probability of child work and higher will be the probability of schooling. The literature basically suggests two types of effects. First as more children are born, to a household where resources are constrained, fewer resources will be available per child. Hence younger siblings will receive less education than the older siblings. Alternatively, older children may enter the labour market and contribute towards household income, and as household income stabilizes the young siblings would get a chance to go to schools as explained earlier. As the effect could be non-linear a squared term is also included in the model. For the age again we assume that the higher the age, the higher will be incidence of child labour and lower will be the probability of schooling. But the

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[46] The micro level analysis is again based on economically active children. This is because we are concerned with the effect of MDM on schooling and the labour, irrespective of how many hours a child is working. Furthermore only 1% children combine schooling and labour hence hours worked does not matter here.

relationship again could be non-linear. Therefore, the non-linearity is also explored as well.

Secondly, household characteristics include household size, household composition (proportion of male and female in different age groups), gender of the household head, household ownership of agriculture land[47] and indices of living standard and durable assets (see annexure A-5.1 for details about the computation). For household size this study acknowledges the presence of endogeneity in it. Therefore, before including it in the model the endogeneity was checked by using the probit model for endogenous variables. The instrument used is the gender of first two born. The Wald test of exogeneity (at the end of the table 5.11 to table 5.17) predicts the presence of endogeneity for both child schooling and labour decision in rural sample and in boys' sample for the child schooling only. Hence in these samples the endogeneity is controlled by applying the two stage instrumental variable approach while in the rest of the samples this variable enters as exogenous. The effect hypothesised is positive due to the fact that household prefers more children in order to earn more from children thus household usually have large size. Alternatively the larger the size the lower will be the probability for a child to work. In the presence of older sibling (age greater than 14) the younger sibling are less likely to work. As our sample is based on the children aged 10 to 14 only, the presence of older sibling in the house is possible; therefore, the effect of the household size on the children age 10 to 14 could be negative. The opposite would be true for the child schooling behaviour.

In order to capture the effect further, household composition is also included in the model. The household composition variable consists of nine variables showing the proportion of male and females in different age groups. The control group is the proportion of male age 15-65. Moreover, as the household composition variables along with household size and birth order may also be endogenous because of the fertility theory (i.e. household have large sizes or prefer to have higher number of children to earn more form each child) we estimated equation 5.3 variously by keeping and

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[47] Before entering agriculture land ownership variable into the model, a separate regression was run having ownership of household enterprise and land (see annex A-5.7) as explanatory variables. Household ownership of enterprise does not show significant effect on two decisions while ownership of agri-land shows significant effect on child schooling decision. Hence only ownership of agri-land was considered suitable as explanatory variable.

dropping these variables. Hence, for each decision two regressions are estimated, one without household size, birth order and household composition variable while the other by including all these variables. The two models hereafter represent one without controlling for fertility and demographic variables, the other with fertility and demographic variables.

Finally parents' characteristics; the model includes sum of father and mother's years of education and the decision- making power of mothers (the variable of interest). Parents' education is measured in terms of sum of number of completed years of schooling and it is hypothesised to have negative relationship with child labour while it has a positive relationship with child schooling. For mother's decision making power we again expect that its relationship with the child labour would be negative while its effect on schooling will be positive. But keeping in mind all recent studies we also expect that the relation could be non-linear and non-monotonic. Therefore a separate analysis is conducted by including square and quadratic terms to check whether the effect of additional power of mother's in the household is concave and non-monotonic for the items that are considered as good for the household (in this case child schooling) and convex and non-monotonic for the items that are consider as bad (in this case child labour). Consumption of items that are considered as good provides positive externalities to both parents. Hence decision- making power has positive effect on these goods. On the contrary, items that are considered as bad incur cost to both parents when consumed and hence have negative association. Children's education is classified as good that generates positive externalities under the reasonable assumption that both parents are concerned with the wellbeing of their children and benefit personally from the purchase of this item. While child labour is considered as a good that generates negative externalities to both parents under the same assumption that both parents are concerned about their child. But these two effects are for the linear term as far as the quadratic term is concerned as defined in Felkey (2005) and Basu (2006) study expect that a further improvement in the mother's relative decision- making power will again attract more child labour and will reduce the schooling of their children as she will be in superior position now and she could influence the decision to buy her own preferred items.

5.5   Results

This section will begin by providing some descriptive statistics. The first section is about the situation of children in labour and in school and second deals with the indicators used in making the index. It will also highlight the summary statistics and correlations among key variables. This section then proceeds to regression results. First the determinants of the decision making index will be discussed and then its effects on child labour supply and schooling will be explored.

5.5.1 Descriptive Analysis

a)   Child Characteristics

As explained earlier the analysis is based on the children aged 10 to 14. The sample consists of 11,209 children. Out of these 8% are economically active. The incidence of child labour in urban areas and for girls is 4% and 5% respectively while in rural areas and for boys the incidence rate is 10%. As far as provincial distribution is concerned, the incidence of child labour is highest for Sindh (10%), then Punjab (8%) while in NWFP and Balochistan provinces it is just over 5%.

Table 5.1: The incidence of Child labour by Region

Children in Labour Force	Region		
	Urban	Rural	Total
Not in LF	4,181 (96.07)	6,179 (90.11)	10,360 (92.43)
in LF	171 (3.93)	678 (9.89)	849 (7.57)
Total	**4,352**	**6,857**	**11,209**

Table 5.2: The incidence of Child labour by Gender

Children in Labour Force	Gender		
	Boys	Girls	Total
Not in LF	5,135 (90.36)	5,225 (94.55)	10,360 (92.43)
in LF	548 (9.64)	301 (5.45)	849 (7.57)
Total	5,683	5,526	11,209

Table 5.3: The incidence of Child labour by Province

Children in Labour Force	Provinces				
	Punjab	**Sindh**	**NWFP**	**Balochistan**	**Total**
Not in LF	3,983 (91.82)	2,296 (90.07)	2,180 (94.45)	1,901 (94.39)	10,360 (92.43)
in LF	355 (8.18)	253 (9.93)	128 (5.55)	113 (5.61)	849 (7.57)
Total	4,338	2,549	2,308	2,014	11,209

The sample includes almost 6% children who are economically active only, 68% are enrolled in school only and 1% combines both work and schooling. As the percentage of children combining work and school is very low we do not distinguish them from other children that are economically active. Table 5.4 shows that 24% of the sampled children neither work nor study. Such a high percentage of children neither in school nor working is not surprising, because of the low quality of schooling, children in remote areas of Pakistan often do not attend school. These children usually perform domestic responsibilities like taking care of younger sibling, fetching water, buying groceries etc. However, as these activities do not generate any income for the household these children are classified here as economically inactive.

Table 5.4: Status of children

Status of Children	# Children	Percentage
Children in LF only	708	6.32
Children in School only	7,648	68.23
Combining School and labour	141	1.26
Neither in school or in LF	2,712	24.19
Total Children	11,209	

b) Mother's Decision Making Indicators

The descriptive statistics (see table 5.5 for reference) on the distribution of mother's decision making power shows that for decisions about mother's paid employment, only 12% decide themselves, 21% claim that the decision is jointly taken while 68% respond that husbands or other members of the household takes the decision. Mothers have more say in purchases of food and clothing, but husband and other members still play major roles; about 40% and 34% mothers consult husbands or other members before the purchase of food and clothes respectively. Medical and recreation decisions are mostly

taken jointly by both (42% decisions for taking medical treatment and 41% decisions for travelling and recreation are done jointly). These two decisions also show high involvement of either husband only or husband with rest of the family member as well.

As explained in section 5.4 that, after applying a scale of 1 to 3 to all the indicators an overall index was constructed with weights determined using principal component analysis. Table 5.6 provides the descriptive statistics and the weights assigned to all the indicators used to construct the decision making index. The weights, in the last column, indicate the relative importance of each variable used in making the index.

Table 5.5: Decision Making Indicators and Mother's Power

Decision taking Paid Employment	Points	Frequency	Percent
Husband only or husband with other members decide	1	7808	68
Both husband and wife jointly decide	2	1394	21
Women herself decides	3	805	12
Decision about Purchasing food		Frequency	Percent
Husband only or husband with other members decide	1	4658	40
Both husband and wife jointly decide	2	1886	28
Women herself decides	3	2144	32
Decision about Purchasing clothing & footwear's		Frequency	Percent
Husband only or husband with other members decide	1	3963	34
Both husband and wife jointly decide	2	2240	33
Women herself decides	3	2226	33
Decision about medical Treatment		Frequency	Percent
Husband only or husband with other members decide	1	4947	43
Both husband and wife jointly decide	2	2839	42
Women herself decides	3	1048	15
Decision about Recreation and Travel		Frequency	Percent
Husband only or husband with other members decide	1	5513	48
Both husband and wife jointly decide	2	2814	41
Women herself decides	3	745	11
Total		6,797	100

Table 5.6 show high weights assigned to the following indicators: decisions regarding the purchasing of clothes and footwear's; taking medical treatment and travelling. Decisions regarding getting into paid employment have the lowest weight. In Pakistan decisions over women getting into paid employment are largely either taken jointly or by the husbands in consultation with elders of the house (these elders are mostly parents of the husband). Both husband and wife alone do not have much power if the parents are alive and living together in a joint family system especially in rural areas of Pakistan.

Table 5.6: Summary of Indicators used in Mother's Decision making Index

	Mean	Std. Deviation	Factor Score	Weights (F/SD)
Decision about Paid Employment	1.04	1.01	0.190	0.19
Decision about Purchasing food	1.74	1.07	0.246	0.23
Decision about Purchasing clothing & footwear's	1.83	1.03	0.258	0.25
Decision about medical Treatment	1.53	0.95	0.275	0.29
Decision about Recreation and Travel	1.41	0.93	0.269	0.29

c) Summary Statistics of Independent Variables

Table 5.7 provides descriptive statistics. It shows that the average score of the mother's decision making index is around 1. Average score point out that decisions are usually taken either by husbands or jointly by husband with other members. The sum of parents' years of schooling shows that parents are on an average primary pass (or have education less than middle). Birth order of the child on average is 4 while on average his/her age is 12. In Pakistan due to combined family system household size is usually high. An average family size in Pakistan is 9.

Table 5.7: Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Child In LF	0.08	0.26	0	1
Child in School	0.69	0.46	0	1
Mother Decision Making (MDM) Index	1.22	0.98	0	3
Sum of parents years of Schooling	6.66	7.56	0	38
Age of the child	11.86	1.45	10	14
Birth order of the child	3.54	1.63	1	10
Child if male	0.51	0.50	0	1
Household headed by Male	0.94	0.24	0	1
Log of Household Size	2.10	0.36	0.69	3.61
Proportion of Female age 0-5	0.06	0.08	0	0.57
Proportion of Female age 6-9	0.07	0.08	0	0.50
Proportion of Female age 10-14	0.13	0.11	0	0.50
Proportion of Female age 15-65	0.23	0.10	0.07	0.80
Proportion of Female age 65 or more	0.01	0.03	0	0.33
Proportion of Male age 0-5	0.06	0.08	0	0.57
Proportion of Male age 6-9	0.07	0.09	0	0.60
Proportion of Male age 10-14	0.13	0.11	0	0.75
Proportion of Male age 65 or more	0.01	0.03	0	0.33
Living Standard Index	-0.05	0.96	-1.46	2.37
Durable Asset Index	0.06	0.99	-2.51	2.10
Agricultural Land Ownership	0.09	0.29	0	1
Age Difference	5.42	4.55	-8	37
Education Difference	2.93	4.94	-16	17
First two born are of different gender	0.58	0.49	0	1

Distribution factors shows that on average mothers are 5 years younger than husbands and are less educated then the husbands. Living standard index which consists of indicators of housing conditions shows an average value of -0.5 while the durable asset index shows an average value less than 1.

As far as the correlations among the variables are concerned (table 5.8) the mother's decision- making power, years of parental education, agriculture land ownership and the indices measuring the living standard and durable assets have negative association with child labour while age and gender of the child shows positive associations. All the independent variables have opposite associations with the child's schooling except for the child being male. This implies that the child labour and schooling decisions are alternatives: as previously discussed, only 1% of children in Pakistan combine schooling and labour.

Table 5.8 shows very low correlation coefficients between mother's decision- making index and both child schooling and child labour (0.11 and -0.02 respectively). To explore the relationships further before going into the depth of the regression results simple t-tests were applied. We tested whether the mean mother's decision making index was the same among children in labour force and not in labour force; and among those in school and those out of school.

Table 5.8: Correlation Matrix

	Child Labour	Child In School	MDM Index	Parents Years of Education	Age of Child	Child if Male	Male head	Living Standard Index	Durable Assets Index	Agri-Land
Child Labour	1.00									
Child In School	-0.33	1.00								
MDM Index	-0.02	0.11	1.00							
Parents Years of Education	-0.17	0.34	0.13	1.00						
Age of Child	0.13	-0.11	0.03	0.00	1.00					
Child if Male	0.08	0.20	-0.01	0.004	-0.01	1.00				
Male Head	0.02	-0.06	-0.15	0.13	-0.01	0.02	1.00			
Living Standard Index	-0.13	0.25	0.16	0.43	0.02	-0.02	0.02	1.00		
Durable Assets Index	-0.18	0.35	0.18	0.43	0.04	-0.02	-0.06	0.55	1.00	
Agri-Land	-0.01	0.04	-0.04	0.06	-0.01	-.001	-0.04	-0.08	0.01	1.00

The t-test indicates that the observed difference in the mean mother's decision making power between children in labour force and not in labour force is significant with t-

value 2.27 and p-value of 0.02. Specifically mother's decision making index averages 0.1 point higher for children not in work than for children in work. There were also significant differences in the mean mother's decision- making power between children in school or not in school. A t-test indicates that the observed difference in the mean for the two groups is significant with a t-value of -11.78 and p-value of 0.00. The mother's decision making index is approximately 0.23 points lower for the group of children not in school than among the children in school. After confirming that there exist significant differences in mean value within the two groups of children, the study proceeds to the regression analysis.

Table 5.9: T-Test

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Confidence Interval]	
Not in LF	10360	1.22	0.01	0.98	1.20	1.24
In LF	849	1.14	0.03	0.95	1.08	1.21
Combined	11209	1.22	0.01	0.98	1.20	1.23
Difference		0.08	0.03		0.01	0.14
	Difference = mean(not in L) - mean(in LF)				t =	2.2679
Ho.: diff = 0	Satterthwaite's degrees of freedom				=	1001.72
Ha: diff < 0	Ha: diff != 0			Ha: diff > 0		
Pr. (T < t) = 0.9882	Pr. (|T| > |t|) = 0.0235			Pr. (T > t) = 0.0118		
Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Confidence Interval]	
Not in School	3420	1.06	0.02	0.90	1.03	1.09
In School	7789	1.28	0.01	1.01	1.26	1.31
Combined	11209	1.22	0.01	0.98	1.20	1.23
Difference		-0.23	0.02		-0.26	-0.19
	Difference = mean(not in L) - mean(in LF)				t =	-11.7813
Ho.: diff = 0	Satterthwaite's degrees of freedom				=	7291.83
Ha: diff < 0	Ha: diff != 0			Ha: diff > 0		
Pr. (T < t) = 0.0000	Pr. (|T| > |t|) = 0.0000			Pr. (T > t) = 1.0000		

5.5.2 Main Results

a) Determinants of Mother's decision making Power

Measuring mother's decision making power is a difficult task, not just in terms of finding suitable indicators to measure this power but also in terms of finding suitable instruments for these indicators. As explained earlier following Reggio (2010), we use two instrumental variables (IV); the difference between husband and wife's age and education. Reggio (2010) also points out that the effect of these factors could be nonlinear; we also include the squared terms of the two IVs as well. F-test and the over

identification test are first performed to confirm that the IV's used are valid instruments. The f-test shows that the instruments used are not weak (see annex A-5.10 part 'b' for more detail). All the instruments representing mother's decision making power also passed over identification test (see last two rows of tables 5.11 to 5.17) as well. Using probit models for the endogenous variables we then check the presence of endogeneity. The Wald test for exogeneity [chi2 = 2.99 and p-value = 0.22 with fertility and demographic controls; chi2 = 1.19 and p-value = 0.275 without fertility and demographic controls] does not reject exogeneity in the all Pakistan sample. However, in rural areas and for boy's schooling the Wald test rejects exogeneity. Therefore the mother's decision making index is entered in these samples after controlling for endogeneity.

Table 5.10 presents the first stage regression results for mother's decision- making power as dependent variable. Table 5.10 illustrates that both age difference and the education difference between husband and wife have significant effects on mother's decision making power. The square term of age is also significant while the square term of education difference is insignificant. In the urban sample, only education difference and the squared term of education difference is significant while in the rural areas all four instruments are significant. Looking at the estimated determinants of mother decision making index we find that, the gap between the education of the father and mother significantly reduces the mother's decision- making power. By contrast the sum of parental education increases the mother's decision- making index thus suggesting that education brings change in the society by affecting the cultural and social norms influencing mother's autonomy. Hence more educated partners may provide their wife greater autonomy. As far as age difference is concerned, generally wives are younger than husbands in Pakistan. It was expected that the wives would have less power when their husbands are older than them but the quadratic plot in figure 5.1 shows a non-monotonic relationship that is often contrary to this expectation. For age gaps upto 7.7 years, increasing the father's age above the mother's increases the mother's decision-making power. It is only where a father's age exceeds the mother's be nearly a decade or more, that further increasing the gap appears to reduce the mother's decision making power.

Aside from the IVs, some of other factors included in equation 5.3 also significantly influence mother's decision-making power. For example the proportion of children aged between 6-14, living standard and durable asset indices found to enhance the decision- making power of women while ownership of land, child's birth order and being in a male- headed house, all significantly reduces mother's decision- making power. The effects are more or less same for both rural and urban areas. As far as provincial variation is concerned, Punjab and Sindh province significantly enhance the mother's decision-making power while Balochistan significantly reduces it; this may reflect the influence of varying cultural norms.

