Will Trade Sanctions Reduce Child Labour?
The Role of Credit Markets: an Empirical Test.

Abstract

In this study we investigate the relationship between trade sanctions and child labor based on a theoretical model created by Jafarey and Lahiri (2002). In their study, Jafarey and Lahiri (henceforth JL) created a two goods and two periods model in which they examined the relationship between trade sanctions and child labor in the context of three scenarios, namely whether parents had access to an international credit market, or to a domestic credit market, or have borrowing constraints. This study investigates the first two scenarios. Using panel data of 141 countries over a period of 40 years, my results seem to confirm results found in JL. Nevertheless, my data suffers of an endogeneity problem which I overcame by using the method of two stages least squares estimation. Moreover, the two stages least squares method of estimation enabled me to look at both the direct and indirect effects of the relationship between trade sanctions and child labor.

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I. Literature Review

There are 218 million child laborers in the world. However, this number has decreased since 2002 by 11 percent. The highest decrease was noticed in the numbers of children working in hazardous works, it fell by 26 percent (ILO, 2006). The term "child labor" is difficult to define. The International Programme on the Elimination of Child Labor, IPEC, defines child labor as "work that deprives children of their childhood, their potential and their dignity, and that is harmful to physical and mental development." (IPEC, 2009). This definition refers to occupations that are mentally, physically, socially or morally dangerous and harmful to children. They deprive or interfere with children's schooling or an opportunity to get an education. They oblige children to leave school prematurely or require them to attempt to combine school attendance with excessively long and tedious tasks.

Child labor is not a recent phenomenon. Basu states that "British census data reveal that the incidence of child labor was very high in the early and middle nineteenth century. According to the Census of England and Wales in 1861, 36.9% of boys in the 10-14 age-group were laborers and the statistic for girls was 20.59%" (Basu, 10). Today, 95 % of child laborers are found in developing countries, with half of these children in Asia (Ranjan, 2001). There is a recent surge of interest on the issue of child labor originated from the Uruguay round of GATT negotiations. During this negotiation, some developed countries introduced environmental and social standards as legitimate basis for trade. Thus, many developing countries were forced to review their laws and practices concerning child labor. However, this did not solve the problem of child labor. To solve an endemic problem like child labor, it is necessary to know the roots of the problem. Child labor has four main determinants. The first is poverty. Neumayer and De Soysa states that "cases studies show, however, that is often impoverished parents that send their children to work in order to survive as a family."(Neumayer and De Soysa, 44) The second is schooling costs and conditions. The third is the availability and quality of education options. The fourth is that children are preferred by employers because they are cheaper and employers do not have to offer them benefits such as medical insurance or pension (Neumayer and Desoya, 45). Some authors suggest globalization as another determinant of child labor. There are many studies, both theoretical and empirical, that try to analyze the impact of trade on child labor. Amongst these studies is "Will trade sanction reduce child labour? The role of credit market" by Saqib Jafarey and Sajal Lahiri. Jafarey and Lahiri's is the focus of this paper.

Jafarey and Lahiri created a two-period model. The economy produces two goods per period. Good 1 and 2 are produced at t=1 and good 3 and 4 produced at t=2. Skilled labor produce goods 1 and 3 while unskilled labor produce goods 2 and 4. One unit of labor produces

one unit of good. Labor is the only input used to produce goods, but technology is held fixed. The wage rate of workers is determined by their marginal revenue, due to the lack of competition in the economy, the wage rate is equal to the marginal revenue. As a result, the price of each goods is also the wage rate for labour. Wage rates for skilled workers and the prices of goods produced by skilled workers are greater than wages rates for unskilled workers and the prices of goods produced by unskilled workers. The economy is a net exporter of goods produced by unskilled workers at each period. The economy is made up of households headed by a single parent. The single parent can be skilled or unskilled and receives wages according to his or her skills. This assumption allows the economy to have two types of households: rich when the parent is skilled and poor when the parent is unskilled. There is N identical numbers of children per household. Each child is born unskilled at t=1 and can receive education at t=2.