Table 5.10: Determinant of Mother's Decision Making Power (OLS)

Dependent Variables	All Pakistan	Urban	Rural
Age Difference	0.01(0.1)***	-0.003(0.62)	0.01(0.02)**
Education Difference	-0.01(0.00)*	-0.01(0.02)**	-0.02(0.00)*
Square of the age difference	-0.0004(0.03)**	-0.0001(0.63)	-0.001(0.02)**
Square of the Education difference	-0.0001(0.78)	-0.001(0.05)**	0.001(0.03)**
First two born are of different gender	-0.03(0.05)**	-0.04(0.12)	-0.02(0.22)
Sum of Parent's Years of Education	0.01(0.00)*	0.01(0.00)*	0.01(0.00)*
Child Age	-0.02(0.87)	-0.07(0.72)	-0.003(0.98)
Square of Child Age	0.001(0.81)	0.003(0.65)	0.0003(0.96)
Birth Order of the child	-0.05(0.04)**	-0.08(0.04)**	-0.02(0.40)
Square of Birth Order	0.002(0.33)	0.003(0.42)	0.00(0.66)
Child if Male	-0.01(0.71)	0.02(0.52)	-0.02(0.40)
Household headed by Male	-0.43(0.00)*	-0.45(0.00)*	-0.42(0.00)*
Proportion of Female age 0-5	0.01(0.92)	0.14(0.56)	-0.04(0.79)
Proportion of Female age 6-9	0.36(0.01)*	0.59(0.01)*	0.26(0.14)
Proportion of Female age 10-14	0.52(0.00)*	0.59(0.00)*	0.52(0.00)*
Proportion of Female age 15-65	-0.10(0.33)	-0.27(0.09)***	0.03(0.82)
Proportion of Female age 65 or more	0.35(0.15)	0.35(0.39)	0.45(0.14)
Proportion of Male age 0-5	0.05(0.71)	0.26(0.28)	-0.06(0.74)
Proportion of Male age 6-9	0.49(0.00)*	0.50(0.02)**	0.51(0.00) *
Proportion of Male age 10-14	0.61(0.00)*	0.73(0.00)*	0.52(0.00)*
Proportion of Male age 65 or more	-0.13(0.62)	-0.39(0.36)	0.02(0.94)
Living standard Index	0.06(0.00)*	0.01(0.43)	0.09(0.00)*
Durable Asset Index	0.04(0.00)*	0.06(0.00)*	0.01(0.44)
Agricultural Land Ownership	-0.05(0.06)***	-0.09(0.11)	-0.02(0.45)
Provincial Dummies: Punjab	0.97(0.00)*	0.93(0.00)*	1.01(0.00)*
Sindh	0.47(0.00)*	0.45(0.00)*	0.48(0.00)*
Balochistan	-0.09(0.00)*	-0.19(0.00)*	-0.03(0.37)
constant	1.15(0.08)***	1.60(0.13)	0.94(0.25)
Number of Observation	11209	4352	6857
Adjusted R-square	0.28	0.28	0.28
F-statistics	168.71	98.28	64.26
Prob. F-test	0.00	0.00	0.00

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values.

Figure 5.1: MDM index and Age Difference
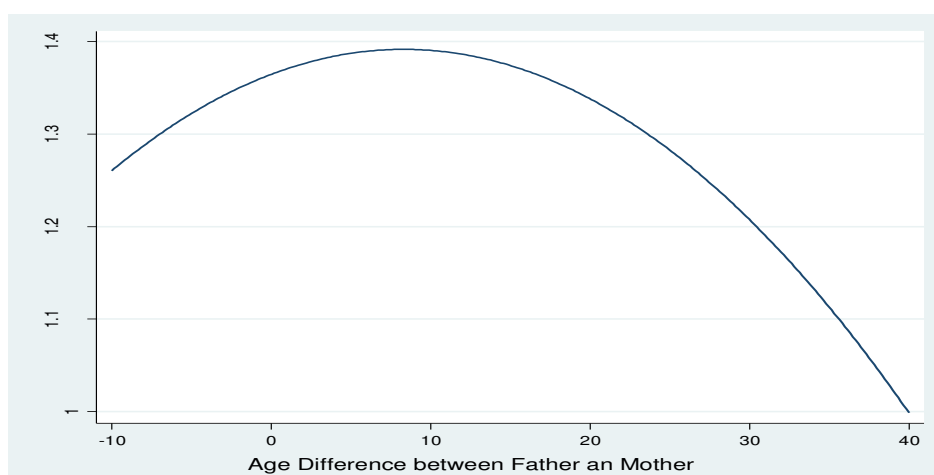
b) Effect on child Labour

Table 5.11 presents the detailed results about the effect of mother's decision-making power on her child's labour. The effect is highly significant and negative on child labour in the all Pakistan sample. A 10 percentage point increase in the decision-making power reduces the incidence of child labour by 0.05 percent points. The effect is same for with and without fertility and demographic controls. Comparing the results across regions it may be said that the effect of mother's decision making- power is significant only in rural sample. In the rural sample a 10 percentage point increase in the decision making power reduces child labour incidence by around 1.8 percentage points. Our findings are consistent with the proposition that mothers in Pakistan are more concerned about child welfare and hence the higher the decision making power of mothers, the lower will be the probability for a child to work. The results seem to be in line with the argument given by Felkey (2005) for the Bulgaria that the effect of mother's decision making power is negative for the goods (such as child labour) that generate negative externalities to the household. As far as parents' education is concerned, the sum of mother's and father's years of schooling appears to have a significant negative effect on the incidence of child labour. The negative effect shows that educated parents usually prefer that their children do not work suggesting that education does bring a change in society. An additional year of parental education reduces child labour incidence by 1 percentage point. Among the child characteristics, a higher birth order lowers the probability for a child to work but the effect is non-linear and significant only in urban sample.

Table 5.11: Probit model of Child Labour

(Estimated Coefficients)

Variables	Without Fertility and demographic Control			With Fertility and demographic Control		
	All Pakistan	Urban	Rural	All Pakistan	Urban	Rural
MDM Index	-0.05(0.02)**	0.03(0.5)	-1.1(0.05)**	-0.05(0.03)**	0.02(0.62)	-1.40(0.03)**
Sum of Parent's Years of Education	-0.06(0.00)*	-0.06(0.0)*	-0.06(0.0)*	-0.06(0.00)*	-0.06(0.00)*	-0.06(0.00)*
Child Age	-0.32(0.24)	0.01(0.99)	-0.34(0.30)	-0.33(0.23)	0.09(0.88)	-0.36(0.29)
Square of Child Age	0.02(0.06)***	0.01(0.66)	0.02(0.12)	0.02(0.06)***	0.01(0.7)	0.02(0.14)
Birth Order of the child				-0.09(0.15)	-0.2(0.04)**	0.02(0.83)
Square of Birth Order				0.02(0.01)*	0.03(0.02)**	0.01(0.31)
Child if Male	0.35(0.00)*	0.6(0.00)*	0.26(0.00)*	0.33(0.00)*	0.59(0.00)*	0.24(0.00)*
Household headed by Male	0.17(0.06)***	0.24(0.23)	-0.32(0.27)	0.24(0.01)*	0.31(0.14)	-0.26(0.39)
Log of Household Size				-0.10(0.19)	0.3(0.08)***	-0.71(0.24)
Proportion of Female age 0-5				0.55(0.10)***	1.17(0.11)	-0.03(0.83)
Proportion of Female age 6-9				0.51(0.14)	1.42(0.05)**	0.02(0.94)
Proportion of Female age 10-14				-0.05(0.88)	1.49(0.02)**	-0.42(0.53)
Proportion of Female age 15-65				0.60(0.03)**	0.69(0.20)	0.6(0.13)
Proportion of Female age 65 or more				-0.35(0.59)	0.63(0.65)	0.03(0.94)
Proportion of Male age 0-5				0.63(0.07)***	0.96(0.20)	0.18(0.82)
Proportion of Male age 6-9				0.20(0.57)	0.79(0.26)	0.001(0.9)
Proportion of Male age 10-14				0.07(0.83)	1.68(0.01)*	-0.37(0.6)
Proportion of Male age 65 or more				-0.65(0.34)	-0.94(0.55)	-0.41(0.66)
Living standard Index	-0.02(0.45)	-0.03(0.52)	0.13(0.07)**	-0.03(0.32)	-0.04(0.46)	0.10(0.18)
Durable Asset Index	-0.26(0.00)*	-0.24(0.0)*	-0.25(0.00)*	-0.24(0.00)*	-0.22(0.00)*	-0.16(0.03)**
Agricultural Land Ownership	0.01(0.94)	-0.13(0.57)	-0.02(0.84)	0.01(0.85)	-0.14(0.54)	-0.01(0.98)
Provincial Dummies: Punjab	0.41(0.00)*	0.42(0.0)*	1.46(0.01)*	0.42(0.00)*	0.47(0.00)*	1.70(0.0)*
Sindh	0.43(0.00)*	0.5(0.00)*	0.91(0.00)*	0.43(0.00)*	0.52(0.00)*	1.02(0.0)*
Balochistan	-0.08(0.25)	0.17(0.25)	-0.2(0.1)***	-0.07(0.31)	0.18(0.26)	-0.2(0.07)***
constant	-1.06(0.51)	-3.96(0.27)	0.42(0.83)	-1.05(0.52)	-5.62(0.12)	2.13(0.42)

Variables	Without Fertility and demographic Control			With Fertility and demographic Control		
	All Pakistan	Urban	Rural	All Pakistan	Urban	Rural
Number of Observation	11209	4352	6857	11209	4352	6857
Log Likelihood Ratio	-2519.30	-570.52	-1934.79	-2498.32	-561.22	-1915.87
LR-statistics	974.94	301.11	554.67	1016.9	319.71	592.52
Prob. LR-statistics	0.000	0.000	0.000	0.00	0.00	0.00
Pseudo R-square	0.16	0.21	0.13	0.169	0.22	0.13
Wald test of exogeneity: chi2	1.83	0.02	4.11	3.39	0.85	5.59
Prob. > chi2	0.18	0.90	0.04	0.18	0.65	0.06
Amemiya-Lee-Newey chi2 (OID-Test)	-	-	4.69	-	-	4.18
P-value (OID-Test)	-	-	0.20	-	-	0.24

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values. The endogeneity in the Decision making power and household size is checked using Wald tests of Exogeneity. As the test values are insignificant i.e. not predicting the endogeneity, both household size and decision making index considered exogenous.

Among the household characteristics, being in a household headed by a male shows positive association with the probability of child work at all Pakistan level. This result is consistent with the effect of mother's decision- making power and could be given the same interpretation. Children living in a male- headed household are estimated to be only 2 percent more likely than those living in a female headed household to work ceteris paribus.

The durable assets index has a significant and negative effect. A one point increase in the durable asset index decreases the predicted probability of a child working by around 2 percentage point. The log of household size has significant effect in urban sample only. As far as the provincial dummies are concerned only Sindh and Punjab province shows significant effects throughout while the effect of Balochistan province is significant only in rural areas. Residence in Sindh and Punjab provinces enhances the probability of children working. The effect of household composition shows that the presence of girls aged 6 to 14 and boys aged 10 to 14 significantly increases the probability of a child work. This shows that the higher the proportion of children either girls or boys, the higher will be the probability for a child to be engaged in work. Children as indicated mostly work as the unpaid family worker hence households prefer more children in order to fulfill the labour demand. The household composition variables also show the significant and positive effect of proportion of females age 15-65 on child labour incidence in all Pakistan and in rural areas only. Furthermore, our results do not show any variation in the two models i.e. model with and without fertility and demographic control variables (household composition variables). However, some of the control variable related to household composition like proportion of girls aged 6-14, boys aged 10-14 and females aged 15-65 shows significant effect. Therefore in the reminder of the section we keep the model with fertility and demographic controls as the main model. Overall study does predict the significant effect of mother's decision making power on her child's labour. The effect is negative as suggested by Felkey (2005) for Bulgaria and theoretically predicted by Basu (2006).

c) Effect on child Schooling

After analyzing the effect of mother's decision- making power on her child's labour, the study now explores its effect on her child's schooling. Table 5.12 shows that the effect is significant and positive in the model without control for household size and

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composition. A 10 percentage point increase in mother's decision- making power increases child schooling around 0.1 percentage point in all Pakistan sample. In urban areas a 10 percentage point increase in mother's decision- making power increases child schooling slightly by 0.1 percentage point while in the rural areas a 10 percentage point increase in mother's decision making power increases child schooling around 2.3 percentage points. The effect of mother's decision- making power is significant only in urban areas, once the fertility and demographic variables (see section 5.4.2 for more detail) are entered in the model. In urban areas after entering the fertility and demographic variables, a 10 percentage point increase in mother's decision making power increases child schooling slightly by 0.1 percentage point.

As far as other explanatory variables are concerned the sum of mother and father's years of schooling appears to have significant positive effect on the child's schooling. An additional year of parental education increases the child schooling about 2 percentage points in all Pakistan sample while it increases the probability of child schooling about 1 percentage point in urban sample and 3 percentage point in rural sample. Among the variables representing child's own characteristics, age shows significant nonlinear effect in all Pakistan and in rural sample. In all Pakistan level precisely a one year increase in the age increases the probability of child schooling around 17 percentage points but as said earlier the effect is nonlinear. The result holds for both with and without fertility and demographic control models. As far as birth order is concerned, the effect is significant and nonlinear in all Pakistan and in urban areas only. In all Pakistan and in urban areas the probability of child schooling first increases with the number of sibling in the house but after a certain threshold it decreases the probability of a child to be in school.

Household accumulation of durable assets shows significant positive effect on child schooling. Ownership of agriculture land is also found to have significant and positive effect. Both ownership of asset and agriculture land represent household economic condition. The better the condition the higher is the probability for a child to be in school. Provincial dummies are also significant but negative in all Pakistan and in rural sample only except for Punjab province. However, the effect of Sindh province is also significant in urban areas as well.

Table 5.12: Probit model of Child Schooling

(Estimated Coefficients)

Variables	Without Fertility and demographic Control			With Fertility and demographic Control		
	All Pakistan	Urban	Rural	All Pakistan	Urban	Rural
MDM Index	0.03(0.09)***	0.1(0.04)**	0.64(0.07)***	0.02(0.22)	0.05(0.09)***	0.7(0.11)
Sum of Parent's Years of Education	0.07(0.00)*	0.06(0.0)*	0.07(0.00)*	0.07(0.00)*	0.06(0.00)*	0.07(0.00)*
Child Age	0.53(0.01)*	0.35(0.30)	0.60(0.01)*	0.5(0.01)*	0.34(0.32)	0.60(0.01)*
Square of Child Age	-0.03(0.00)*	-0.02(0.12)	-0.03(0.00)*	-0.03(0.0)*	-0.02(0.12)	-0.03(0.00)*
Birth Order of the child				0.1(0.01)*	0.22(0.00)*	0.13(0.22)
Square of Birth Order				-0.01(0.0)*	-0.02(0.00)*	-0.01(0.15)
Child if Male	0.68(0.00)*	0.28(0.00)	0.88(0.00)*	0.75(0.00)*	0.38(0.00)*	0.95(0.00)*
Household headed by Male	-0.42(0.00)*	-0.3(0.01)*	-0.18(0.36)	-0.3(0.0)*	-0.20(0.1)***	-0.03(0.86)
Log of Household Size				-0.15(0.0)*	-0.25(0.00)*	-0.36(0.42)
Proportion of Female age 0-5				0.06(0.79)	-0.66(0.14)	0.20(0.64)
Proportion of Female age 6-9				-0.05(0.86)	-0.60(0.17)	-0.29(0.61)
Proportion of Female age 10-14				0.74(0.00)*	0.56(0.15)	0.23(0.67)
Proportion of Female age 15-65				1.09(0.00)*	0.76(0.02)**	1.17(0.00)*
Proportion of Female age 65 or more				1.45(0.00)*	1.76(0.05)**	1.2(0.06)***
Proportion of Male age 0-5				-0.01(0.98)	-0.65(0.14)	0.12(0.78)
Proportion of Male age 6-9				0.20(0.41)	-0.06(0.90)	-0.34(0.56)
Proportion of Male age 10-14				0.17(0.44)	-0.28(0.46)	-0.32(0.59)
Proportion of Male age 65 or more				0.9(0.05)**	-0.58(0.49)	1.87(0.00)*
Living standard Index	0.07(0.00)*	0.04(0.18)	-0.03(0.52)	0.06(0.00)*	0.03(0.29)	-0.05(0.30)
Durable Asset Index	0.32(0.00)*	0.29(0.0)*	0.32(0.00)*	0.32(0.00)*	0.29(0.00)*	0.34(0.00)*
Agricultural Land Ownership	0.13(0.01)*	0.3(0.02)**	0.13(0.03)**	0.14(0.01)*	0.34(0.01)*	0.1(0.04)**
Provincial Dummies: Punjab	-0.04(0.30)	-0.04(0.63)	-0.68(0.06)**	-0.07(0.11)	-0.06(0.47)	-0.8(0.05)**
Sindh	-0.43(0.00)*	-0.28(0.0)*	-0.80(0.00)*	-0.4(0.00)*	-0.29(0.00)*	-0.81(0.00)*
Balochistan	-0.28(0.00)*	-0.10(0.21)	-0.37(0.00)*	-0.3(0.0)*	-0.07(0.36)	-0.36(0.00)*
constant	-1.85(0.10)***	-0.62(0.76)	-3.06(0.04)**	-2.3(0.05)**	-0.53(0.80)	-2.94(0.13)

Variables	Without Fertility and demographic Control			With Fertility and demographic Control		
	All Pakistan	Urban	Rural	All Pakistan	Urban	Rural
Number of Observation	11209	4352	6857	11209	4352	6857
Log Likelihood Ratio	-5317.41	-1691.52	-3562.46	-5280.59	-1670.27	-3539.34
LR-statistics	3155.26	787.83	1990.17	3228.9	830.35	2036.41
Prob. LR-statistics	0.00	0.00	0.00	0.00	0.00	0.00
Pseudo R-square	0.23	0.19	0.22	0.23	0.20	0.22
Wald test of exogeneity: chi2	0.91	0.12	3.41	1.28	0.69	5.18
Prob. > chi2	0.34	0.73	0.06	0.52	0.71	0.08
Amemiya-Lee-Newey chi2 (OID-Test)	-	-	1.47	-	-	3.64
P-value (OID-Test)	-	-	0.20	-	-	0.30

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values. The endogeneity in the Decision making power and household size is control in all Pakistan and rural samples, where Wald tests of Exogeneity is significant i.e. predicting the endogeneity.

Furthermore, result also shows that children being in the male headed household are less likely to go to school. However the effect is insignificant in urban areas. Higher household size means lower will be the resources available for each child to be invested on his/her human capital formation. As far as household composition is concerned, proportion of girls' aged 10 -14 increases the probability of schooling at all Pakistan level only. Proportion of female age 15 or higher and male aged 65 or higher significantly increases child schooling. This could imply that the higher the number of adult in the house the higher will be the probability of adult to be at work then children.

Overall finding indicates that the effect of mother's decision- making power on child schooling is highly significant and positive. Therefore we conclude that our results are consistent with the main hypothesis that mothers are more concerned for the welfare of the children than male members of the household.

5.5.3 Extension in Results

a)   Disaggregating by paid and unpaid Employment

This section will explore the effect of mother's decision making power on her child's labour by considering two types of child's work i.e. paid work and unpaid work. This is because Reggio (2010) using Mexican data had empirically shown that the effect of mother's decision making power on her child's paid employment is statistically insignificant. In order to test the argument given in Reggio (2010) for Pakistan we group the children as: children in paid employment equal one otherwise zero and children in unpaid work equal one otherwise zero, as explained in section 5.4.2. We estimated the model by keeping all independent variables used in estimating equation 5.3. Table 5.13 presents the result.

Table 5.13 shows that the effect of mother's decision- making power is endogenous on her child's paid employment but exogenous on her child's unpaid employment. Results further indicate that the effect on both decisions, her child's paid and unpaid employment is negative and significant. A 10 percentage point increase in the mother's decision- making power reduces her child's unpaid work slightly by 0.1 percentage point while reduces her child's paid employment by around 0.7 percentage points. In summary, children either work for pay or as family worker, the decision making power of mother significantly reduce their labour. However the effect is more pronounced for

child's paid work. Nevertheless for Pakistan we conclude that mother's decision making power effect child's paid and unpaid employment significantly.