Children who do not receive education at t=1 work as full time unskilled workers in both periods. Children who receive education at t=1 become skilled and work as full time skilled labor at t=2. Nevertheless, the training decision is made solely by the parent. Each household's training decision is a fraction *e,* in which *Ne* children receive education and *N(1-e)* children work as child labor. At the equilibrium, the marginal benefit of sending one child to school is equal to the marginal cost. An increase of *e* has three effects. First, it leads to an increase of the pecuniary equivalent of the marginal utility in units of income. Second, it also leads to a direct increase of the household's future income discounted back to the present using the interest rate. Third, it results in a loss of current income due to the foregone wages of an unskilled child worker at t=1. Given an interior solution, *e* depends on the interest rate. The interest rate influences the borrowing or lending decisions of households. As a result, JL found a negative relationship between the parent training decision and the interest rate when parents are borrowers. Indeed, an increase of the interest lowers the pecuniary returns to education. At the same time, an increase of *e* lowers the welfare of borrowers. These actions will induce a lower choice of *e* and lower the marginal benefit of education.

The second objective of Jafarey and Lahiri model was to study how access to credits markets influences the training decision of a household. Thus, they only focused on poor households which are likely to borrow. They considered three credit market scenarios. The first scenario is a perfect credit market where all households are free to borrow from the international market. In this scenario, the interest rate is exogenous. The second scenario allows households to participate in a domestic credit market. Here, the interest rate is endogenous. In the third scenario, households face borrowing constraints. Introducing a temporary trade sanction in the three scenarios, they then analyzed the effect of the trade sanction on the training decision. They defined trade sanction as a reduction in the relative price of goods produced by unskilled labors. In the next paragraph, I will only report JL results for the two scenarios of interest for this study.

In the first scenario, a trade sanction has an ambiguous effect on *e*. Indeed, a decrease in the price of the exportable goods lowers the household's income causing a decrease of *e*. A

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decrease of *e* means that fewer children will be sent to school; consequently, more children will be sent to work. At the same time, a reduction of the price of exportable goods decreases the opportunity cost of sending children to school, which increases *e* (substitution effect). Thus, a trade sanction in the first scenario ends with two opposite effects of trade sanction on child labor. But, the final result depends on the parents' preferences. In the second scenario, households participate in a domestic credit market. Here, they consider the impact of trade sanction on both poor and rich households. Indeed, trade sanctions increases the income of rich households at t=1. Both exportable and importable goods are substitutes. A fall in the price of exportable goods increases the demand of importable goods, thus increasing the income of rich households. Since rich households are the supplier of funds in the credit market, an increase of their income increases the supply of loans. Trade sanctions reduce the income of the poor; consequently, it will increase the demand for loans raising the interest rate. The negative relationship between interest rate and the training decision of parents will cause more children to go to work than children going to school. In this scenario, the income effect is bigger than the substitution effect, as a consequence, interest rate will be higher. For poor households, the income effect is exactly as the effect of trade sanction in the first scenario. In the end, there is a positive relation between trade sanctions on the training decision.

Dehejia and Gatti (2003) also found results similar to JL's results, though their study was an empirical. In Dehejia and Gatti's study, they focused on the link between child labor and credit constraints. Their basic intuition is based on the fact that parents face tradeoff between current and future incomes. Sending kids to school reduces their current income, and at the same time, this helps to build a child's human capital, which will raise the family future income. If parents have access to credit markets, it allows the family to smooth their earnings over time. DG's results showed a strong negative relationship between child labor and borrowing constraints after controlling for income, rural population, imports, fertility and other variables that can influence child labor. They also considered income shocks or income variability, which they proxied by using the standard deviation of annual GDP growth in the previous 5 years. Introducing this variable in their regression, they found that the coefficient for income variability is positive and significant for countries with low access to credit. This paper's investigation is different from Dehejia's study because I consider a specific income shocks: a decrease of the price of exportable goods or increase of trade sanctions. The similarity between both studies is the use of CREDIT as a proxy for access to credit market, which is considered as a smoothing mechanism for income.

Much of the literature on child labor has focused on investigating the relationship between globalization and child labor. An example of this literature is a paper by Cigno, Rosati and Guarcello (2002). In their paper, they also focused on the same relationship. They defined globalization as "the process by which an increasing share of world production is traded internationally and the productive systems of different countries become increasingly integrated" (1579). They used an empirical framework in which they considered two dependent variables:

child labor and primary school nonattendance rate. Moreover, they also used two independents variables for trade. The first is trade ratio as a measure of openness and the second is the Sachs-Warner index. They defined child labor as 10-14 labor force participation which does not include children younger than 10. The second dependent variable is the primary school nonattendance rate, which is a complement to unity of the primary school net enrollment rate reported by the world development indicators. Cigno, Rosati and Guarcello found that trade increases the 10-14 labor participation rate and has no significant effect on the primary school nonattendance rate, if skill composition is not controlled. When skill composition is controlled, trade has no effect on both dependent variables. When they replaced the trade variable by the Sachs-Warner index, the relation between trade and child labor becomes negative.

Edmonds and Pavcnik (2006) focused on the relationship between international trade and child labor in a cross-country framework taking into account the possible endogeneity between both variables. This study is different from the three studies mentioned above because they examined various channels through which trade affects child labor. They identified two main channels. The first channel is through the effect of trade on income. Trade increases income, which is associated with a decline in child labor. The second channel is through the return to unskilled labor. Trade affects the relative return to unskilled labor, which in turn affects the level of child labor. To investigate their hypotheses, they used an empirical framework with three equations. The first equation is a simple linear equation, which describes the direct relationship between the percent of the 10-14 population economically active and openness. The second equation is a quadratic equation where they control the effect of income on child labor. The third equation focuses on the relationship between trade and child labor considering country characteristics. They solved the endogenous character of openness by instrumenting it for trade based on geography as in Frankel and Romer (1999). They found that there is a significant negative relationship between openness and child labor. The strength of this relationship lessens when they considered the endogeneity of openness. Next, they focused their study on low developing countries. They found that a 10 percent increase in openness causes child labor to decrease by 0.67 percent. Taking account endogeneity, the negative relationship between openness and child labor becomes even stronger for low income countries.

A second study by Edmonds and Pavcnik (2005) investigates the effect of trade liberalization on child labor. Contrary to their previous study mentioned above, where they used a cross-country framework, this second study uses a household-level data on 3000 rural households collected in 1993 and 1998 from the Vietnam Living Standard Survey. In this study, they specifically linked variations in the relative price of rice to variations in child labor using. They opted for a linear probability model as a method of estimation. Their dependent variable is the indicator of whether a child living in a community is engaged in child labor. They found a positive and significant relationship between the price of rice and child labor. They believe that this correlation between price of rice and child labor is spurious. There are two sources for this spurious correlation. First, the price of rice varies within regions. Second, the price of rice also

varies with a community's accessibility. Consequently, they needed to focus on the income effect of an increase price of rice. They allowed the relationship between the price of rice and child labor to vary across households with household net production. Using this new framework, their variable of interest had a negative coefficient making their results consistent with the theoretical discussion. They concluded that an increase in the price of rice causes a decrease in child labor in household that are net producers and an increase in child labor in household that are net consumers of rice.

This study has two objectives. The first objective is to investigate the relationship between trade sanctions and child labor when parents have access to an international credit market or to a domestic credit market. The second objective is to see if an empirical model can confirm the results found by JL. In other words, the primary objective of this study is to see how the theoretical model captures reality. The rest of this paper is structured as follows. Section 2 contains data description and their sources. Section 3 presents the empirical framework. Section 4 gives the results and section 5 is the conclusion.

II. Data Description and Sources

This study investigates the relationship between child labor and trade sanctions. It uses the definition of child labor as adopted by the International Labour Organization (ILO). ILO defines child as a person of less than 15 years of age. A child is considered as being economically active if he or she does work on a regular basis for which he or she is remunerated or which results in output which reaches a market. Data used in this study are from 140 countries (both low and middle income countries) for a period of 40 years (from 1940 to 2000). Table I gives definitions of each variable and their sources. Child is the dependent variable while other variables are independent, except for legal origins which are dummy variables.