Table 5.13: Probit model by Paid and Unpaid Employment

		(Estimated Coefficients)
Variables	**Unpaid Child Labour**	**Paid Child Labour**
MDM Index	-0.09(0.00)*	-4.47(0.02)**
Sum of Parent's Years of Education	-0.05(0.00)*	-0.04(0.00)*
Child Age	-0.23(0.43)	-0.09(0.89)
Square of Child Age	0.01(0.23)	0.01(0.66)
Birth Order of the child	-0.04(0.53)	0.19(0.51)
Square of Birth Order	0.01(0.07)***	0.0001(0.99)
Child if Male	0.23(0.00)*	0.44(0.00)*
Household headed by Male	0.20(0.06)***	-1.48(0.08)***
Log of Household Size	-0.17(0.05)**	-2.2(0.08)***
Proportion of Female age 0-5	0.19(0.61)	-0.26(0.82)
Proportion of Female age 6-9	0.06(0.88)	0.18(0.90)
Proportion of Female age 10-14	-0.37(0.30)	0.32(0.82)
Proportion of Female age 15-65	0.30(0.34)	0.84(0.22)
Proportion of Female age 65 or more	-0.49(0.50)	2.6(0.15)
Proportion of Male age 0-5	0.21(0.59)	0.18(0.87)
Proportion of Male age 6-9	-0.09(0.82)	0.06(0.97)
Proportion of Male age 10-14	-0.36(0.31)	0.70(0.67)
Proportion of Male age 65 or more	-0.33(0.66)	-1.93(0.34)
Living standard Index	-0.16(0.00)*	0.44(0.00)*
Durable Asset Index	-0.23(0.00)*	0.20(0.19)
Agricultural Land Ownership	0.08(0.28)	-0.408(0.07)***
Provincial Dummies: Punjab	0.29(0.00)*	4.74(0.01)*
Sindh	0.37(0.00)*	2.29(0.01)*
Balochistan	-0.19(0.01)*	-0.26(0.32)
constant	-0.98(0.59)	4.9(0.41)
Number of Observation	11209	11209
Log Likelihood Ratio	-2007.61	-954.04
LR-statistics	739.51	381.13
Prob. LR-statistics	0.00	0.00
Pseudo R-square	0.156	0.167
Wald test of exogeneity: chi2	0.83	26.9
Prob. > chi2	0.66	0.00
Amemiya-Lee-Newey chi2 (OID-Test)	-	1.39
P-value (OID-Test)	-	0.71

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values. The endogeneity in the Decision making power and household size is checked using Wald tests of Exogeneity. As the test values are insignificant i.e. not predicting the endogeneity, both household size and decision making index considered exogenous.

b) Disaggregating by Child Gender

So far we have explored the effect of mother's decision- making power on her child's labour and schooling at all Pakistan level and in urban and rural areas. However this

effect may vary by gender. Gitter and Barham (2008) for Nicaragua find out that the mother relative education level to father had a positive impact on boy's education outcomes only. They also found that non-monotonic relation holds for girls but not for boys. Reggio (2010) working on Mexican data also observed that increase in mother's bargaining power is associated with fewer hours of work for her daughters but not for her sons. Keeping these in mind we also expect that the effect of mother's decision-making power may differ for boys and girls in Pakistan as well. Table 5.14 presents the result.

Table 5.14 shows that the effect of mother's decision- making power on her child's labour is significant only in girls sample providing the support to the argument given in Reggio (2010). However, the effect of mother's decision making power on her child's education is significant for both boys and girls sample. The effect is negative for labour while positive for schooling.

Furthermore, Gitter and Barham (2008) also found that the effect of mother's decision making power is non-monotonic for girls sample only. The Study also tries to explore the proposition by including quadratic and cubed terms in the model. Table 5.15 presents the result. The result shows that the effect may be non-monotonic for the labour decision only. The non-monotonic effect is far more evident for boy's labour decision than the girl's labour decision. This is because the linear term is insignificant for girl's labour decisions while squared and cubed terms are significant. Based on the results we conclude that the relationship between mother's decision- making power may be non-monotonic for the girl's labour decision while for the boy's labour decision the effect is non-monotonic.

Table 5.14: Probit model of child labour and schooling by Gender

(Estimated Coefficients)

Dependent Variables	Child Labour		Child Schooling	
	Boys	Girls	Boys	Girls
MDM Index	-0.03(0.37)	-0.09(0.01) *	0.92(0.03) **	0.07(0.00) *
Sum of Parent's Years of Education	-0.07(0.00) *	-0.04(0.00) *	0.06(0.00) *	0.07(0.00) *
Child Age	-0.53(0.14)	-0.01(0.99)	0.83(0.00) *	0.43(0.11)
Square of Child Age	0.03(0.03) **	0.005(0.78)	-0.04(0.00) *	-0.03(0.02) **
Birth Order of the child	-0.24(0.00) *	0.13(0.20)	-0.02(0.89)	0.18(0.00) *
Square of Birth Order	0.03(0.00) *	-0.01(0.54)	0.0001(0.99)	-0.02(0.00) *
Household headed by Male	0.47(0.00) *	-0.01(0.95)	-0.03(0.92)	-0.22(0.02) **
Log of Household Size	-0.12(0.22)	-0.08(0.52)	0.41(0.54)	-0.27(0.00) *
Proportion of Female age 0-5	0.8(0.08) ***	0.20(0.70)	0.9(0.08)***	-0.35(0.30)
Proportion of Female age 6-9	1.03(0.02) **	-0.26(0.65)	0.22(0.80)	-0.11(0.77)
Proportion of Female age 10-14	0.37(0.38)	-0.66(0.21)	0.52(0.36)	0.65(0.04) **
Proportion of Female age 15-65	0.84(0.02) **	0.23(0.61)	1.20(0.00) *	1.15(0.00) *
Proportion of Female age 65 or more	-1.0(0.27)	0.39(0.68)	1.84(0.01) *	0.89(0.16)
Proportion of Male age 0-5	1.06(0.02) **	0.06(0.92)	0.73(0.17)	-0.32(0.35)
Proportion of Male age 6-9	0.55(0.22)	-0.34(0.55)	0.50(0.57)	0.04(0.90)
Proportion of Male age 10-14	0.37(0.37)	-0.61(0.24)	0.39(0.76)	0.42(0.18)
Proportion of Male age 65 or more	-0.83(0.36)	-0.57(0.59)	0.86(0.35)	1.17(0.08) ***
Living standard Index	0.02(0.62)	-0.10(0.04) **	-0.08(0.08) ***	0.18(0.00) *
Durable Asset Index	-0.23(0.00) *	-0.26(0.00) *	0.22(0.00) *	0.37(0.00) *
Agricultural Land Ownership	0.05(0.59)	-0.01(0.90)	0.24(0.01) *	0.10(0.17)
Provincial Dummies: Punjab	0.39(0.00) *	0.48(0.00) *	-1.28(0.00) *	0.19(0.00) *
Sindh	0.41(0.00) *	0.46(0.00) *	-0.96(0.00) *	-0.35(0.00) *
Balochistan	0.09(0.29)	-0.47(0.00) *	-0.16(0.05) **	-0.37(0.00) *
constant	0.08(0.97)	-2.40(0.35)	-5.21(0.04) **	-1.54(0.34)

Dependent Variables	Child Labour		Child Schooling	
	Boys	Girls	Boys	Girls
Number of Observation	5683	5526	5683	5526
Log Likelihood Ratio	-1475.96	-985.76	-2462.02	-2674.83
LR-statistics	652.95	365.67	961.20	2088.14
Prob. LR-statistics	0.00	0.00	0.00	0.00
Pseudo R-square	0.18	0.16	0.16	0.28
Wald test of exogeneity: chi2	3.67	2.53	5.60	1.36
Prob. > chi2	0.16	0.28	0.06	0.51
Amemiya-Lee-Newey chi2	-	-	1.4	-
P-value (OID-Test)	-	-	0.71	-

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values. The endogeneity in the Decision making power and household size is checked using Wald tests of Exogeneity. As the test values are insignificant i.e. not predicting the endogeneity, both household size and decision making index considered exogenous.

Table 5.15: Exploring the Non-linearity and Non Monotonicity in MDM by Gender using Probit

Variables:	Child Labour		Child Schooling	
	Boys	Girls	Boys	Girls
Mother's DM Index	0.35(0.06) **	0.28(0.21)	0.92(0.21)	-0.18(0.22)
Square of Mother's DM Index	-0.37(0.02) **	-0.34(0.07) ***	0.22(0.70)	0.13(0.27)
Cube of Mother's DM Index	0.08(0.01) *	0.07(0.07) ***	-0.10(0.49)	-0.01(0.56)
Sum of Parent's Years of Education	-0.07(0.00) *	-0.04(0.00) *	0.06(0.00) *	0.07(0.00) *
Child Age	-0.54(0.13)	-0.004(0.99)	0.83(0.00) *	0.42(0.12)
Square of Child Age	0.03(0.03) **	0.005(0.78)	-0.04(0.00) *	-0.03(0.03) **
Birth Order of the child	-0.23(0.00) *	0.12(0.21)	0.003(0.98)	0.19(0.00) *
Square of Birth Order	0.03(0.00) *	-0.01(0.56)	-0.001(0.96)	-0.02(0.00) *
Household headed by Male	0.49(0.00) *	0.0002(1.00)	-0.08(0.79)	-0.2(0.06) ***
Log of Household Size	-0.11(0.26)	-0.08(0.55)	0.27(0.69)	-0.28(0.00) *
Proportion of Female age 0-5	0.72(0.10) ***	0.18(0.74)	0.95(0.09)***	-0.36(0.30)
Proportion of Female age 6-9	1.02(0.02) **	-0.26(0.65)	0.05(0.95)	-0.11(0.77)
Proportion of Female age 10-14	0.36(0.40)	-0.68(0.20)	0.44(0.44)	0.65(0.04) **
Proportion of Female age 15-65	0.83(0.02) **	0.21(0.63)	1.24(0.00) *	1.14(0.00) *
Proportion of Female age 65 or more	-1.02(0.26)	0.33(0.73)	1.94(0.01) *	0.88(0.17)
Proportion of Male age 0-5	1.03(0.02) **	0.05(0.93)	0.67(0.21)	-0.33(0.33)
Proportion of Male age 6-9	0.55(0.22)	-0.38(0.50)	0.33(0.71)	0.03(0.94)
Proportion of Male age 10-14	0.36(0.39)	-0.60(0.25)	0.16(0.90)	0.40(0.20)
Proportion of Male age 65 or more	-0.77(0.40)	-0.59(0.57)	0.96(0.29)	1.14(0.09)***
Living standard Index	0.02(0.55)	-0.10(0.04) **	-0.1(0.07)***	0.18(0.00) *
Durable Asset Index	-0.23(0.00) *	-0.26(0.00) *	0.22(0.00) *	0.37(0.00) *
Agricultural Land Ownership	0.05(0.61)	-0.02(0.84)	0.25(0.01) *	0.10(0.18)
Provincial Dummies: Punjab	0.39(0.00) *	0.49(0.00) *	-1.35(0.00) *	0.18(0.00) *
Sindh	0.40(0.00) *	0.45(0.00) *	-1.03(0.00) *	-0.33(0.00) *
Balochistan	0.07(0.41)	-0.48(0.00) *	-0.1 (0.10)***	-0.37(0.00) *
Constant	0.07(0.98)	-2.44(0.34)	-4.9(0.05) **	-1.45(0.37)

Variables:	Child Labour		Child Schooling	
	Boys	Girls	Boys	Girls
Number of Observation	5683	5526	5683	5526
Log Likelihood Ratio	-1472.88	-984.069	-2460.56	-2669.9
LR-statistics	659.11	369.05	964.12	2097.97
Prob. LR-statistics	0.00	0.00	0.000	0.00
Pseudo R-square	0.183	0.158	0.164	0.28

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values.

c) Economically In-Active Children and Mother's Decision Making Power

Table 5.4 of section 5.1 shows that almost 24% children in Pakistan are neither in school and nor working. There is vast literature available on exploring the characteristics and reasons behind such a high percentage of children being inactive in developing countries. Children could remain inactive either because of the high cost of schooling or low quality of schooling but Maitra et.al., (2006) have argued that household prefer children to remain inactive in order to meet the unexpected family labour demand. They consider 'idle children' as buffers to meet demand for family labour. Therefore in their model children remain inactive for a long period not because of the high cost of schooling but because they work only w-hen needed.

For Pakistan recently Khan et.al., (2011) have suggested that children are absent from school and not performing economic activity as well because they are involved in home-care activities. Children either playing a role of reserved worker or engaged in home care activities could be considered as economically inactive. Considering the points raised by Maitra et.al., (2006) we merged the two categories of children; children that are economically active and children nor in school or nor in labour. Again probit model was estimated using first just the linear term of mother's decision- making power and then by entering the quadratic and cubed term. Table 5.16 presents the result.

It is evident from the table that the effect of mother's decision- making power is insignificant in explaining the supply of child labour based on this broader definition. On the basis of the result, study concludes that the effect of mother's decision making power on her child's labour after combining economically active and inactive role is insignificant.

Table 5.16: Probit model for Economically Inactive Children

Variables	Economically Inactive Children	
Mother's DM Index	-0.02(0.22)	0.16(0.11)
Square of the Mother's DM Index	-	-0.11(0.21)
Cube of the Mother's DM Index	-	0.01(0.43)
Sum of Parent's Years of Education	-0.06(0.00) *	-0.06(0.00) *
Child Age	-0.69(0.00) *	-0.69(0.00) *
Square of Child Age	0.04(0.00) *	0.04(0.00) *
Birth Order of the child	-0.11(0.01) *	-0.11(0.01) *
Square of Birth Order	0.01(0.01) *	0.01(0.00) *
Household headed by Male	0.30(0.00) *	0.28(0.00) *
Log of Household Size	0.14(0.00) *	0.15(0.00) *
Proportion of Female age 0-5	-0.03(0.91)	-0.02(0.92)
Proportion of Female age 6-9	0.02(0.93)	0.03(0.92)
Proportion of Female age 10-14	0.67(0.00) *	0.67(0.00) *
Proportion of Female age 15-65	-0.85(0.00) *	-0.84(0.00) *
Proportion of Female age 65 or more	-1.25(0.01) *	-1.25(0.01) *
Proportion of Male age 0-5	0.07(0.76)	0.08(0.72)
Proportion of Male age 6-9	-0.18(0.45)	-0.17(0.47)
Proportion of Male age 10-14	-1.42(0.00) *	-1.41(0.00) *
Proportion of Male age 65 or more	-0.83(0.08) ***	-0.81(0.08) ***
Living standard Index	-0.07(0.00) *	-0.07(0.00) *
Durable Asset Index	-0.32(0.00) *	-0.32(0.00) *
Agricultural Land Ownership	-0.13(0.01) *	-0.13(0.01) *
Provincial Dummies: Punjab	0.04(0.32)	0.05(0.23)
Sindh	0.40(0.00) *	0.38(0.00) *
Balochistan	0.19(0.00) *	0.19(0.00) *
Constant	2.79(0.01) *	2.77(0.02) **
Number of Observation	11209	11209
Log Likelihood Ratio	-5539.02	-5534.87
LR-statistics	2935.82	2944.12
Prob. LR-statistics	0.00	0.00
Pseudo R-square	0.2095	0.21
Wald test of exogeneity: chi2	1.84	-
Prob. > chi2	0.398	-
Amemiya-Lee-Newey chi2 (OID-Test)	-	-
P-value (OID-Test)	-	-

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values.

d) An alternate Index of Mother's Decision Making Power

From table 5.11 and 5.12 it is evident that the effect of mother's decision making power on her child's labour decision is negative while for her child's schooling is positive. The result shows that the association between mother decision making power and the

goods that incur cost to household is negative while the relationship between mother's decision- making power and the goods that generates positive externalities is positive. These results although point out that mothers are concerned for the welfare of their children but to confirm further study also performed a simple sensitivity analysis. The sensitivity analysis was performed by changing the construction of mother's decision-making index. Instead of basing the index on the weights assign through PCA now we based the index on average scores earned by a mother in all five decisions. Recall that we have 5 decisions and for each decision there are three categories for who takes the decision. On the bases of who takes the decision, a score of 1 to 3 was assigned with three being the highest. It gives a total score of 15 that a mother can achieve. We then take the average score a woman can achieve and use it as an index of mother's decision-making power.

The two tables 5.17 and 5.18 explore the effect of mother's decision making index on her child's schooling and labour decision based on this new index. The same exercise is followed i.e. first the presence of endogeneity in the overall and in sub sample is confirmed and then the probit model for the two decisions is estimated. The results show exactly the same effects except that the effect is now insignificant in the urban areas for child schooling. The effect of mother's decision- making power was significant previously at 10% significance level for the child's schooling decision in urban areas. There is no further discrepancy in the results of the two indices; the result shows the same effect. Precisely the effect of mother's decision- making power is insignificant for her child's labour decision in urban areas while its effect is significant in rural areas as predicted before. As far as the effect on gender is concerned, the effect is highly significant for girls and boys schooling and girl's labour decisions only (as predicted earlier). Therefore we conclude that our results are robust.