Table I: Variable Definitions

CHILD
Share of the active population between the age of 10 and 14 over total population between 10 and 14.
Proxy: Child labor
Source: ILO

EXP
Export of goods and services is the sum of merchandise exports. (Percentage of GDP).
Proxy: Exportable goods
Source: World Development Indicators

IMP
Import of goods and services is the sum of merchandise imports, imports of (non-factor) services and factor payments. (Percentage of GDP).
Proxy: Importable goods
Source: World Development Indicators

CREDIT
Private credit by deposit money banks to GDP.
Proxy: Access to Credits
Source: Beck et al. (1999)

M2
Money and quasi money comprise the sum of currency in circulation and demand deposits (except those of the central government), time, savings, and foreign currency deposits of resident sectors other than the central government. (Percentage of GDP)
Proxy: Level of development of the domestic market
Source: World Bank Indicators

LGDPC
Logarithm of real GDP per capita. (PPP, constant 2005 international).
Proxy: Income
Source: Author's own calculations.

INTRATE
Real interest rate (percentage) is the lending interest rate adjusted for inflation as measured by the GDP deflator.
Proxy: Interest rate
Source: World Development Indicators.

LEGAL ORIGINS
Dummy variables for Leg_Uk (British). Leg _Fr (French), Leg_So (Socialist), Leg_Ge (German) and Leg_Sc (Scandinavian)
Proxy: legal Origins
Source: Dehejia et al. (2002) from La Porta, Lopez-de-Silanes, Shleifer,

Table II: Data Description

stats	child	exp	imp	credit	m2	lgdpc	intrate	int_crd	exp_crd
N	4288	3913	3959	2793	3426	4219	1809	1521	2683
mean	.2491737	28.39721	37.43994	.2036609	31.31022	3.354545	5.745439	1.928755	7.250179
sd	.1678915	18.26228	23.05028	.1801033	41.67172	.3586344	25.2929	3.429171	11.39066
max	.794	131.479	173	1.659618	1450	4.459682	790	29.17217	178.9202
min	.0001	.0231293	1.05	.0040861	.0462	2.231852	-98.1	-15.1235	.000535

stats	int_m2	exp_m2	exp_int
N	1774	3290	1768
mean	250.8296	991.9345	178.955
sd	822.4642	1358.07	774.7794
max	25280	24829.8	14204.99
min	-3446.1	.3751902	-7762.739

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Table III: Correlations among Variables

	child	exp	imp	credit	m2	lgdpc	intrate	int_crd	exp_crd	int_m2
child	1.0000									
exp	-0.2866	1.0000								
imp	-0.1167	0.6784	1.0000							
credit	-0.3371	0.3366	0.2288	1.0000						
m2	-0.4396	0.2979	0.2794	0.7561	1.0000					
lgdpc	-0.7310	0.4179	0.1754	0.4557	0.4239	1.0000				
intrate	-0.0702	0.0069	0.0369	0.1593	0.0567	0.1281	1.0000			
int_crd	-0.2386	0.0474	0.0202	0.5331	0.3175	0.3161	0.6847	1.0000		
exp_crd	-0.2745	0.5663	0.3758	0.8393	0.6722	0.3744	0.0459	0.3156	1.0000	
int_m2	-0.1959	0.0749	0.0704	0.3971	0.3076	0.2635	0.8411	0.8747	0.2378	1.0000
exp_m2	-0.3582	0.6657	0.4718	0.7311	0.7916	0.4169	0.0189	0.2315	0.9211	0.2270
exp_int	-0.1266	0.2101	0.2060	0.1719	0.1042	0.1473	0.8231	0.5350	0.1500	0.6821

	exp_m2	exp_int
exp_m2	1.0000	
exp_int	0.1545	1.0000

Table II gives a description of each variable. Table III presents the correlation between variables. Consistent with the first scenario, child labor is negatively related to export, credit, M2, and interest rate. Nevertheless, this negative correlation between CHILD and other variables can also be an indication of an endogeneity problem that might exist in the data. Endogeneity rises naturally from the theoretical model. In the theoretical model, one unit of labour produces one unit of good. Labour is the only input used to produce goods. The wage rate of workers is determined by their marginal revenue, due to the lack of competition in the economy, the wage

rate is equal to the marginal revenue. As a result, the price of each goods is also the wage rate for labour.