Table 5.17: Effect of Average Scores on Child Labour Using Probit Model

Variables	All Pakistan	Urban	Rural	Boys	Girls
Mother's DM Index	-8.53(0.00)*	0.02(0.62)	-6.9(0.02)**	-0.03(0.37)	-0.09(0.01) *
Sum of Parent's Years of Education	-0.05(0.00)*	-0.06(0.00)*	-0.06(0.0)*	-0.07(0.00) *	-0.04(0.00) *
Child Age	-0.19(0.50)	0.09(0.88)	-0.27(0.40)	-0.53(0.14)	-0.01(0.99)
Square of Child Age	0.01(0.22)	0.01(0.76)	0.02(0.21)	0.03(0.03) **	0.005(0.78)
Birth Order of the child	0.10(0.42)	-0.23(0.04)**	0.16(0.32)	-0.24(0.00) *	0.13(0.20)
Square of Birth Order	0.01(0.19)	0.03(0.02)**	0.01(0.51)	0.03(0.00) *	-0.01(0.54)
Child if male	0.33(0.00)*	0.59(0.00)*	0.22(0.0)*	-	-
Household headed by Male	0.28(0.02)**	0.31(0.14)	0.44(0.01)*	0.47(0.00) *	-0.01(0.95)
Log of Household Size	-1.61(0.01)*	0.3(0.08)***	-1.6(0.05)**	-0.12(0.22)	-0.08(0.52)
Proportion of Female age 0-5	-0.23(0.65)	1.17(0.11)	-0.43(0.46)	0.8(0.08) ***	0.20(0.70)
Proportion of Female age 6-9	-0.11(0.86)	1.42(0.05)**	-0.49(0.54)	1.03(0.02) **	-0.26(0.65)
Proportion of Female age 10-14	-0.04(0.95)	1.49(0.02)**	-0.66(0.34)	0.37(0.38)	-0.66(0.21)
Proportion of Female age 15-65	-0.01(0.97)	0.69(0.20)	0.18(0.61)	0.84(0.02) **	0.23(0.61)
Proportion of Female age 65 or more	0.75(0.33)	0.63(0.65)	0.29(0.74)	-1.0(0.27)	0.39(0.68)
Proportion of Male age 0-5	-0.04(0.94)	0.96(0.20)	-0.15(0.80)	1.06(0.02) **	0.06(0.92)
Proportion of Male age 6-9	-0.20(0.76)	0.79(0.26)	-0.55(0.50)	0.55(0.22)	-0.34(0.55)
Proportion of Male age 10-14	0.33(0.61)	1.68(0.01)*	-0.42(0.58)	0.37(0.37)	-0.61(0.24)
Proportion of Male age 65 or more	-2.42(0.02)**	-0.94(0.55)	-2.1(0.05)**	-0.83(0.36)	-0.57(0.59)
Living standard Index	0.06(0.18)	-0.04(0.46)	0.03(0.61)	0.02(0.62)	-0.1(0.04) **
Durable Asset Index	-0.14(0.01)*	-0.22(0.00)*	-0.15(0.02)**	-0.23(0.00) *	-0.26(0.00) *
Agricultural Land Ownership	-0.11(0.20)	-0.14(0.54)	-0.04(0.66)	0.05(0.59)	-0.01(0.90)
Provincial Dummies: Punjab	2.26(0.00)*	0.47(0.00)*	1.85(0.00)*	0.39(0.00) *	0.48(0.00) *
Sindh	1.34(0.00)*	0.52(0.00)*	1.07(0.00)*	0.41(0.00) *	0.46(0.00) *
Balochistan	-0.12(0.09)***	0.18(0.26)	-0.14(0.12)	0.09(0.29)	-0.47(0.00) *
constant	4.41(0.09)***	-5.62(0.12)	4.33(0.14)	0.08(0.97)	-2.4(0.35)

Variables	All Pakistan	Urban	Rural	Boys	Girls
Number of Observation	11209	4352	6857	5683	5526
Log Likelihood Ratio	-2496.84	-561.22	-1916.06	-1475.96	-985.76
LR-statistics	1019.87	319.71	592.12	652.95	365.67
Prob. LR-statistics	0.00	0.00	0.00	0.00	0.00
Pseudo R-square	0.17	0.22	0.13	0.18	0.157
Wald test of exogeneity: chi2	7.94	1.64	5.25	3.87	0.20
Prob. > chi2	0.019	0.44	0.07	0.1443	0.903
Amemiya-Lee-Newey chi2 (OID)	1.99	-	3.6	-	-
P-value (OID-Test)	0.57	-	0.31	-	-

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values. The endogeneity in the Decision making power and household size is checked using Wald tests of Exogeneity. As the test value is insignificant the variables are considered as exogenous.

Table 5.18: Effect Average Scores on Child Schooling using Probit Model

Variables	All Pakistan	Urban	Rural	Boys	Girls
Mother's DM Index	0.02(0.22)	0.05(0.09)***	2.79(0.16)	3.47(0.04) **	0.07(0.00) *
Sum of Parent's Years of Education	0.07(0.00)*	0.06(0.00)*	0.07(0.00)*	0.06(0.00) *	0.07(0.00) *
Child Age	0.54(0.01)*	0.34(0.32)	0.6(0.02)**	0.75(0.01) *	0.43(0.11)
Square of Child Age	-0.03(0.00)*	-0.02(0.12)	-0.03(0.0)*	-0.04(0.00) *	-0.03(0.02) **
Birth Order of the child	0.12(0.01)*	0.22(0.00)*	0.08(0.50)	-0.07(0.64)	0.18(0.00) *
Square of Birth Order	-0.01(0.01)*	-0.02(0.00)*	-0.01(0.21)	0.002(0.83)	-0.02(0.00) *
Child if male	0.75(0.00)*	0.38(0.00)*	0.96(0.00)*	-	-
Household headed by Male	-0.30(0.00)*	-0.20(0.11)	-0.34(0.0)*	-0.40(0.02) **	-0.22(0.02) **
Log of Household Size	-0.15(0.00)*	-0.25(0.00)*	-0.06(0.91)	0.73(0.29)	-0.27(0.00) *
Proportion of Female age 0-5	0.06(0.79)	-0.66(0.14)	0.33(0.45)	1.07(0.06) ***	-0.35(0.30)
Proportion of Female age 6-9	-0.05(0.86)	-0.60(0.17)	-0.13(0.83)	0.40(0.64)	-0.11(0.77)
Proportion of Female age 10-14	0.74(0.00)*	0.56(0.15)	0.30(0.57)	0.53(0.35)	0.65(0.04) **
Proportion of Female age 15-65	1.09(0.00)*	0.76(0.02)**	1.34(0.00)*	1.31(0.00) *	1.15(0.00) *
Proportion of Female age 65 or more	1.45(0.00)*	1.76(0.05)**	1.2(0.07)***	1.83(0.01) *	0.89(0.16)
Proportion of Male age 0-5	-0.01(0.98)	-0.65(0.14)	0.22(0.61)	0.82(0.14)	-0.32(0.35)
Proportion of Male age 6-9	0.20(0.41)	-0.06(0.90)	-0.15(0.80)	0.65(0.46)	0.04(0.90)
Proportion of Male age 10-14	0.17(0.44)	-0.28(0.46)	-0.33(0.55)	0.50(0.70)	0.42(0.18)
Proportion of Male age 65 or more	0.92(0.05)**	-0.58(0.49)	2.58(0.00)*	1.60(0.14)	1.17(0.08) ***
Living standard Index	0.06(0.00)*	0.03(0.29)	-0.02(0.65)	-0.06(0.16)	0.18(0.00) *
Durable Asset Index	0.32(0.00)*	0.29(0.00)*	0.34(0.00)*	0.23(0.00) *	0.37(0.00) *
Agricultural Land Ownership	0.14(0.01)*	0.34(0.01)*	0.1(0.02)**	0.26(0.01) *	0.10(0.17)
Provincial Dummies: Punjab	-0.07(0.11)	-0.06(0.47)	-0.7(0.09)***	-1.18(0.00) *	0.19(0.00) *
Sindh	-0.42(0.00)*	-0.29(0.00)*	-0.8(0.00)*	-0.94(0.00) *	-0.35(0.00) *
Balochistan	-0.27(0.00)*	-0.07(0.36)	-0.4(0.00)*	-0.23(0.00) *	-0.37(0.00) *
constant	-2.3(0.05)**	-0.53(0.80)	-3.6(0.10)***	-5.69(0.03) **	-1.54(0.34)

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Variables	All Pakistan	Urban	Rural	Boys	Girls
Number of Observation	11209	4352	6857	5683	5526
Log Likelihood Ratio	-5280.58	-1670.26	-3539.77	-2462.196	-2674.83
LR-statistics	3228.90	830.35	2035.55	960.86	2088.14
Prob. LR-statistics	0.00	0.00	0.00	0.00	0.000
Pseudo R-square	0.23	0.20	0.22	0.16	0.281
Wald test of exogeneity: chi2	2.37	0.67	4.46	5.29	0.88
Prob. > chi2	0.306	0.71	0.107	0.071	0.6436
Amemiya-Lee-Newey chi2 (OID)	-	-	4.07	1.697	-
P-value (OID-Test)	-	-	0.25	0.6375	-

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values. The endogeneity in the Decision making power and household size is control in all Pakistan and rural samples, where Wald tests of Exogeneity is significant i.e. predicting the endogeneity.

e) Exploring the effect of Individual Component of Mother Decision Making Index

Although the decision-making index has similar effects whether using PCA or a simple average score, the individual effects of the components could be very different. To explore this, we model child labour and schooling using the individual components directly as regressors rather than aggregating them into an index. Table 5.19 presents the results. Table 5.19 also includes a variant of the model which drops the parental education variable. This is because sometimes researchers have used level of education as a proxy for decision-making power and the education itself could be highly correlated with child's labour and schooling decision. Our results show that the effects of the individual indicators of mother's decision-making are robust to whether or not parental education is controlled for.

Among the five indicators of mother's decision making power, three have significant effects on child labour while only two have a significant effect on child schooling. It will be recalled from the main results presented in table 5.12 that the aggregate mother's decision-making power index was insignificant in determining child schooling decision once fertility and demographic variables were controlled for. Of the three indicators that are significant in the child labour model, the mother's paid employment and her deciding food purchases appeared to reduce the incidence of child labour while her having decision-making power over purchases of clothes and footwear appeared to increase child labour. It is very interesting that when a woman has the power to decide whether she herself enters paid employment, the household tends to reduce the labour supply of her children. This echoes some of the arguments in the literature that female employment may improve child welfare due to maternal altruism. More generally, a woman's control of her own labour supply and of food purchases may indicate significant general bargaining power within the household and as such, the favourable effects on child labour are in line with expectations from the literature.

Table 5.19: Effect of Individual Component of Mother's Decision Making Index Using Probit Model

Variables	With Education		Without Education	
	Child Labour	Schooling	Child Labour	Schooling
Decision about Paid Employment	-0.04(0.08)***	-0.001(0.94)	-0.04(0.07)***	0.01(0.41)
Decision about Purchase of Food	-0.13(0.0)*	0.05(0.02)**	-0.14(0.00)*	0.06(0.00)*
Decision about Purchase of Clothes and Footwear	0.06(0.05)**	-0.04(0.10)***	0.07(0.02)*	-0.04(0.04)**
Decision About Medical Treatment	-0.04(0.40)	0.02(0.51)	-0.04(0.37)	0.02(0.55)
Decision about Recreation & Travel	0.07(0.11)	-0.01(0.82)	0.06(0.16)	0.00(0.99)
Sum of Parent's Years of Education	-0.06(0.00)*	0.07(0.00)*	-	-
Child Age	-0.32(0.24)	0.53(0.01)*	-0.32(0.23)	0.54(0.00)*
Square of Child Age	0.02(0.06)***	-0.03(0.00)*	0.02(0.06)***	-0.03(0.00)*
Birth Order of the child	-0.09(0.13)	0.10(0.01)*	-0.09(0.13)	0.09(0.03)**
Square of Birth Order	0.02(0.01)*	-0.01(0.01)*	0.02(0.01)*	-0.01(0.02)**
Child if male	0.33(0.00)*	0.75(0.00)*	0.32(0.00)*	0.72(0.00)*
Household headed by Male	0.28(0.00)*	-0.32(0.00)*	0.12(0.22)	-0.09(0.16)
Log of Household Size	-0.01(0.06)***	-0.01(0.00)*	-0.01(0.21)	-0.02(0.00)*
Proportion of Female age 0-5	0.55(0.10)***	0.11(0.65)	0.57(0.08)***	0.18(0.45)
Proportion of Female age 6-9	0.46(0.18)	0.02(0.93)	0.50(0.13)	0.12(0.63)
Proportion of Female age 10-14	-0.02(0.94)	0.76(0.00)*	-0.07(0.83)	0.85(0.00)*
Proportion of Female age 15-65	0.59(0.03)**	1.11(0.00)*	0.46(0.09)***	1.21(0.00)*
Proportion of Female age 65 or more	-0.43(0.51)	1.43(0.00)*	-0.58(0.37)	1.64(0.00)*
Proportion of Male age 0-5	0.68(0.05)**	0.02(0.93)	0.63(0.06)***	0.19(0.42)
Proportion of Male age 6-9	0.18(0.60)	0.27(0.27)	0.20(0.54)	0.34(0.15)
Proportion of Male age 10-14	0.13(0.67)	0.19(0.37)	0.13(0.66)	0.24(0.25)
Proportion of Male age 65 or more	-0.70(0.31)	0.93(0.05)**	-0.93(0.17)	1.33(0.00)*
Living standard Index	-0.03(0.26)	0.07(0.00)*	-0.10(0.00)*	0.15(0.00)*
Durable Asset Index	-0.25(0.00)*	0.33(0.00)*	-0.35(0.00)*	0.45(0.00)*
Agricultural Land Ownership	0.01(0.93)	0.14(0.01)*	-0.09(0.20)	0.25(0.00)*
Provincial Dummies: Punjab	0.46(0.00)*	-0.09(0.04)**	0.44(0.00)*	-0.07(0.10)***
Sindh	0.44(0.00)*	-0.45(0.00)*	0.36(0.00)*	-0.33(0.00)*

Variables	With Education		Without Education	
	Child Labour	Schooling	Child Labour	Schooling
Balochistan	-0.05(0.46)	-0.29(0.00)*	-0.07(0.33)	-0.26(0.00)*
Constant	-1.21(0.46)	-2.40(0.04)**	-1.27(0.43)	-2.40(0.03)**
Number of Observation	11209	11209	11209	11209
Log Likelihood Ratio	-2484.55	-5276.85	-2593.88	-5618.75
LR-statistics	1044.44	3236.36	825.78	2552.55
Prob. LR-statistics	0.00	0.00	0.00	0.00
Pseudo R-square	0.17	0.23	0.14	0.185

*Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values.*

The positive effect of mother's control over purchases of clothes and footwear can be explained using the Basu (2006) model. Basu posited that if mothers have power they would prefer to spend the extra income that her child will bring on the consumption of her own preferred good. Clothing can be taken as the best example of the good that women often prefer. Hence if women have decision making power to decide about the purchase of clothes and footwear, it may lead to an increase in the child labour incidence. Moreover, as child labour and schooling are substitutes (as only around 1% children combine work and schooling) the effects of the indicators have the opposite signs in the respective models for these outcomes. For example the effect of mother's power over the purchase of clothes and footwear is positive for child labour and negative for child schooling.

f) Exploring the Nonlinearity and Non-Monotonicity in Decision Making Power

Theoretical arguments given by Basu (2006) claim that if, the power is concentrated in the hand of one partner than the partner who has more power in the house would be more attracted to child labour. This is because of the extra income that child work brings. He/she can now spend this extra income generated through the use of child labour on the consumption of her favourite goods. If this argument is true then the effect of mother's decision making power would be non-linear and may also be non-monotonic. Felkey (2005), argued that if one does not assume that the relationship between mother's decision making power and child labour is linear, it is reasonable not to assume the relationship is quadratic either. The theoretical claims of Basu (2006) and empirical findings of Felkey (2005) for Bulgaria and Lancaster et.al (2006) for India have suggested looking for higher order effects. Exploring the higher order effects of mother's decision making power on her child's labour and schooling decisions may be informative. Keeping this in mind we entered the squared and the cubed terms in the model.

Table 5.20 shows that the relationship between mother's decision- making power and the child's labour decision is non-monotonic in the all Pakistan and in rural sample only. Table 5.20 does not clearly predicts the non-monotonicity in the mother's decision making index for child schooling. As the non-monotonic effect is evident only for child labour we further investigated the non-monotonic nature by plotting the predicted values of child labour against mother's decision making power (see figure 5.2 for

reference). Figure 5.2 shows that out of the total working children 53 percent belongs to mothers whom decision- making power is in the range of 0.65 to 2.6 while 38 percent children belongs to mothers having index value below 0.65. Regression analysis based on these two samples (below 0.65 and in range of 0.65 to 2.6) shows significant effect of mother's decision- making power on her child's work as well. However, on the region where mother's decision- making power exceeds value 2.6 the effect of mother's decision- making power on her child's work remains insignificant.

Figure 5.2: Non-Monotonic effect of MDM on her Child's Labour
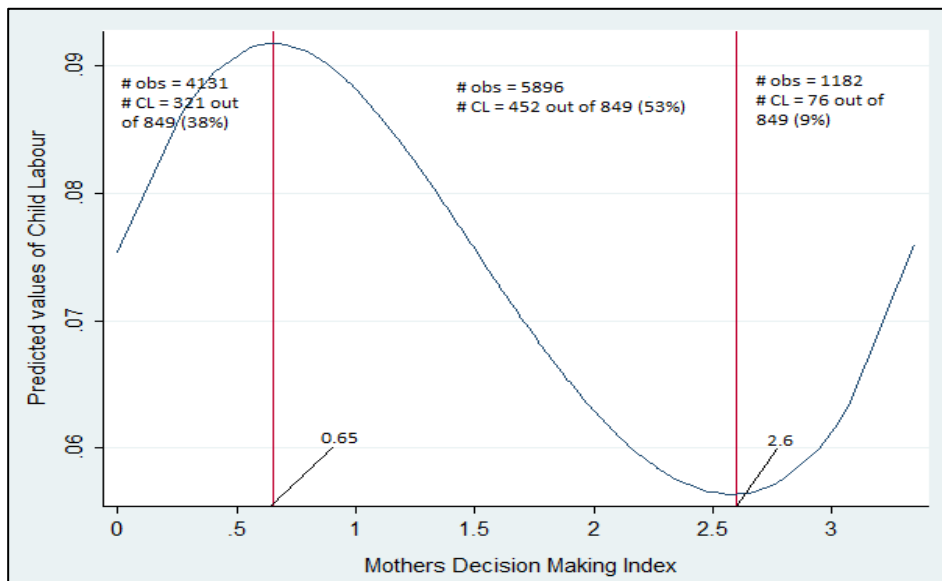
Overall we conclude that, we have tested the non-linear and non-monotonic effect of mother's decision- making power and found that the effect is linear on child schooling but could be non-linear and non-monotonic for child labour. Contrary to child schooling, the child labour model shows that the effect of mother's decision making power on her child's labour decision is non-monotonic in all Pakistan and rural sample only. This implies that the effect of mother's decision making- power would be very different at different stages of decision making process. As Basu (2006) has theoretically shown that at some starting point and at the point where mother and father equally share the power child labour incidence will be lower. The positive effect of mother's power on child's labour decision will only be realized at the point where she has gain more power than her husband. At this point she will be in a position to spend the income generated through child labour on her own preferred goods hence child labour will further increase (see section 2.2 part d for further argument).

Table 5.20: Non-Linearity & Non Monotonicity in MDM

(Estimated Coefficients)

Variables	Child Labour			Child Schooling		
	All Pakistan	Urban	Rural	All Pakistan	Urban	Rural
MDM Index	0.32(0.02)**	-0.05(0.85)	0.46(0.01)*	-0.15(0.13)	-0.29(0.11)	-0.68(0.5)
Square MDM Index	-0.36(0.00)*	-0.03(0.90)	-0.49(0.00)*	0.10(0.24)	0.3(0.09)***	0.90(0.27)
Cube of Mother's DM Index	0.08(0.00)*	0.02(0.69)	0.10(0.00)*	-0.01(0.47)	-0.05(0.13)	-0.18(0.39)
Sum of Parent's Years of Education	-0.06(0.00)*	-0.06(0.00)*	-0.06(0.00)*	0.07(0.00)*	0.06(000)*	0.07(0.0)*
Child Age	-0.33(0.22)	0.12(0.84)	-0.39(0.21)	0.54(0.01)*	0.34(0.32)	0.6(0.01)*
Square of Child Age	0.02(0.06)***	0.01(0.80)	0.02(0.07)	-0.03(0.00)*	-0.02(0.12)	-0.03(0.0)*
Child if male	-0.08(0.15)	-0.2(0.05)**	-0.05(0.47)	0.12(0.01)*	0.22(0.0)*	0.13(0.2)
Birth Order of the child	0.02(0.01)*	0.03(0.02)**	0.01(0.05)**	-0.01(0.01)*	-0.02(0.0)*	-0.01(0.13)
Square of Birth Order	0.34(0.00)*	0.60(0.00)*	0.27(0.00)*	0.75(0.00)*	0.4(0.00)*	0.95(0.0)*
Household headed by Male	0.26(0.01)*	0.35(0.1)***	0.24(0.03)**	-0.28(0.00)*	-0.19(0.14)	-0.02(0.9)
Log of Household Size	-0.09(0.23)	0.3(0.06)***	-0.2(0.02)**	-0.16(0.00)*	-0.26(0.0)*	-0.38(0.37)
Proportion of Female age 0-5	0.52(0.13)	1.16(0.12)	0.22(0.57)	0.06(0.79)	-0.65(0.14)	0.19(0.63)
Proportion of Female age 6-9	0.51(0.14)	1.4(0.05)**	0.20(0.62)	-0.05(0.85)	-0.58(0.19)	-0.27(0.63)
Proportion of Female age 10-14	-0.06(0.85)	1.5(0.02)**	-0.60(0.12)	0.73(0.00)*	0.55(0.15)	0.27(0.60)
Proportion of Female age 15-65	0.59(0.03)**	0.66(0.21)	0.49(0.14)	1.08(0.00)*	0.8(0.02)**	1.18(0.0)*
Proportion of Female age 65 or more	-0.39(0.55)	0.65(0.64)	-0.74(0.32)	1.45(0.00)*	1.8(0.04)**	1.2(0.05)**
Proportion of Male age 0-5	0.61(0.08)***	0.92(0.22)	0.45(0.25)	-0.02(0.94)	-0.64(0.15)	0.12(0.77)
Proportion of Male age 6-9	0.17(0.62)	0.82(0.25)	-0.10(0.81)	0.19(0.43)	-0.04(0.93)	-0.30(0.6)
Proportion of Male age 10-14	0.06(0.85)	1.69(0.01)*	-0.51(0.17)	0.16(0.47)	-0.29(0.44)	-0.28(0.61)
Proportion of Male age 65 or more	-0.63(0.35)	-0.91(0.56)	-0.65(0.40)	0.9(0.06)***	-0.62(0.46)	1.8(0.01)*
Living standard Index	-0.03(0.38)	-0.04(0.47)	0.01(0.77)	0.07(0.00)*	0.03(0.33)	-0.04(0.44)
Durable Asset Index	-0.24(0.00)*	-0.23(0.00)*	-0.23(0.00)*	0.32(0.00)*	0.29(0.0)*	0.35(0.0)*
Agricultural Land Ownership	0.01(0.90)	-0.15(0.52)	0.02(0.79)	0.14(0.01)*	0.3(0.01)*	0.1(0.04)**
Provincial Dummies: Punjab	0.43(0.00)*	0.46(0.00)*	0.45(0.00)*	-0.1(0.08)***	-0.07(0.34)	-0.7(0.06)***
Sindh	0.42(0.00)*	0.5(0.00)*	0.40(0.00)*	-0.41(0.00)*	-0.3(0.00)*	-0.7(0.00)*
Balochistan	-0.09(0.21)	0.16(0.29)	-0.2(0.06)***	-0.26(0.00)*	-0.07(0.36)	-0.4(0.00)*
constant	-1.07(0.51)	-5.80(0.11)	-0.09(0.96)	-2.24(0.05)**	-0.49(0.81)	-2.44(0.19)

Variables	Child Labour			Child Schooling		
	All Pakistan	Urban	Rural	All Pakistan	Urban	Rural
Number of Observation	11209	4352	6857	11209	4352	6857
Log Likelihood Ratio	-2493.44	-559.95	-1906.15	-5276.57	-1668.26	-3537.34
LR-statistics	1026.68	322.24	611.94	3236.93	834.35	2040.42
Prob. LR-statistics	0.00	0.00	0.00	0.00	0.00	0.00
Pseudo R-square	0.17	0.22	0.14	0.23	0.20	0.22

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values. The endogeneity in the Decision making power and household size is control in all Pakistan and rural samples for the schooling decision only, where Wald tests of Exogeneity is significant i.e. predicting the endogeneity. For the c*hild' labour decision both household size and mother's decision making index enters as exogenous.*

5.6   Conclusions

Household has remained an integral part of the cash transfer policies that aims to improve child welfare especially through improvement in education and health. Therefore, understanding the process by which households takes decisions regarding their child's labour and schooling is critical for the effective design of child labour and schooling policies. Recently studies have examined the effect of mother's decision making power on schooling decision (mainly the effect of bargaining power on household expenditures including education expenditures).

In Pakistan strict social and cultural norms imply that men are often considered to have dominating roles in decision- making while women are often perceived to have limited impacts on decisions. But this perceived role is now changing and researchers are turning to collective approaches to model the effect of women's decision- making power on child related outcomes. For example Hou (2011) had rejected the unitary model approach for Pakistan and found that the effect of women bargaining power on education expenditure is positive and significant. Our work can be considered in line with the study done by Hou (2011). Hou (2011) looks at the effect of women's power on the household expenditure pattern on food, lighting transport and education expenditure. But in this study we have explored explicitly its effect on child schooling and labour decisions.

Further to this, acknowledging the theoretical prediction of Basu (2006), this study has also examined whether effect of mother's decision making power on her child's schooling and labour decisions is non-monotonic. Using the Pakistan Standard of Living Measurement Survey Data for 2007-8 this chapter has provided evidence that the intrahousehold distribution of power does affects child schooling and labour. The chapter shows that the effect of any additional power given to mothers increases child schooling and decreases the incidence of child labour. However, this effect is non-monotonic in nature for child labour only. Therefore, the effect of mother's decision- making power may not always be positive or negative. There is a turning point, beyond which additional power gain by mothers may have a different effect on child labour. Here, in our case the turning point after which mother's decision making power has positive effect on her child's labour decision is 2.6. Our results

are consistent with the empirical evidence given by Lancaster et.al (2006) for India and Felkey (2005) for Bulgaria.

Annexures:

Annex A-5.1: Construction of Wealth Indices

In order to measure the economic and social status of the household two indices were developed (1) living standard index and (2) durable assets index. Each index itself compromises of number of indicators. The weights for the indicators were assigned using the Principal Component Analysis (PCA). Below tables provides the detail of Indices calculated using the PCA.

1. Living Standard Index:

a) Own Residential Building
b) Have Electricity Connection
c) Have Gas Connection
d) Have Access to piped water
e) Have Access to Covered drainage System

Descriptive Statistics	Mean	Std. Deviation	Factor Score	F/SD
Own Residential Building	.8724	.33370	-.210	-0.63
Have Electricity Connection	.8872	.31638	.235	0.74
Have Gas Connection	.3163	.46506	.403	0.87
Have Access to piped water	.3807	.48558	.330	0.68
Have Access to Cover drainage System	.2065	.40480	.369	0.91

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	1.974	39.479	39.479	1.974	39.479	39.479
2	.945	18.895	58.374			
3	.850	16.995	75.369			
4	.735	14.709	90.078			
5	.496	9.922	100.000			

2. Durable Assets Index:

Durable assets index consists of many household items, small and large. The table hereunder provides detail of these assets.

Descriptive Statistics	Mean	Std. Deviation	Factor Score	F/SD
Refrigerator	.3663	.48181	.249	0.52
Freezer	.0323	.17679	-.105	-0.59
Air conditioner	.0460	.20955	-.063	-0.30
Air cooler	.0846	.27826	-.006	-0.02
Fan (Ceiling, Table, Pedestal, Exhaust)	.8398	.36680	.291	0.79
Geyser (Gas, Electric)	.0698	.25474	-.040	-0.16
Washing machine/dryer	.4419	.49662	.248	0.50
Camera (Still)	.0239	.15280	-.026	-0.17
Camera (Movie)	.0057	.07553	.002	0.03
Cooking stove	.3575	.47929	.226	0.47
Cooking Range, Microwave oven	.0191	.13682	-.059	-0.43
Heater	.0879	.28311	.011	0.04
Bicycle	.2940	.45559	.059	0.13
Car / Vehicle	.0539	.22582	-.056	-0.25
Motorcycle/scooter	.1795	.38381	.053	0.14
TV	.5314	.49903	.303	0.61
VCR, VCP, Receiver, De-coder	.0188	.13591	.018	0.13
Radio / cassette player	.2345	.42372	-.113	-0.27
Compact disk player	.0447	.20660	.058	0.28
Vacuum cleaner	.0103	.10104	-.068	-0.67
Sewing/Knitting Machine	.5458	.49791	.132	0.27
Personal Computer	.0710	.25690	-.028	-0.11

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	4.950	22.498	22.498	4.950	22.498	22.498
2	2.139	9.721	32.219	2.139	9.721	32.219
3	1.242	5.644	37.863	1.242	5.644	37.863
4	1.107	5.031	42.894	1.107	5.031	42.894
5	1.028	4.671	47.565	1.028	4.671	47.565
6	.983	4.468	52.033			
7	.913	4.151	56.183			
8	.883	4.012	60.195			
9	.825	3.752	63.947			
10	.809	3.678	67.624			
11	.749	3.403	71.027			
12	.731	3.323	74.350			
13	.706	3.207	77.558			
14	.673	3.061	80.619			
15	.635	2.886	83.505			
16	.623	2.830	86.335			
17	.613	2.785	89.120			
18	.586	2.662	91.782			
19	.503	2.284	94.066			
20	.483	2.195	96.262			
21	.444	2.019	98.281			
22	.378	1.719	100.000			

Annex A-5.2: Construction of Mother's Decision Making Index

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	3.212	64.241	64.241	3.212	64.241	64.241
2	.712	14.244	78.484			
3	.608	12.155	90.639			
4	.328	6.551	97.190			
5	.140	2.810	100.000			

Annex A- 5.3: T-Tests (Assuming unequal variance)

All Pakistan

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Confidence Interval]	
Not in LF	10360	1.22	0.01	0.98	1.20	1.24
In LF	849	1.14	0.03	0.95	1.08	1.21
Combined	11209	1.22	0.01	0.98	1.20	1.23
Difference		0.08	0.03		0.01	0.14
	Difference = mean(not in L) - mean(in LF)			t =		2.2679
Ho.: diff = 0	Satterthwaite's degrees of freedom			=		1001.72
Ha: diff < 0	Ha: diff != 0			Ha: diff > 0		
Pr. (T < t) = 0.9882	Pr. (|T| > |t|) = 0.0235			Pr. (T > t) = 0.0118		
Group	**Obs.**	**Mean**	**Std. Err.**	**Std. Dev.**	**[95% Confidence Interval]**	
Not in School	3420	1.06	0.02	0.90	1.03	1.09
In School	7789	1.28	0.01	1.01	1.26	1.31
Combined	11209	1.22	0.01	0.98	1.20	1.23
Difference		-0.23	0.02		-0.26	-0.19
	Difference = mean(not in L) - mean(in LF)			t =		-11.7813
Ho.: diff = 0	Satterthwaite's degrees of freedom			=		7291.83
Ha: diff < 0	Ha: diff != 0			Ha: diff > 0		
Pr. (T < t) = 0.0000	Pr. (|T| > |t|) = 0.0000			Pr. (T > t) = 1.0000		

Urban

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Confidence Interval]	
Not in LF	4181	1.37	0.02	0.99	1.34	1.40
In LF	171	1.41	0.08	1.05	1.25	1.57
Combined	4352	1.37	0.02	1.00	1.34	1.40
Difference		-0.04	0.08		-0.21	0.12
	Difference = mean(not in L) - mean(in LF)				t =	-0.5460
Ho.: diff = 0	Satterthwaite's degrees of freedom				=	182.639
Ha: diff < 0	Ha: diff != 0			Ha: diff > 0		
Pr. (T < t) = 0.2929	Pr. (|T| > |t|) = 0.5857			Pr. (T > t) = 0.7071		
Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Confidence Interval]	
Not in School	806	1.18	0.03	0.93	1.11	1.24
In School	3546	1.41	0.02	1.01	1.38	1.44
Combined	4352	1.37	0.02	1.00	1.34	1.40
Difference		-0.23	0.04		-0.31	-0.16
	Difference = mean(not in L) - mean(in LF)				t =	-6.2864
Ho.: diff = 0	Satterthwaite's degrees of freedom				=	1264.88
Ha: diff < 0	Ha: diff != 0			Ha: diff > 0		
Pr. (T < t) = 0.0000	Pr. (|T| > |t|) = 0.0000			Pr. (T > t) = 1.0000		

Rural

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Confidence Interval]	
Not in LF	6179	1.12	0.01	0.97	1.10	1.15
In LF	678	1.08	0.04	0.92	1.01	1.15
Combined	6857	1.12	0.01	0.96	1.10	1.14
Difference		0.05	0.04		-0.03	0.12
	Difference = mean(not in L) - mean(in LF)				t =	1.2472
Ho.: diff = 0	Satterthwaite's degrees of freedom				=	850.428
Ha: diff < 0	Ha: diff != 0			Ha: diff > 0		
Pr. (T < t) = 0.8937	Pr. (|T| > |t|) = 0.2127			Pr. (T > t) = 0.1063		
Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Confidence Interval]	
Not in School	2614	1.02	0.02	0.88	0.99	1.06
In School	4243	1.18	0.02	1.00	1.15	1.21
Combined	6857	1.12	0.01	0.96	1.10	1.14
Difference		-0.16	0.02		-0.20	-0.11
	Difference = mean(not in L) - mean(in LF)				t =	-6.7548
Ho.: diff = 0	Satterthwaite's degrees of freedom				=	6056.61
Ha: diff < 0	Ha: diff != 0			Ha: diff > 0		
Pr. (T < t) = 0.0000	Pr. (|T| > |t|) = 0.0000			Pr. (T > t) = 1.0000		

Boys

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Confidence Interval]	
Not in LF	5135	1.22	0.01	0.98	1.19	1.25
In LF	548	1.12	0.04	0.96	1.04	1.21
Combined	5683	1.21	0.01	0.98	1.18	1.24
Difference		0.09	0.04		0.01	0.18
	Difference = mean(not in L) - mean(in LF)				t =	2.1722
Ho.: diff = 0	Satterthwaite's degrees of freedom				=	675.246
Ha: diff < 0	Ha: diff != 0			Ha: diff > 0		
Pr. (T < t) = 0.9849	Pr. (|T| > |t|) = 0.0302			Pr. (T > t) = 0.0151		
Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Confidence Interval]	
Not in School	1210	1.15	0.03	0.94	1.09	1.20
In School	4473	1.23	0.01	0.99	1.20	1.26
Combined	5683	1.21	0.01	0.98	1.18	1.24
Difference		-0.08	0.03		-0.14	-0.02
	Difference = mean(not in L) - mean(in LF)				t =	-2.6614
Ho.: diff = 0	Satterthwaite's degrees of freedom				=	2001.38
Ha: diff < 0	Ha: diff != 0			Ha: diff > 0		
Pr. (T < t) = 0.0039	Pr. (|T| > |t|) = 0.0078			Pr. (T > t) = 0.9961		

Girls

Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Confidence Interval]	
Not in LF	5225	1.22	0.01	0.99	1.20	1.25
In LF	301	1.18	0.05	0.94	1.07	1.28
Combined	5526	1.22	0.01	0.98	1.19	1.25
Difference		0.05	0.06		-0.06	0.16
	Difference = mean(not in L) - mean(in LF)				t =	0.8130
Ho.: diff = 0	Satterthwaite's degrees of freedom				=	338.886
Ha: diff < 0	Ha: diff != 0			Ha: diff > 0		
Pr. (T < t) = 0.7916	Pr. (|T| > |t|) = 0.4168			Pr. (T > t) = 0.2084		
Group	Obs.	Mean	Std. Err.	Std. Dev.	[95% Confidence Interval]	
Not in School	2210	1.01	0.02	0.87	0.97	1.05
In School	3316	1.36	0.02	1.03	1.33	1.40
Combined	5526	1.22	0.01	0.98	1.19	1.25
Difference		-0.35	0.03		-0.40	-0.30
	Difference = mean(not in L) - mean(in LF)				t =	-13.5875
Ho.: diff = 0	Satterthwaite's degrees of freedom				=	5220.84
Ha: diff < 0	Ha: diff != 0			Ha: diff > 0		
Pr. (T < t) = 0.0000	Pr. (|T| > |t|) = 0.0000			Pr. (T > t) = 1.0000		

Annex A-5.4: First stage regressions for Household size

Dependent Variables	All Pakistan	Urban	Rural
Age Difference	-0.005(0.00)*	-0.005(0.02) **	-0.004(0.01) *
Education Difference	0.002(0.03)**	0.001(0.33)	0.003(0.03) **
Square of the age difference	6.E-05(0.29)	3.E-05(0.78)	0.0001(0.43)
Square of the Education difference	7.E-05(0.38)	3.E-05(0.79)	0.0001(0.53)
First two born are of different gender	0.08(0.00)*	0.07(0.00) *	0.09(0.00) *
Sum of Parent's Years of Education	-0.005(0.00)*	-0.004(0.00) *	-0.01(0.00) *
Child Age	-0.03(0.36)	-0.05(0.45)	-0.02(0.69)
Square of Child Age	-1.E-04(0.94)	0.0001(0.95)	-0.001(0.74)
Birth Order of the child	0.25(0.00)*	0.28(0.00) *	0.23(0.00) *
Square of Birth Order	-0.01(0.00)*	-0.01(0.00) *	-0.01(0.00) *
Child if male	0.01(0.38)	0.003(0.80)	0.01(0.37)
Household headed by Male	0.18(0.00)*	0.16(0.00) *	0.19(0.00) *
Proportion of Female age 0-5	-0.73(0.00) *	-0.90(0.00) *	-0.63(0.00) *
Proportion of Female age 6-9	-1.29(0.00) *	-1.50(0.00) *	-1.18(0.00) *
Proportion of Female age 10-14	-1.21(0.00) *	-1.30(0.00) *	-1.16(0.00) *
Proportion of Female age 15-65	0.11(0.00) *	0.21(0.00) *	0.03(0.56)
Proportion of Female age 65 or more	0.28(0.00) *	0.27(0.06) **	0.26(0.01) *
Proportion of Male age 0-5	-0.70(0.00) *	-0.86(0.00) *	-0.61(0.00) *
Proportion of Male age 6-9	-1.34(0.00) *	-1.37(0.00) *	-1.33(0.00) *
Proportion of Male age 10-14	-1.33(0.00) *	-1.43(0.00) *	-1.26(0.00) *
Proportion of Male age 65 or more	0.86(0.00) *	0.96(0.00) *	0.79(0.00) *
Living standard Index	-0.03(0.00) *	-0.02(0.01) *	-0.06(0.00) *
Durable Asset Index	0.07(0.00) *	0.04(0.00) *	0.09(0.00) *
Agricultural Land Ownership	0.04(0.00) *	0.09(0.00) *	0.01(0.35)
Provincial Dummies: Punjab	-0.12(0.00) *	-0.07(0.00) *	-0.15(0.00) *
Sindh	-0.08(0.00) *	-0.07(0.00) *	-0.08(0.00) *
Balochistan	-0.03(0.00) *	0.04(0.00) *	-0.08(0.00) *
constant	2.28(0.00) *	2.33(0.00) *	2.21(0.00) *
Number of Observation	11209	4352	6857
Adjusted R-square	0.41	0.42	0.41
F-statistics	286.37	119.1	174.63
Prob. F-test	0.00	0.00	0.00

*Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values.*

Annex A- 5.5: **Exploring the Non-linearity and Non Monotonicity in MDM by Gender**

Variables:	Child Labour		Child Schooling	
	Boys	**Girls**	**Boys**	**Girls**
Mother's DM Index	0.35(0.06) **	0.28(0.21)	0.92(0.21)	-0.18(0.22)
Square of Mother's DM Index	-0.37(0.02) **	-0.34(0.07) ***	0.22(0.70)	0.13(0.27)
Cube of Mother's DM Index	0.08(0.01) *	0.07(0.07) ***	-0.10(0.49)	-0.01(0.56)
Sum of Parent's Years of Education	-0.07(0.00) *	-0.04(0.00) *	0.06(0.00) *	0.07(0.00) *
Child Age	-0.54(0.13)	-0.004(0.99)	0.83(0.00) *	0.42(0.12)
Square of Child Age	0.03(0.03) **	0.005(0.78)	-0.04(0.00) *	-0.03(0.03) **
Birth Order of the child	-0.23(0.00) *	0.12(0.21)	0.003(0.98)	0.19(0.00) *
Square of Birth Order	0.03(0.00) *	-0.01(0.56)	-0.001(0.96)	-0.02(0.00) *
Household headed by Male	0.49(0.00) *	0.0002(1.00)	-0.08(0.79)	-0.2(0.06) ***
Log of Household Size	-0.11(0.26)	-0.08(0.55)	0.27(0.69)	-0.28(0.00) *
Proportion of Female age 0-5	0.72(0.10) ***	0.18(0.74)	0.95(0.09)***	-0.36(0.30)
Proportion of Female age 6-9	1.02(0.02) **	-0.26(0.65)	0.05(0.95)	-0.11(0.77)
Proportion of Female age 10-14	0.36(0.40)	-0.68(0.20)	0.44(0.44)	0.65(0.04) **
Proportion of Female age 15-65	0.83(0.02) **	0.21(0.63)	1.24(0.00) *	1.14(0.00) *
Proportion of Female age 65 or more	-1.02(0.26)	0.33(0.73)	1.94(0.01) *	0.88(0.17)
Proportion of Male age 0-5	1.03(0.02) **	0.05(0.93)	0.67(0.21)	-0.33(0.33)
Proportion of Male age 6-9	0.55(0.22)	-0.38(0.50)	0.33(0.71)	0.03(0.94)
Proportion of Male age 10-14	0.36(0.39)	-0.60(0.25)	0.16(0.90)	0.40(0.20)
Proportion of Male age 65 or more	-0.77(0.40)	-0.59(0.57)	0.96(0.29)	1.14(0.09)***
Living standard Index	0.02(0.55)	-0.10(0.04) **	-0.1(0.07)***	0.18(0.00) *
Durable Asset Index	-0.23(0.00) *	-0.26(0.00) *	0.22(0.00) *	0.37(0.00) *
Agricultural Land Ownership	0.05(0.61)	-0.02(0.84)	0.25(0.01) *	0.10(0.18)
Provincial Dummies: Punjab	0.39(0.00) *	0.49(0.00) *	-1.35(0.00) *	0.18(0.00) *
Sindh	0.40(0.00) *	0.45(0.00) *	-1.03(0.00) *	-0.33(0.00) *
Balochistan	0.07(0.41)	-0.48(0.00) *	-0.1 (0.10)***	-0.37(0.00) *
Constant	0.07(0.98)	-2.44(0.34)	-4.9(0.05) **	-1.45(0.37)
Number of Observation	5683	5526	5683	5526
Log Likelihood Ratio	-1472.88	-984.069	-2460.56	-2669.9
LR-statistics	659.11	369.05	964.12	2097.97
Prob. LR-statistics	0.00	0.00	0.000	0.00
Pseudo R-square	0.183	0.158	0.164	0.28

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values.

Annex A-5.6:   Effect of ownership of Household enterprises and Agriculture land

The table below explores the effect of ownership of household enterprise and land on children schooling and labour decisions. The issue is worth exploring as 72% of the economically active children work as unpaid family helper. Although not all of these children work on family owned farms and household enterprise, they usually help parents who work as tenants or labourer.

Table A-5.6

Effect of Household ownership of enterprise and land on Child status

Variables	Child Labour	Child Schooling
Mother's DM Index	-0.05(0.02) **	0.02(0.27)
Sum of Parent's Years of Education	-0.06(0.00) *	0.06(0.00) *
Child Age	-0.25(0.35)	0.67(0.00) *
Square of Child Age	0.02(0.10) ***	-0.03(0.00) *
Birth Order of the child	-0.09(0.12)	0.10(0.02) **
Square of Birth Order	0.02(0.01) *	-0.01(0.02) **
Household headed by Male	0.23(0.02) **	-0.31(0.00) *
Log of Household Size	-0.10(0.19)	-0.16(0.00) *
Proportion of Female age 0-5	0.55(0.10) ***	0.07(0.78)
Proportion of Female age 6-9	0.53(0.13)	0.01(0.96)
Proportion of Female age 10-14	-0.68(0.03) **	-0.67(0.00) *
Proportion of Female age 15-65	0.60(0.03) **	1.04(0.00) *
Proportion of Female age 65 or more	-0.30(0.64)	1.46(0.00) *
Proportion of Male age 0-5	0.66(0.05) **	0.04(0.88)
Proportion of Male age 6-9	0.23(0.50)	0.26(0.28)
Proportion of Male age 10-14	0.68(0.02) **	1.54(0.00) *
Proportion of Male age 65 or more	-0.64(0.34)	0.83(0.08) ***
Living standard Index	-0.03(0.30)	0.06(0.00) *
Durable Asset Index	-0.24(0.00) *	0.31(0.00) *
Agricultural Land Ownership	0.02(0.83)	0.13(0.01) *
Household Enterprise ownership	0.07(0.20)	0.03(0.35)
Provincial Dummies: Punjab	0.42(0.00) *	-0.05(0.22)
Sindh	0.44(0.00) *	-0.39(0.00) *
Balochistan	-0.05(0.45)	-0.24(0.00) *
constant	-1.30(0.43)	-2.66(0.02) **
Number of Observation	11209	11209
Log Likelihood Ratio	-2515.81	-5462.76
LR-statistics	981.93	2864.54
Prob. LR-statistics	0.00	0.00
Pseudo R-square	0.16	0.208
Wald test of exogeneity: chi2	3.08	2.90
Prob. > chi2	0.2143	0.2344
Amemiya-Lee-Newey chi2 (OID-Test)	-	-
P-value (OID-Test)	-	-

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values. The endogeneity in the Decision making power and household size is control in all sub-samples where Wald tests of Exogeneity is significant i.e. predicting the endogeneity.

It is evident from table A-5.6 that the effect of household enterprise is insignificant on child's schooling and labour decision but the effect of ownership of agriculture land

does show significant and positive effect. The effect is significant only for the schooling decision. Although we assumed that the ownership of the land will increase the child labour incidence thereby reduce schooling, as children work mostly as family helpers. But the result shows contradiction to the above assumption. This could be because household with agri-land might have stable income therefore invest in their children schooling rather than engaging them to work.

Annex A-5.7: Some Diagnostic Tests

a) Testing Multi-collinearity among the Variables

Variable	VIF	SQRT VIF	Tolerance	R-Squared
Child in LF	1.17	0.15	1.17	0.15
Child in School	1.43	0.30	1.43	0.30
MDM Index	1.14	0.12	1.14	0.12
Sum of parents years of Schooling	1.63	0.39	1.63	0.39
Child Age	1.34	0.26	1.34	0.26
Birth order	4.01	0.75	4.01	0.75
Child if male	2.05	0.51	2.05	0.51
Household headed by Male	1.25	0.20	1.25	0.20
Log of Household Size	1.66	0.40	1.66	0.40
Proportion of Female age 0-5	2.05	0.51	2.05	0.51
Proportion of Female age 6-9	2.12	0.53	2.12	0.53
Proportion of Female age 10-14	2.78	0.64	2.78	0.64
Proportion of Female age 15-65	1.94	0.48	1.94	0.48
Proportion of Female age 65 or more	1.12	0.11	1.12	0.11
Proportion of Male age 0-5	2.05	0.51	2.05	0.51
Proportion of Male age 6-9	2.15	0.54	2.15	0.54
Proportion of Male age 10-14	2.75	0.64	2.75	0.64
Proportion of Male age 65 or more	1.10	0.09	1.10	0.09
Living standard Index	1.61	0.38	1.61	0.38
Durable Assets Index	1.76	0.43	1.76	0.43
Agricultural Land Ownership	1.03	0.03	1.03	0.03
Punjab Province	1.02	0.02	1.02	0.02
Sindh Province	1.26	0.21	1.26	0.21
Balochistan Province	1.07	0.06	1.07	0.06
Age Difference	1.17	0.15	1.17	0.15
Education Difference	1.43	0.30	1.43	0.30
First two are of Different Gender	1.14	0.12	1.14	0.12
Mean VIF			**1.73**	

b)   F-test to check the Weak Instrument

Test Parameter: Age Difference, Education Difference, Square of the Age Difference, Square of the education difference and First two born are of different Gender

(1) Age Difference = 0
(2) Education Difference = 0
(3) Square of the Age Difference = 0
(4) Square of the education difference = 0
(5) First two born are of different Gender = 0

In Decision Making model (All)

F. (5, 11182) = 12.44

Prob. > F = 0.0000

In Household Size model (all)

F. (5, 11182) =53.62

Prob. > F. = 0.0000

In Decision Making model (Rural)

F. (5, 6830) = 6.84

Prob. > F = 0.0000

In Household Size model (Rural)

F. (5, 6830) = 38.48

Prob. > F = 0.0000

In Decision Making model (Boys)

F(5, 5656) =   4.16

Prob> F =   0.0009

In Household Size model (Boys)

F(5, 5656) =   13.99

Prob> F =   0.0000

c)   Marginal Effects:

(i)   Probit model for Child Labour (with fertility and demographic controls)

Dependent Variables: Child Labour	All Pakistan	Urban	Rural
Mother's DM Index	-0.005	0.001	-0.18
Sum of Parent's Years of Education	-0.01	-0.002	-0.01
Child Age	-0.03	0.003	-0.05
Square of Child Age	0.002	0.0002	0.003
Birth Order of the child	-0.01	-0.01	0.002
Square of Birth Order	0.001	0.001	0.001
Child if male	0.03	0.02	0.03
Household headed by Male	0.02	0.01	-0.04
Log of Household Size	-0.01	0.01	-0.09
Proportion of Female age 0-5	0.05	0.04	-0.004
Proportion of Female age 6-9	0.04	0.05	0.003
Proportion of Female age 10-14	-0.004	0.05	-0.05
Proportion of Female age 15-65	0.05	0.02	0.07
Proportion of Female age 65 or more	-0.03	0.02	0.004
Proportion of Male age 0-5	0.05	0.03	0.02
Proportion of Male age 6-9	0.02	0.03	0.0001
Proportion of Male age 10-14	0.01	0.06	-0.05
Proportion of Male age 65 or more	-0.06	-0.03	-0.05
Living standard Index	-0.003	-0.001	0.01
Durable Asset Index	-0.02	-0.01	-0.02
Agricultural Land Ownership	0.001	-0.004	-0.001
Provincial Dummies: Punjab	0.04	0.02	0.31
Sindh	0.05	0.02	0.20
Balochistan	-0.01	0.01	-0.02

(ii)   Probit model for Child Labour (without fertility and demographic controls)

Dependent Variables: Child Labour	All Pakistan	Urban	Rural
Mother's DM Index	-0.005	0.001	-0.14
Sum of Parent's Years of Education	-0.01	-0.002	-0.01
Child Age	-0.03	0.0003	-0.04
Square of Child Age	0.002	0.0004	0.003
Child if male	0.03	0.02	0.03
Household headed by Male	0.01	0.01	-0.05
Living standard Index	-0.002	-0.001	0.02
Durable Asset Index	-0.02	-0.01	-0.03
Agricultural Land Ownership	0.001	-0.004	-0.003
Provincial Dummies: Punjab	0.04	0.02	0.26
Sindh	0.05	0.02	0.17
Balochistan	-0.01	0.01	-0.02

(iii)   Non-linearity and Non Monotonicity in MDM

Dependent Variables: Child Labour	All Pakistan	Urban	Rural
Mother's DM Index	0.03	-0.002	0.06
Square of Mother's DM Index	-0.03	-0.001	-0.06
Cube of Mother's DM Index	0.01	0.001	0.01
Sum of Parent's Years of Education	-0.01	-0.002	-0.01
Child Age	-0.03	0.004	-0.05
Square of Child Age	0.002	0.0002	0.003
Birth Order of the child	-0.01	-0.01	-0.01
Square of Birth Order	0.001	0.001	0.002
Child if male	0.03	0.02	0.03
Household headed by Male	0.02	0.01	0.03
Log of Household Size	0.01	0.01	-0.03
Proportion of Female age 0-5	0.04	0.04	0.03
Proportion of Female age 6-9	0.04	0.05	0.03
Proportion of Female age 10-14	-0.01	0.05	-0.08
Proportion of Female age 15-65	0.05	0.02	0.06
Proportion of Female age 65 or more	-0.03	0.02	-0.09
Proportion of Male age 0-5	0.05	0.03	0.06
Proportion of Male age 6-9	0.01	0.03	-0.01
Proportion of Male age 10-14	0.01	0.06	-0.07
Proportion of Male age 65 or more	-0.05	-0.03	-0.08
Living standard Index	-0.002	-0.001	0.002
Durable Asset Index	-0.02	-0.01	-0.03
Agricultural Land Ownership	0.001	-0.004	0.003
Provincial Dummies: Punjab	0.04	0.02	0.06
Sindh	0.04	0.02	0.06
Balochistan	-0.01	0.01	-0.02

(iv)   Probit model for Child Labour by Gender

Dependent Variables: Child Labour	Boys	Girls
Mother's DM Index	-0.003	-0.01
Sum of Parent's Years of Education	-0.01	-0.003
Child Age	-0.06	-0.0003
Square of Child Age	0.003	0.0003
Birth Order of the child	-0.03	0.01
Square of Birth Order	0.003	-0.0004
Household headed by Male	0.04	-0.001
Log of Household Size	-0.01	-0.01
Proportion of Female age 0-5	0.08	0.01
Proportion of Female age 6-9	0.11	-0.02
Proportion of Female age 10-14	0.04	-0.04
Proportion of Female age 15-65	0.09	0.01
Proportion of Female age 65 or more	-0.11	0.03
Proportion of Male age 0-5	0.11	0.004
Proportion of Male age 6-9	0.06	-0.02
Proportion of Male age 10-14	0.04	-0.04
Proportion of Male age 65 or more	-0.09	-0.04
Living standard Index	0.002	-0.01
Durable Asset Index	-0.02	-0.02
Agricultural Land Ownership	0.01	-0.001
Provincial Dummies: Punjab	0.04	0.03
Sindh	0.05	0.04
Balochistan	0.01	-0.02

(v)   Non-linearity and Non Monotonicity in MDM by Gender

Dependent Variables: Child Labour	Boys	Girls
Mother's DM Index	0.04	0.02
Square of Mother's DM Index	-0.04	-0.02
Cube of Mother's DM Index	0.01	0.005
Sum of Parent's Years of Education	-0.01	-0.003
Child Age	-0.06	-0.0003
Square of Child Age	0.003	0.0003
Birth Order of the child	-0.02	0.01
Square of Birth Order	0.003	-0.0004
Household headed by Male	0.04	0.00001
Log of Household Size	-0.01	-0.005
Proportion of Female age 0-5	0.08	0.01
Proportion of Female age 6-9	0.11	-0.02
Proportion of Female age 10-14	0.04	-0.04
Proportion of Female age 15-65	0.09	0.01
Proportion of Female age 65 or more	-0.11	0.02
Proportion of Male age 0-5	0.11	0.003
Proportion of Male age 6-9	0.06	-0.02
Proportion of Male age 10-14	0.04	-0.04
Proportion of Male age 65 or more	-0.08	-0.04
Living standard Index	0.002	-0.01
Durable Asset Index	-0.02	-0.02
Agricultural Land Ownership	0.01	-0.001
Provincial Dummies: Punjab	0.05	0.04
Sindh	0.05	0.04
Balochistan	0.01	-0.02

(vi)   Probit model for Child Schooling (with fertility and demographic controls)

Dependent Variables: Child Schooling	All Pakistan	Urban	Rural
Mother's DM Index	0.01	0.01	0.24
Sum of Parent's Years of Education	0.02	0.01	0.03
Child Age	0.17	0.07	0.22
Square of Child Age	-0.01	-0.005	-0.01
Birth Order of the child	0.04	0.05	0.05
Square of Birth Order	-0.004	-0.005	-0.004
Child if male	0.23	0.08	0.34
Household headed by Male	-0.09	-0.04	-0.01
Log of Household Size	-0.05	-0.05	-0.13
Proportion of Female age 0-5	0.02	-0.14	0.07
Proportion of Female age 6-9	-0.01	-0.13	-0.11
Proportion of Female age 10-14	0.23	0.12	0.08
Proportion of Female age 15-65	0.34	0.16	0.43
Proportion of Female age 65 or more	0.45	0.37	0.44
Proportion of Male age 0-5	-0.002	-0.14	0.04
Proportion of Male age 6-9	0.06	-0.01	-0.13
Proportion of Male age 10-14	0.05	-0.06	-0.12
Proportion of Male age 65 or more	0.29	-0.12	0.69
Living standard Index	0.02	0.01	-0.02
Durable Asset Index	0.10	0.06	0.13
Agricultural Land Ownership	0.04	0.06	0.05
Provincial Dummies: Punjab	-0.02	-0.01	-0.28
Sindh	-0.14	-0.07	-0.31
Balochistan	-0.09	-0.02	-0.14

(vii)   Probit model for Child Schooling (without fertility and demographic controls)

Dependent Variables: Child Schooling	All Pakistan	Urban	Rural
Mother's DM Index	0.01	0.01	0.23
Sum of Parent's Years of Education	0.02	0.01	0.03
Child Age	0.17	0.08	0.22
Square of Child Age	-0.01	-0.005	-0.01
Child if male	0.21	0.06	0.32
Household headed by Male	-0.11	-0.06	-0.06
Living standard Index	0.02	0.01	-0.01
Durable Asset Index	0.10	0.06	0.12
Agricultural Land Ownership	0.04	0.05	0.05
Provincial Dummies: Punjab	-0.01	-0.01	-0.25
Sindh	-0.14	-0.07	-0.31
Balochistan	-0.09	-0.02	-0.14