III. Empirical Methodology

Since, I consider two scenarios of the three presented in JL (2002). I use both fixed effects and two stages least squares estimations. The fixed effects method of estimation enables me to investigate the relationship between parents' incomes and parent's training decisions while taking into account the heterogeneity that exists between countries. I first estimate two equations using the fixed effects estimation. The two equations are:

(1) $Child_{it} = \alpha_i + \beta_1\, Lgdpc_{it} + \beta_2\, Exp_{it} + \beta_4\, Intrate_{it} + \beta_5\, Exp\_Int_{it} + \varepsilon_{it}$

(2) $Child_{it} = \alpha_i + \beta_1\, Lgdpc_{it} + \beta_2\, Exp_{it} + \beta_3\, Imp_{it} + \beta_4\, Intrate_{it} + \beta_5\, Credit_{it} + \beta_6\, M2_{it}$

$\qquad\qquad + \beta_7\, Inter_{it} + \varepsilon_{it}$

The first equation describes the former scenario while the second equation describes the latter scenario. I include an exogenous variable, *Inter,* which proxies for interaction terms. I created five interactions terms: exp_crd, exp_int, exp_m2, int_m2, and int_crd. These interactions terms capture the combined effects of both an increase (or decrease) of exports and interest, exports and credit, export and M2, interest rate and M2, and interest rate and credit. The equations for the two stages least squares method of estimation are:

(1) $Lgdpc_{it} = \theta_i + \delta_1\, Exp_{it} + \delta_2\, Legal\ Origins_{it} + \mu_{it}$

(2) $Child_{it} = \alpha_i + \beta_1\, Lgdpcest_{it} + \beta_2\, Exp_{it} + \beta_4\, Intrate_{it} + \beta_5\, Exp\_Int_{it} + \varepsilon_{it}$

(3) $Lgdpc_{it} = \theta_i + \delta_1\, Exp_{it} + \delta_2\, Impt_{it} + \delta_3\, Legal\ Origins_{it} + \mu_{it}$

(4) $Child_{it} = \alpha_i + \beta_1\, Lgdpcest_{it} + \beta_2\, Exp_{it} + \beta_3\, Imp_{it} + \beta_4\, Intrate_{it} + \beta_5\, Credit_{it} + \beta_6\, M2_{it} + \beta_7\, Inter_{it} + \varepsilon_{it}$

Equations (1) and (3) are the first stage equations which describe the direct effect of trade sanctions on parent's incomes. They also describe the income effect. Equations (2) and (4) are the second stage equations in which I include the estimation of parents' income (*Lgdpcest*). The two stage least squares capture both the direct effect and indirect effects of trade sanctions on child labor, inversely, trade sanction and children schooling.

IV. Empirical Results

Empirical results of the fixed effect estimation are reported in the table below.

Table IV: Fixed Effect Estimation (CHILD: dependent variable)

Variables	First scenarios	Second Scenarios
LGDPC	-0.0963*	-0.0740*
	(0.0107)	(0.0123)
EXPORT	-0.000439*	-0.00084*
	(0.0001)	(0.00015)
IMPORT		0.000332*
		(0.0001)
INTRATE	$5.95 \ 10^{-05}$	$-7.60 \ 10^{-05}$
	$(6.73 \ 10^{-05})$	(0.000141)
EXP_INT	$-6.03 \ 10^{-06}$ **	$-6.32 \ 10^{-07}$
	$(2.86 \ 10^{-06})$	$(3.08 \ 10^{-06})$
CREDIT		0.0131
		(0.0229)
M2		-0.000769**
		(0.00042)
EXP_CRD		0.000160
		(0.0004)
EXP_M2		$1.20 \ 10^{-06}$
		$(5.16 \ 10^{-06})$
INT_CRD		-0.000337
		(0.00064)
INT_M2		$-1.23 \ 10^{-05}$**
		$(6.20 \ 10^{-06})$
Observations	1431	1216
R-squared	0.97	0.98
Adjusted R-squared	0.96	0.98
F-statistic	486.884	542.5017

Notes: *, **, *** represent significance at the 1, 5 and 10 percent levels. Standards errors are in parentheses.