(viii)   Non-linearity and Non Monotonicity in MDM

Dependent Variables: Child Schooling	All Pakistan	Urban	Rural
Mother's DM Index	-0.05	-0.06	-0.01
Square of Mother's DM Index	0.03	0.05	-0.01
Cube of Mother's DM Index	-0.004	-0.01	0.005
Sum of Parent's Years of Education	0.02	0.01	0.03
Child Age	0.17	0.07	0.23
Square of Child Age	-0.01	-0.005	-0.01
Birth Order of the child	0.04	0.05	0.02
Square of Birth Order	-0.004	-0.005	-0.003
Child if male	0.23	0.08	0.33
Household headed by Male	-0.08	-0.04	-0.12
Log of Household Size	-0.05	-0.05	-0.04
Proportion of Female age 0-5	0.02	-0.14	0.12
Proportion of Female age 6-9	-0.02	-0.12	0.07
Proportion of Female age 10-14	0.23	0.12	0.31
Proportion of Female age 15-65	0.34	0.16	0.43
Proportion of Female age 65 or more	0.45	0.38	0.53
Proportion of Male age 0-5	-0.01	-0.13	0.09
Proportion of Male age 6-9	0.06	-0.01	0.11
Proportion of Male age 10-14	0.05	-0.06	0.13
Proportion of Male age 65 or more	0.28	-0.13	0.60
Living standard Index	0.02	0.01	0.01
Durable Asset Index	0.10	0.06	0.12
Agricultural Land Ownership	0.04	0.06	0.04
Provincial Dummies: Punjab	-0.02	-0.02	-0.03
Sindh	-0.14	-0.07	-0.18
Balochistan	-0.09	-0.02	-0.14

(ix)   Probit model for Child Schooling by Gender

Dependent Variables: Child Schooling	Boys	Girls
Mother's DM Index	0.23	0.03
Sum of Parent's Years of Education	0.01	0.03
Child Age	0.20	0.16
Square of Child Age	-0.01	-0.01
Birth Order of the child	-0.01	0.07
Square of Birth Order	0.00002	-0.01
Household headed by Male	-0.01	-0.08
Log of Household Size	0.10	-0.10
Proportion of Female age 0-5	0.25	-0.13
Proportion of Female age 6-9	0.05	-0.04
Proportion of Female age 10-14	0.13	0.24
Proportion of Female age 15-65	0.30	0.42
Proportion of Female age 65 or more	0.46	0.33
Proportion of Male age 0-5	0.18	-0.12
Proportion of Male age 6-9	0.12	0.02
Proportion of Male age 10-14	0.10	0.15
Proportion of Male age 65 or more	0.21	0.43
Living standard Index	-0.02	0.07
Durable Asset Index	0.05	0.14
Agricultural Land Ownership	0.05	0.04
Provincial Dummies: Punjab	-0.35	0.07
Sindh	-0.29	-0.13
Balochistan	-0.04	-0.14

(x)   Non-linearity and Non Monotonicity in MDM by Gender

Dependent Variables: Child Schooling	Boys	Girls
Mother's DM Index	0.23	-0.07
Square of Mother's DM Index	0.05	0.05
Cube of Mother's DM Index	-0.02	-0.01
Sum of Parent's Years of Education	0.01	0.03
Child Age	0.20	0.16
Square of Child Age	-0.01	-0.01
Birth Order of the child	0.001	0.07
Square of Birth Order	-0.0001	-0.01
Household headed by Male	-0.02	-0.06
Log of Household Size	0.07	-0.10
Proportion of Female age 0-5	0.23	-0.13
Proportion of Female age 6-9	0.01	-0.04
Proportion of Female age 10-14	0.11	0.24
Proportion of Female age 15-65	0.31	0.42
Proportion of Female age 65 or more	0.48	0.32
Proportion of Male age 0-5	0.17	-0.12
Proportion of Male age 6-9	0.08	0.01
Proportion of Male age 10-14	0.04	0.15
Proportion of Male age 65 or more	0.24	0.42
Living standard Index	-0.02	0.07
Durable Asset Index	0.05	0.14
Agricultural Land Ownership	0.06	0.03
Provincial Dummies: Punjab	-0.37	0.06
Sindh	-0.31	-0.12
Balochistan	-0.03	-0.14

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(xi)   Economically Inactive Children

Variables	Economically Inactive Children	
Mother's DM Index	-0.01	0.05
Square of the Mother's DM Index	-	-0.03
Cube of the Mother's DM Index	-	0.005
Sum of Years of Parents' Schooling	-0.02	-0.02
Child Age	-0.23	-0.23
Square of Child Age	0.01	0.01
Birth Order of the child	-0.04	-0.04
Square of Birth Order	0.004	0.004
Household headed by Male	0.09	0.08
Log of Household Size	0.05	0.05
Proportion of Female age 0-5	-0.01	-0.01
Proportion of Female age 6-9	0.01	0.01
Proportion of Female age 10-14	0.22	0.22
Proportion of Female age 15-65	-0.28	-0.27
Proportion of Female age 65 or more	-0.41	-0.41
Proportion of Male age 0-5	0.02	0.03
Proportion of Male age 6-9	-0.06	-0.06
Proportion of Male age 10-14	-0.46	-0.46
Proportion of Male age 65 or more	-0.27	-0.26
Living standard Index	-0.02	-0.02
Durable Asset Index	-0.10	-0.10
Agricultural Land Ownership	-0.04	-0.04
Provincial Dummies: Punjab	0.01	0.02
Sindh	0.14	0.13
Balochistan	0.07	0.07

(xii)   Paid and Unpaid Labour

Variables	Unpaid Child Labour	Paid Child Labour
Mother's DM Index	-0.01	-0.07
Sum of Parent's Years of Education	-0.003	-0.001
Child Age	-0.01	0.0002
Square of Child Age	0.001	0.0002
Birth Order of the child	-0.003	-0.01
Square of Birth Order	0.001	0.0005
Child if male	0.01	0.01
Household headed by Male	0.01	-0.12
Log of Household Size	-0.01	0.001
Proportion of Female age 0-5	0.01	0.03
Proportion of Female age 6-9	0.004	0.05
Proportion of Female age 10-14	-0.02	0.05
Proportion of Female age 15-65	0.02	0.01
Proportion of Female age 65 or more	-0.03	0.03
Proportion of Male age 0-5	0.01	0.03
Proportion of Male age 6-9	-0.01	0.05
Proportion of Male age 10-14	-0.02	0.06
Proportion of Male age 65 or more	-0.02	-0.05
Living standard Index	-0.01	0.01
Durable Asset Index	-0.01	0.0001
Agricultural Land Ownership	0.01	-0.01
Provincial Dummies: Punjab	0.02	0.49
Sindh	0.03	0.17
Balochistan	-0.01	-0.002

Annex A-5.8: Sub-sample consist of Household headed by Male

Although results predict the significant effect of mother's decision- making power on her child's schooling and labour decision but in order to check specifically the influence of decision making power gained by females in the male- headed household, we re-estimated the model for only those households that have male heads. Out of the 11209 household 94% is headed by males. Female- headed household mostly includes those household where mothers of the husbands, head the house. Table A-5.10.1 and table A-5.10.2 provides the results. Result does not show any significant difference for the child labour but for the schooling the result differ. The effect of mother's decision- making power on her child's schooling in urban areas is insignificant which was previously significant.

Table A-5.8.1: Effect on Child Labour

Variables	All Pakistan	Urban	Rural	Boys	Girls
Mother's DM Index	-0.06(0.02)*	0.003(0.94)	-1.6(0.01) *	-0.05(0.17)	-0.1(0.02)**
Sum of Parent's Years of Education	-0.06(0.00) *	-0.05(0.00)*	-0.07(0.0) *	-0.07(0.0) *	-0.04(0.0) *
Child Age	-0.22(0.43)	0.51(0.40)	-0.35(0.28)	-0.45(0.22)	-0.003(0.99)
Square of Child Age	0.02(0.15)	-0.01(0.68)	0.02(0.11)	.03(0.06)***	0.005(0.80)
Birth Order of the child	-0.09(0.13)	-0.23(0.04) **	-.004(0.98)	-0.2(0.00) *	0.14(0.16)
Square of Birth Order	0.02(0.01) *	0.03(0.03) **	0.01(0.18)	0.03(0.00) *	-0.01(0.44)
Log of Household Size	-0.06(0.45)	0.32(0.03) **	-0.60(0.29)	-0.11(0.26)	-0.02(0.89)
Proportion of Female age 0-5	0.50(0.16)	1.2(0.10) ***	-0.09(0.87)	0.9(0.05) **	-0.09(0.88)
Proportion of Female age 6-9	0.56(0.12)	1.44(0.05) **	0.21(0.78)	1.0(0.03) **	-0.23(0.70)
Proportion of Female age 10-14	-0.7(0.03) **	0.44(0.49)	-0.73(0.30)	0.52(0.23)	-0.76(0.18)
Proportion of Female age 15-65	0.5(0.09) ***	0.69(0.21)	0.39(0.26)	0.8(0.03) **	0.00(1.00)
Proportion of Female age 65 or more	-0.06(0.93)	1.21(0.39)	0.34(0.69)	-0.78(0.4)	0.67(0.50)
Proportion of Male age 0-5	0.6(0.07) ***	1.10(0.15)	0.19(0.72)	1.1(0.02) **	-0.03(0.96)
Proportion of Male age 6-9	0.17(0.63)	0.77(0.28)	0.18(0.83)	0.51(0.27)	-0.43(0.46)
Proportion of Male age 10-14	0.75(0.01) *	2.66(0.00) *	0.34(0.65)	0.36(0.40)	-0.59(0.27)
Proportion of Male age 65 or more	-0.98(0.17)	-1.76(0.30)	-0.70(0.43)	-1.24(0.19)	-0.78(0.48)
Living standard Index	-0.04(0.19)	-0.03(0.48)	0.11(0.12)	0.01(0.71)	-0.1(0.02)**
Durable Asset Index	-0.21(0.00) *	-0.21(0.00) *	-0.14(0.04)	-0.2(0.00) *	-0.23(0.0) *
Agricultural Land Ownership	-0.002(0.98)	-0.14(0.53)	-0.03(0.71)	0.03(0.79)	-0.02(0.86)
Provincial Dummies: Punjab	0.47(0.00) *	0.51(0.00) *	1.98(0.0) *	0.40(0.00) *	0.59(0.00) *
Sindh	0.47(0.00) *	0.55(0.00) *	1.2(0.0) *	0.42(0.00) *	0.55(0.00) *
Balochistan	-0.03(0.70)	0.22(0.16)	-.2(0.09)***	0.09(0.29)	-0.4(0.01) *
Constant	-1.32(0.43)	-7.53(0.04) **	1.83(0.46)	0.07(0.98)	-2.52(0.35)
Number of Observation	10540	4129	6411	5373	5167
Log Likelihood Ratio	-2385.01	-548.75	-1818.55	-1417.45	-912.48
LR-statistics	937.86	282.01	548.23	621.82	352.13
Prob. LR-statistics	0.00	0.00	0.00	0.00	0.00
Pseudo R-square	0.164	0.204	0.131	0.18	0.16

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values. The endogeneity in the Decision making power and household size is checked using Wald tests of Exogeneity. As the test value is insignificant the variables are considered as exogenous.

Table A-5.8.2: Effect on Child Schooling

Variables	All Pakistan	Urban	Rural	Boys	Girls
Mother's DM Index	0.01(0.74)	0.03(0.28)	0.54(0.17)	1.13(0.01) *	0.05(0.05) **
Sum of Parent's Years of Education	0.06(0.00) *	0.06(0.0) *	0.07(0.00) *	0.05(0.00) *	0.07(0.00) *
Child Age	0.62(0.00) *	0.34(0.33)	0.71(0.00) *	0.81(0.01) *	0.35(0.21)
Square of Child Age	-0.03(0.00) *	-0.02(0.13)	-0.04(0.0) *	-0.04(0.0) *	-0.02(0.06) ***
Birth Order of the child	0.09(0.03) **	0.2(0.01) *	0.10(0.33)	0.03(0.86)	0.17(0.01) *
Square of Birth Order	-0.01(0.04) **	-0.02(0.01) *	-0.01(0.26)	-0.002(0.86)	-0.02(0.01) *
Log of Household Size	-0.17(0.00) *	-0.30(0.00) *	-0.31(0.47)	0.17(0.82)	-0.27(0.00) *
Proportion of Female age 0-5	0.09(0.71)	-0.50(0.27)	0.13(0.74)	0.9(0.10) ***	-0.34(0.35)
Proportion of Female age 6-9	0.03(0.92)	-0.39(0.40)	-0.27(0.63)	-0.05(0.96)	-0.09(0.81)
Proportion of Female age 10-14	-0.69(0.00) *	-0.12(0.75)	-1.59(0.0) *	0.39(0.52)	0.59(0.08) ***
Proportion of Female age 15-65	1.07(0.00) *	0.95(0.00) *	0.99(0.0) *	1.34(0.00) *	1.20(0.00) *
Proportion of Female age 65 or more	1.55(0.00) *	2.1(0.02) **	1.1(0.07)***	2.09(0.01) *	0.99(0.14)
Proportion of Male age 0-5	0.04(0.88)	-0.49(0.27)	0.08(0.84)	0.67(0.23)	-0.33(0.35)
Proportion of Male age 6-9	0.28(0.27)	0.12(0.79)	-0.25(0.67)	0.22(0.82)	0.07(0.85)
Proportion of Male age 10-14	1.61(0.00) *	0.53(0.14)	1.54(0.01) *	-0.01(1.0)	0.49(0.13)
Proportion of Male age 65 or more	0.94(0.05) **	-0.54(0.53)	1.72(0.01) *	1.32(0.18)	1.26(0.06) ***
Living standard Index	0.07(0.00) *	0.04(0.17)	-0.03(0.53)	-.1(0.06)***	0.19(0.00) *
Durable Asset Index	0.30(0.00) *	0.28(0.00) *	0.31(0.00) *	0.22(0.0) *	0.35(0.00) *
Agricultural Land Ownership	0.12(0.02) **	0.35(0.01) *	0.1(0.08)***	0.3(0.02) **	0.1(0.17)
Provincial Dummies: Punjab	-0.06(0.19)	-0.05(0.55)	-0.6(0.1) ***	-1.53(0.0) *	0.20(0.00) *
Sindh	-0.41(0.00) *	-0.30(0.00) *	-0.73(0.0) *	-1.09(0.0) *	-0.34(0.00) *
Balochistan	-0.26(0.00) *	-0.08(0.34)	-0.34(0.0) *	-.2(0.07)***	-0.37(0.00) *
Constant	-2.64(0.02) **	-0.53(0.80)	-3.2(0.08)***	-5(0.07)***	-1.25(0.46)
Number of Observation	10540	4129	6411	5373	5167
Log Likelihood Ratio	-5175.93	-1611.03	-3517.79	-2367.36	-2510.98
LR-statistics	2725.23	762.51	1547.73	917.13	1963.50
Prob. LR-statistics	0.00	0.00	0.00	0.00	0.00
Pseudo R-square	0.208	0.19	0.18	0.16	0.28

Note: *, ** & *** represents significant at 1%, 5% & 10% significance level. Numbers in parenthesis are P-values.
The endogeneity in the Decision making power and household size is control in all Pakistan and rural samples, where Wald tests of Exogeneity is significant i.e. predicting the endogeneity

6. Conclusions and Policy Implications

6.1 Summary of Findings and Policy implications

The issue of child labour has been in debate for many centuries. It is a pervasive problem in developing countries but developed countries have also remained concerned over the alarming situation of child labour. The issue is not only relevant for investigation on humanitarian grounds but also for the sustainable growth of a country. Sustainable development requires human capital formation for which child labour is an obstacle. History suggests that every nation has passed through a stage of development during which child labour persisted but with compulsory education laws brought in place, technological advancement and resulting growth, child labour has eliminated. The issue is therefore not new, but the recent growth in the literature may be attributed to the Child Deterrence Act of US which restricted the export of products that uses children as inputs. The motivation of the dissertation is thus based on the on-going debates on child labour.

Specifically the dissertation has explored the determinants of child labour in the light of recent debates on trade sanctions, labour market conditions and intra household bargaining power. The dissertation provides two kind of evidence. The first kind of evidence (chapter 3) is macro and cross country, while the second kind (4 and 5) is meso/micro and speak to Pakistan. The two parts can be grouped into demand and supply side economics of child labour. The first two empirical chapters (chapter 3 and 4) focus on the demand for child labour whereas the third empirical chapter (chapter 5) looks into the question why households supply child labour. This chapter provides a brief summary of the aims of each empirical chapter, how they contribute to the literature and their principal findings.

As was said earlier, a large part of recent literature has explicitly explored the effect of trade liberalization on the incidence of child labour. But the effect was mainly explored without controlling the endogeneity of the trade variable, while Edmond and Pavcnik (2006) rejected the exogeneity of the trade variable. Further to this Davis and Voy (2009) not only rejected the exogeneity of the trade variable but they also argued that the effect of FDI inflow is also endogenous to the child labour. Both of these studies

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provided the empirical support for their argument using a cross country regression framework. On the theoretical side Jafarey and Lahiri (2002) have explored the effect of trade sanctions by considering the credit market imperfection on child labour incidence. Their model demonstrates that trade can increase child labour among poor households; a possibility that decreases as their access to credit improves. Maskus (1997) on the other hand argues that overall incidence of child labour may decline due to the income effect of trade but child labour incidence in export related industries could increase due to the result of an increase in demand for cheap labour.

Mostly studies exploring the effect of globalisation (defined by trade openness and FDI inflow) on child labour did not explore the presence of imperfect credit market on child labour. Although there are studies that have explored the effect of credit market imperfections but they are not concerned with the effect of globalization. The first contribution of this chapter is that it has explored the effect of credit market imperfections and globalization, after controlling for the endogeneity in trade openness, FDI inflow and credit market indicator. Chapter 3 further contribute in the existing literature by comparing the effect of export and trade and by including an alternative measure of the income, estimated by using Gini coefficient and income share of bottom quintile population.

The findings indicate that countries that are more open to trade and have higher FDI inflow have lower incidence of child labour. This effect is channelled through income (after correcting for endogeneity in trade openness and FDI inflow). This is because both trade openness and FDI inflow is statistically significant only after dropping income from the model. It is evident from the macro data that trade openness and FDI inflow will affect child labour through affecting the living standard. Hence, trade sanctions may not have a significant effect on the incidence of child labour. This may be because child labour in export related industries is hard to find. Further to this, credit market imperfection does not show significant effect. We included credit variable to analyse the proposition given by Jafarey and Lahiri (2002) that when trade reduces the income, poor household will need credit to overcome the income shock. In our estimation both trade and FDI found to be enhancing the income rather than reducing it. The insignificant effect of credit may be because of this reason (both trade and FDI inflow reducing child labour through increasing income). Furthermore, comparing the

results of trade openness and exports study conclude that, at macro level, both trade openness and exports effects child labour through raising income of the poor. This might be because at macro level it very difficult to find children working for the large scale exporting sectors as explains earlier.

Chapter 3 has also explored the effect of income on child labour, first by testing the effect of real GDP per capita and then by including alternative measure of income estimated from Gini coefficient and income share of the bottom quintile population as explained earlier. Both measures of income shows that increases in income reduce the incidence of child labour significantly. Based on statistical tests (AIC and BIC) the study conclude that income of the bottom quartile of the population is the best representation of the income of the poor when studying child labour.

In addition to the above, results also show highly negative and significant effect of average years of adult schooling on incidence of child labour, an important variable representing presence of skilled labour in an economy. The higher the average year of schooling the higher will be skilled labour force and the lower will be the child labour incidence. Furthermore, result also provides empirical evidence of the negative relationship between foreign aid and incidence of child labour. Hence study concludes that increasing the aid flow from developed countries to developing countries may help countries in increasing the development and social expenditure which may help in reducing child labour incidence.

After exploring the effect of globalization and some macro-economic factors on the incidence of child labour, the study then turns to the question of where children find employment. What role does the labour market conditions have in creating demand for child labour? Cain and Mozumder (1980) argued that the economic value of children cannot properly be assessed without reference to the structure of the labour market. Chapter 4 addresses various specific research questions namely: Are households more likely to send their children to work if they live in regions where wages are low? Is there any demand side effect of higher adult wages? Does there exist substitution between adult and child labour leading to high adult unemployment rate? And is the effect sensitive to the degree of segmentation between the formal and informal sector? The issue is probed by using the Labour Force Survey data of Pakistan. Chapter 4 is

based on Pakistan, firstly because there is an extensive literature addressing the economics of child labour in Pakistan but the literature ignores the effect of labour market conditions. Secondly because the in-depth analysis of the effect of labour market indicators on the incidence of child labour requires micro level surveys that are rarely available. Although SIMPOC [48] provides some micro level surveys but the indicators of SIMPOC do not measure the labour market situation of the countries.

Chapter 4 is also the first comprehensive study of Pakistan that looks into the effect of labour market indicators by pooling the cross sectional surveys of Labour Force from 1990 onwards. The chapter has not only controlled the regional variations but has also explored the effect with respect to time as well. The findings indicate that labour market indicators can produce both supply side and demand driven effects. The demand for child labour arises mainly due to adult wages and presence of the informal, agriculture and exporting sectors while the supply of child labour usually arise because of high adult unemployment in the household.

Conversely the higher adult unemployment at a division/district/city lowers the probability for a child to find employment. This is in contrast to the effect of adult unemployed proportion at the household level which lowers the income of the household and thus raises supply of child labour. The Informal sector is the sector which absorbs a high proportion of child labour due its nature of being not recognized or protected under the legal and regulatory frameworks. We find, the higher the size of informal sector in an area, the higher will be child labour.

Recall that in chapter 3, results at macro level (cross country analysis) predicted that the effect of export and trade only affected child labour by increasing the income of the poor. This macro finding could be explained on the ground that presence of child labour in the export related industries is very small. However, based on the micro data, the study reveals that the presence of export related industry in a division/district/city increases child labour significantly. This is due to the subcontracting system that exists in Pakistan. In Pakistan, like in other developing countries, to remain cost competitive in the world market, producers are using a subcontracting system for the production process. Children are sometimes engaged in the informal sector or in the subsidiary

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[48]Statistical Information and Monitoring Programme on Child Labour (SIMPOC) by ILO/IPEC

sectors which provides raw material to the exporting sectors. The macro level data fails to capture the effect of these hidden industries. But based on the meso level evidence, the study concludes that the higher the export related work in a division/district/city the higher will be the probability for a child to find employment.

Chapter 3 and 4 are mainly concerned with the demand side determinant of child labour[49]. On the supply side there exists a vast literature on the topic. A large part of the literature explores the effect of poverty, parental education and occupation, household income and child characteristics on the incidence of child labour. However recently, there is a growing debate on the intra household distribution of power and its effect on household expenditure including expenditure on education. The on-going debate on intra household balance of power has raised an argument i.e. is the identification of the person who holds the money important for welfare of the household, especially for child related outcomes (health and education)?

Recently Basu (2006) theoretically while Lancaster et.al (2006) and Felkey (2005) empirically found that the effect of mother's bargaining power on child education is significant. Addressing the arguments that have arisen in recent literature, chapter 5 of the dissertation has explored the effect of a mother's bargaining power on her child's schooling and labour decisions. The issue is probed by using the Pakistan Standard of Living Measurement Survey data. Although for Pakistan Hou (2011) has explored the effect of women's bargaining power on the budget share, caloric intake and children's school enrollment, but the effect on child labour has not yet been addressed in any study. His finding indicate that when women have more decision making power at home, households tend to spend more on women's preferred goods such as clothing, education, non-grain items and children's education particularly girls are more likely to be enrolled in the school. Furthermore, Hou (2011) does not explore the possible nonlinearity and non-monotonic nature of bargaining power effect. The aim of chapter 5 is therefore, not only to explore the effect of mother's decision making power on her child's labour and schooling decision but also to explore the nonlinear and non-monotonic nature of the mother's decision making power as well.

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[49] Although some of the indicators analysed also have supply side effect but the overall objectives (the effect of trade and labour market) usually concerned demand side effects.

The chapter clearly shows that the mother's decision making power significantly affects child schooling and labour decision. Generally the effect is positive on child schooling decisions while negative on the child labour. However, the effect of mother's decision making power is non-monotonic for child labour only. There is a turning point, beyond which additional power gained by mothers may have a different effect on labour decision. Further to this chapter 5 also point out that the effect of mother decision making differs by gender. The effect is significant for girl's labour decision but insignificant for boy's labour decision. The effect differs across regions as well. The effect of mother's decision making power on her child's labour decision is significant only in rural areas.

Overall the dissertation predicts that globalization, labour market conditions and intra-household distribution of power significantly influence child labour supply and demand. In sum the dissertation points out that:

- Trade openness and FDI inflow after correcting for endogeneity raise the standard of living in an economy thereby reducing the supply of child labour.
- Income either measure by GDP per-capita or by income of the poorest quintile after correcting for endogeneity shows significant negative effect
- As trade and FDI both affect through income, credit market indicator does not show significant effect.
- Average years of adult schooling and foreign aid reduce child labour incidence significantly.
- For exports dissertation provides some mixed evidence. At macro level it reduces the supply of child labour by affecting the income of the poor. While at meso level the subcontracting of production process to small informal sector, producing raw material for the large exporting sector, increases the demand for child labour.
- the informal sector being unprotected by law employ a high proportion of child labour
- high adult wages in an area increase the demand for child labour
- presence of adult unemployed proportion in an area reduces the demand for child labour, in contrast to household adult unemployment which increases the supply of child labour
- agriculture sector increase the demand for child labour

- Mother's decision making power decreases the child labour supply and increases child schooling.
- The effect of mother's decision making power for her child's labour decision is significant only for girls while its effect on child schooling decision is significant for both girls and boys.
- Furthermore, the effect is non-monotonic for her child's labour decision only.

Any policy combating child labour incidence must take into account the role of above variables. For example, for globalization as discuss above, at the macro level dissertation points out that the channel through which trade and FDI could affect child labour is by increasing the income therefore, study recommend that trade sanctions may not have significant effect. Moreover, at macro level exports decreases child labour incidence while at meso level exports found to be increasing child labour incidence in the informal sector. There may be circumstances in which export may generate the demand for child labour in the informal sectors producing raw material for large scale sector. Therefore, study recommends that promoting trade liberalization policies may be meaningful in reducing child labour incidence by increasing income and raising living standard of the people. However as it may also generate child labour demand in informal sector therefore we recommend that trade policies such as relaxation of taxes and provision of subsidies and encouraging inflow of investment in the modern sectors, may help in the development of modern sectors through technological advancement. Technological advancement may decrease the reliance on human capital and may also increase income. Overall this will increase the standard of living (as evidence show) thereby effectively reducing the demand for child labour.

Next as analysis shows significant negative effect of income of the poorest quintile study recommend that effective policy to reduce child labour incidence within an economy should accompany with the efforts in reducing income inequality as well. The result also shows a highly negative and significant effect of increase in average year of adult schooling on incidence of child labour. In developing countries, mainly because of the low level of educational attainment, unskilled labourers are in abundance. This includes child labour as well. Therefore any increase in average years of schooling will result in skill formation leading to high wages and a reduction in the supply of child labour. Presence of high skilled labour increased labour productivity and economic

growth over the long run. It may also result in more equal distribution of income because of an increase in the relative wage for unskilled labour resulting from a reduced supply of unskilled labour. This may also help in attracting FDI, leading to further economic development.

The result also provides empirical evidence of the negative relationship between aid and incidence of child labour. Increasing aid flow from developed countries to developing countries was found to reduce child labour. Hence, the study concludes that if the developed nations fund programs that target working children for rehabilitation and education (like UNICEF program "food for education") this may help in reducing child labour in the developing countries. With the help of foreign aid, World Bank poverty reduction programs and UNICEF programs, a change could be made. Working children may end up going to school rather than working. With a ban on child labour and support for the education assistance programmes, children may benefit.

In case of Pakistan result shows that the demand for child labour usually arises because of the presence of informal, agriculture and export related sectors. Exporting sector employing children is usually informal in nature as one cannot find children in large scale manufacturing sector while agriculture sector is by nature informal. Overall these three sectors employing children can be considered as basically informal. Now the question arises, how to reduce the effect of informal sector on child labour? It is a very critical question. In Pakistan 74% of the economy is informal. Its role in generating employment, income and growth cannot be ignored. There is a paper by Burki and Afaqi (1996) on the role of informal sector in Pakistan economy. By considering its importance he concluded that it is necessary to develop these sector through inter or intra industry technology transfer. If this is the case then technology transfer could reduce child labour demand as there is ample evidence from the 19th century technology revolution that technology reduces child labour demand considerably.

Generally, in Pakistan the most common reason given by parents for sending children to work is to equip the children with skills. This situation can be moderated by providing vocational training based education with some small compensation. Realizing this fact, government of Pakistan has already started establishing the Vocational training

institutes. But the work is more concentrated in the urban areas (mainly in large cities) and targeting unskilled adult. This may be fruitful in long run as it will help in enhancing the skill and income of the adult labour which will definitely affect child labour supply. Some NGO's are also working at grass root level to provide skilled based education at school level with some compensation such as; a tin of oil, meal for one time a day or some small amount as compensation. But the work is still in progress and the fruit is yet to be analysed.

Finally, based on the finding of chapter 5, the study proposed that in-order to target poor mothers in the cash transfer programme it is necessary to understand the effect of distribution of power on the welfare of the household or on child related outcome in depth. Transferring cash to the mother may result in the human development of her child and it may lower child labour supply but the effect may not be same for all children and region. The effect of mother's decision making power varies based on the gender of the child and region residing. Moreover, the non-monotonic relationship between mother's decision making power on her child's labour stresses that the effect should be constantly reassessed. As the effect of cash transfer for reducing the child labour today may differ from the effect of tomorrow. The changes in the effect depend on the changing behaviour of the distribution of power with in the household.

Lastly, we also recommend that Governmental organizations, Non-governmental organizations, Women's organizations and other stakeholders (private initiatives, civil society etc.) should address women directly with awareness, literacy and skill related development programmes. For example agencies could implement skill based education programmes for the mothers. These skill base education strategies will also encourage husbands to support their wives in taking part in the employment opportunities. This will enhance mother's economic contribution which in turn improve their status and role within the house and outside in the community as well.

Table 6.1: Summary Findings

Chapters	Main Objective	List of Variables	Estimation Technique & Data set Used	Major Findings
Effect of Globalization and credit market imperfections on child labour	Investigate the link between globalization, defined as increase in trade openness and penetration of FDI, and incidence of child labour by taking in to account the role of credit market imperfections	**Dependent Variable:** Percentage of Economically Active Children Age 10-14. **Independent Variables:** Trade openness, FDI, Private Credit (% GDP), GDP per-capita, Income based on Poorest Quintile (Q1), Export & Import. **Control Variables:** Share of Agriculture and Manufacturing Sectors in GDP, Average Years of Schooling, Pupil Teacher Ratio, Female Labour Force Participation Rate, Aid (% GNI).	IV-2SLS and Tobit. **Endogenous Variables:** Income of Bottom Quintile, GDP per-capita, Trade Openness, Export, FDI and Private Credit as % GDP. Data set is based on 129 Developing Countries for 5 decades, 1970, 80, 90, 2000 & 2010	• Predicts the negative effect of income using two different measures of income, after correcting endogeneity bias, (i) GDP per-capita (ii) Income of the poorest Quintile (Q1)-helpful in testing the inequality argument as well. • Impacts of international trade and FDI on child labour, after correcting for endogeneity shows that, countries that are more open to trade and having higher FDI inflow have lower incidence of child labour. But this effect is principally channel through income. • As trade, export and FDI all affect child labour through income, the proposition that household will borrow when trade sanction reduces the income, in-order to avoid child work does not hold.
Labour Market Conditions and Child Labour	Explores the effect of Labour conditions on Child Labour incidence by arguing that Labour market indicators can produce both supply side and demand driven affects.	**Dependent Variable:** Economically Active Children Age 10-14. **Independent Variables:** Adult Wages at District and Household level, Adult Unemployment at Household and district level, Size of Informal, Agriculture and Exporting Sector at District level **Control Variables:** Child age & Gender, Gender of the household head, Education of the male & Female heads, Education of the spouse of male heads & household size.	Fixed Effect after making Pseudo Panel. Based on Cross sectional data of Labour Force Survey of Pakistan for the period 1990-91, 1991-92, 1992-93, 1994-95, 1997-98, 1999-2000, 2001-02, 2003-4, 2005-06 and 2007-08	• The demand for child labour arises mainly due to the adult wages, Size of informal, agriculture and exporting Sectors at District level. • The supply of child labour usually arises because of the high adult unemployed proportion in the household and low household wages. • Adult unemployment rate at district level shows that the higher the adult unemployed proportion in a division/district/city the lower will be the probability for a child to find an employment. • Presence of the export related industries in an area increases the probability of child work mainly due to the existence of subcontracting system. • Informal sector absorbs high proportion of child labour due its nature being not recognized or protected under the legal & regulatory frameworks.
Mother's Decision Making Power and Child's labour and Schooling Decisions	Intra-household distribution of power affects the child related outcomes	**Dependent Variable:** Children in labour force and in Schools, age 10-14. **Independent Variables:** Mother's Decision Making Index **Control Variables:** Child age & Birth order, Gender of the household head, Parents years of Schooling, household size, Living standard & durable Asset Index.	IV-Probit. **Endogenous Variables:** Mother's Decision making Index and Household Size. Based on Pakistan Standard of Living Measurement Survey- 2007-08	• Mother's Decision Making power significantly affect child schooling and labour decision. The effect is positive on child's schooling Decision while negative on the child's labour decision. • The effect is of mothers decision making power is nonlinear but non-monotonic for child labour.

6.2   Some Limitations and Future scope of the study

There are some fundamental limitations imposed on desk-based research studies that rely exclusively on existing literature and available datasets. This study also faces certain limitations. The first limitation that this study faced is the limited availability of data on economically active children aged 10-14. In chapter 4 the data on economically active population age 10-14 is taken from the ILO database of EAPEP [Economically Active Population, Estimates and Projections – 4th Editions (1996)]. The ILO has computed the activity rates by using the household survey data of individual countries. In order to make the data comparable across countries and time, several adjustments had been made by ILO. The adjustments were made because the individual country survey data vary in terms of definition of economically active population followed, geographical areas covered, type of survey available, age groups considered etc. Furthermore survey years also differ for each country. Although EAPEP provides comparable information on individual countries across time but the problem with this data is that very few countries have multiple observations available over time. Therefore much of the variation in child labor data is because of the imputations and adjustments made by ILO. This puts a question mark on the reliability of the estimates as well.

However, in the absence of the cross country comparable estimates with respect to time, many empirical studies have used this dataset for the assessment purpose (e.g. Cigno et al., 2002; Deheija and Gatti, 2002; Rogers, and Swinnerton, 2001 and many others). Although this study acknowledges the limitation of this dataset but in the absence of any comparable estimates, the empirical assessment of chapter 4 is also based on this dataset as well.

Second, measuring the mother's decision making power is a difficult task, both in-terms of finding the suitable measure and finding good quantitative surveys. The concept of decision making is multi-dimensional, difficult to define, identify or measure. It refers to a variety of attitudes and attributes, which are likely to vary across class, time, and space [Mayoux, (1998)]. The social, political and cultural dimensions of decision making process are interconnected, qualitative and subjective. This makes the assessment difficult [Goetz and Sen Gupta, (1996)]. Recently authors have used control

over resources and share of women earning as a decision making indicator. But as in Pakistan the women are less likely to be involved in outside paid work and the data on the ownership of assets is hard to find, the study cannot be based on these two indicators. Further to this, survey data of PSLM-2007-08, used to measure the decision making power, is the last available dataset that incorporates questions on the women decision making power of mother. After 2007-08, due to the changes in the strategies, the PSLM now only covers the living standard measurement questions (such as health, education, living conditions etc.). The PSLM 2007-08 provides information on the decisions related to purchase of food and clothing, decision about travelling and getting into employment etc. In the absence of data on control over resources and female earning share, the measure of decision making power is based on these indicators and the findings are for 2007-08 only.

Third limitation that this study faced is related to the identification of export related industries at division/district/city level. The pseudo panel constructed in chapter four provides in-depth assessment of the labour market conditions of Pakistan but the effect of export related industry may be over or under estimated. This is because of the absence of direct information on individual involvement in exporting firms. Labour Force Survey of Pakistan does not provide information about whether the person is directly engaged in an exporting firm or not. In the absence of the information, export related activity in a division/district/city was computed (as explain in Annex A- 4.21). Although the estimated size of the export related industry provides significant positive effect on child labour demand but here it is acknowledge that the estimates may be over or under estimated.

Finally in order to reach any final conclusion how child labour could be effected by the exports study recommend that future studies should explore the role of informal sectors providing input to the large scale exporting sector in depth. As in Pakistan national level surveys do not have information whether or not informal sectors are producing input for the large scale manufacturing directly, a study based on small sample may be helpful in order to get the in-depth knowledge. These small scale studies may address the labour market conditions in an area. For example, in Pakistan Sialkot city is famous for producing surgical instrument that cover a large part of exports as well. The industry is once famous for children employment. Due to the world pressure now, at the large

scale manufacturing sector, one cannot find working children. There might be a case of shifting of children from large scale manufacturing to informal sector. A small scale study addressing labour market conditions of Sialkot City may help in generalizing the impact in greater detail.

Furthermore, analysis of chapter 4 indicates that there exists substantial difference between the two periods, before and after 1995-96. This could be because of the changes in the trade polices due to the implementation of Child Deterrence Act of 1997. But because of the unavailability of the time series data on child labour, at cross country level and also in Pakistan, the effect of exogenous shocks, due to the changes in economic events after the implementation of act, cannot be assessed. It is widely accepted fact that a structural break is a common problem in macroeconomic series that are usually affected by policy changes. Therefore, the relationship between trade liberalization and incidence of child labour is likely to be subject to variation as a result of changes in the trade structure due to Child Deterrence Act of 1997. In this regard the study recommends that instead of using the cross country regression framework future studies can perform single country analysis where time series data is available. This may help in predicting the parameters, used for making inference or forecasting, more accurately.

Finally, study also acknowledges that chapter on labour market conditions should also have explored the work related injuries associated with child labour and the determinants of domestic child work. But due to time limitation these two points have not been explored in the dissertation. Study recommends that in future study can use the data from labour Force survey of Pakistan to evaluate the work related injuries. For child domestic work small sample survey can be used to analyse the factors promoting domestic child worker. Analysing the factors promoting child domestic work will be helpful in designing the policy to protect domestic child worker from violence especially in the case of Pakistan.

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