According to the theoretical study by JL (2002), when parents have access to an international credit market, trade sanctions have two opposite effects on child labor. The first effect is a decrease of parent's income which increases child labor. The second effect increases the number of children going to school by decreasing the opportunity cost of going to school. The end result is an ambiguous effect on child labor. Nevertheless, the end result depends on parents' preferences. JL defines trade sanction as being a fall in the price of exportable goods. Using this definition, the empirical results show that a decrease of exports decreases child labor and this relationship is significant. The relationship between income and child labor is negative and significant at the one percent level. This result is consistent with results found in the study by Dehjia et al. (2003), Kruger 2007, Edmonds and Pavcnik 2005, Edmonds and Pavcnik 2006, etc. The interest rate coefficient is positive and insignificant. The insignificant relationship between the interest and child labor is not surprising because the interest is exogenous in the first scenario. The coefficients of the interactions term between export and interest rate is negative and significant. This coefficient describes the end result of trade sanctions on child labor when parents have access to international credit market. The empirical results confirm the theoretical results of JL (2002).

In the JL model, the second scenario result to an unambiguous positive relationship between trade sanctions and the incidence of child labor while considering the interest rate as endogenous. The interest rate is endogenous since this scenario has a domestic credit market where rich families supply loans to poor families. Important coefficients are coefficients for lgdpc, export, import, intrate, credit, and m2. Consistent with both the theoretical results, income has a significant and negative relationship with child labor. The more income a family has, fewer children will be sent to work or more children will go to school. A trade sanction or a decrease of exports increases child labor through its actions on parent's incomes. If trade sanction is considered as a shock to household's incomes, our empirical result is consistent with the results found by Guarcello et al. (2009). Contrary to the first scenario, the coefficient for interest rate is still negative but insignificant. This coefficient fails to capture the important role that the interest rate plays in this second scenario because the interest rate determines the ability of poor families to borrow, and, how many children are sent to work or to school. Having access to a credit market allows poor families to borrow for financing the education of their children. I used credit as a proxy for access to credit market; nevertheless, the interpretation of its coefficient should be made with cautious. Credit is defined as private credit by deposit money banks to GDP thus capturing access to the official credit market in which poor families cannot participate since they do not have collaterals. Thus a positive coefficient for credit will capture the positive relationship between child labor and access to the official credit market. For this study, I interpret a positive coefficient as being negative. Therefore, an access to unofficial credit market leads to a fall of child labor. This negative relationship is consistent with the intuition since poor parents use credit as a way to smooth their incomes. Dehejia et al (2002) also have the same results. The coefficient for M2 is negative and significant at the five level percent capturing the relationship

between the level of development of financial market with child labor. Thus, greater development of financial institutions correlates with lower child labor. This result is consistent with Beck et al. (2004). In their study, they have found evidences that credit issuing intermediaries are pro-poor and increase primary school enrollment.

I perform a Hausman test to see if the random effect is a better approach for this study. The results of the two tests are in the table below. For the first scenario, the chi-square statistics is 53.9352 which is greater than the critical value from the chi-squared table, so the null hypothesis is rejected. For the second scenario, the chi-square statistics is 62.0448 which is also greater than the critical value from the chi-squared table, so the null hypothesis is also rejected. Thus, a fixed effect model is appropriate for this data.

Table VI: Hausman Tests

Scenario	Test Summary	Chi-sq statistic	Chi-Sq. d.f.	Prob
1	Cross-section random	53.9352	4	0.0000
2	Cross-section random	62.0448	11	0.000

The empirical results from the two stages least square is presented in table VII where columns (1) and (3) report results of the first stage and columns (2) and (4) report the second stage least. In Jafarey and Lahiri model, endogeneity raise naturally due to the setup of the model. Considering this fact, I performed a Durbin-Wu-Hausman test in order to see if the endogeneity was present in the data. I found a p-value of 0.000 confirming the presence of endogeniety in the data.

Table VII: Two Stages Least Squares Estimation

Variables	First Scenario		Second Scenario	
	(1) **LGDPC**	**(2)** **CHILD**	**(3)** **LGDPC**	**(4)** **CHILD**
LGDPCEST		-0.2984* (0.0394)		-2.7879* (0.0424)
EXPORT	0.00931* (0.0003)	-0.0002 (0.0003)	0.0107* (0.00004)	-.0009 (0.0006)
IMPORT			-0.0019* (0.0003)	0.0008* (0.0002)
LEG_UK	-1.19* (0.0203)		-1.1842* (0.2104)	
LEG_FR	0.0222 (0.0203)		0.0146 (0.2030)	
INTRATE		0.0003 (0.00027)		0.0015** (0.0006)
CREDIT				0.0525 (0.0678)
M2				-0.0048* (0.0006)
EXP_INT		-0.00002** $(9.79 \ 10^{-06})$		-0.00004* (0.00001)
EXP_CRD				0.00233 (0.00151)
EXP_M2				0.00001 (0.00017)
INT_CRD				-.014067* (0.00273)
INT_M2				0.0000593** (0.00002)
Observations	3464	1495	3449	1263
R-squared	0.21	0.14	0.21	0.32
Adjusted R-squared	0.21	0.13	0.21	0.31

| F-statistic | 311.45 | 61.38 | 239.61 | 53.69 |

Notes: *, **, *** represent significance at the 1, 5 and 10 percent levels. Standards errors are in parentheses.

A challenge in testing JL model is to capture the direct and the indirect effect that arise in their model. An advantage of using the two stages least squares method is that it enables me to see both the direct and indirect effects of trade sanctions and child labor. Columns (1) and (3) give the results of the first stage which represents the direct effect. Columns (2) and (4) give the results of the second stage which shows the indirect effect. For the first scenario, there is a positive and significant relationship between trade sanctions and parent's income hence consistent with theoretical results. Two of the four instrument variables used in the first stage were dropped due to collinearity, only the coefficient for British legal origin was negative and significant. The negative relationship between income and child labor is confirmed in the second stage. The coefficient for export is negative and shows the indirect relationship between trade sanction and child labor. Hence, a fall of exports causes an increase of child labor. The results from the two stage least squares substantiate Jafarey and Lahiri's conclusions.

The first stage results for the second scenario are similar to the first stage results for the first scenario. In the first stage, import has a negative and significant relationship with income. The coefficients for income and exports are both negatives as predicted by Jafarey and Lahiri. Moreover, the coefficient of interest rate is positive suggesting that an increase of interest rate causes an increase of child labor supporting the JL results. Poor families reduce their demand of loans as interest rate increases; consequently, they will send more children to work than to school. The coefficient for credit is insignificant as most of the interaction terms. The coefficient for M2 is negative hence consistent with both the results of the fixed effects estimation and JL results. Three of the interaction terms have significant coefficients.

V. Conclusion

This study investigated the relationship between trade sanction and child labor using a theoretical model by Jafarey and Lahiri as the background. JL created a two-period model of an economy made up of two types of households headed by a single parent with identical numbers of children. Parents decide on whether to train their children or send them to work. This decision depends on the parents' incomes which in turns depend on the price of exportable and importable goods. They also investigate how the relationship between trade sanction and child labor changes when parents have access to credit markets. In this effect, they considered three scenarios. I focus on the first two scenarios. The empirical results seem to confirm the theoretical results. There are two mechanisms through which trade sanction affects child labor. The first is a direct effect of trade sanction on poor parents' income. Trade sanction, defined as decrease of export, decrease poor parents' income. A decrease of parents' incomes increases child labor resulting to fewer children going to school. This first effect is similar for both scenarios. For the

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second scenario, I also investigated the impact of a change of interest rate on parents' incomes. Interest rates determine how much parents are able to borrow because they use loans as a way to smooth their consumption and pay for their children education. Thus, an increase in interest rates decreases the number of children being sent to school and, increases child labor. Faced with both a trade sanction and an increased interest rate, parents will send fewer children to school.

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