The Impact of Fair Trade on Child Labor Working Hours in a Small Open Economy

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Motivation

- Worldwide, 160 million children are engaged in child labor (ILO and UNICEF, 2020)

- **Official bans on child labor are not always effective**, rather they might dig child labor into the shadow economy. For instance, India's Constitution prohibits the employment of children under the age of 14 years, yet the 2011 Census recorded 10.1 million working children.

- One possible approach is the Fair Trade (FT). To obtain FT label, firms **must refrain from employing child labor,** pay **higher crop prices to farmers** (reflecting as FT wages), and provide **the FT premium** to farmers' unions to support improvements in local infrastructure.

FT minimum prices (FT farmers' wages) and FT premium

	Product ↓↑	Quality ↓↑	Form ↓↑	Country / Region ↓↑	Producer Scope ↓↑	Price level (INCOTERMS) ↓↑	Quantity / Unit ↓↑	Currency ↓	Fairtrade minimum price ↑	Fairtrade premium ↓
+	Coffee	Conventional	Arabica;Natural	Worldwide	SPO	FOB	1 pound	USD	1.35	0.2
+	Coffee	Conventional	Arabica;Natural	Worldwide	SPO	FOB	1 pound	USD	1.75	0.2
+	Coffee	Conventional	Arabica;Washed	Worldwide	SPO	FOB	1 pound	USD	1.4	0.2
+	Coffee	Conventional	Arabica;Washed	Worldwide	SPO	FOB	1 pound	USD	1.8	0.2
+	Coffee	Conventional	Robusta;Natural	Worldwide	SPO	FOB	1 pound	USD	1.01	0.2
+	Coffee	Conventional	Robusta;Natural	Worldwide	SPO	FOB	1 pound	USD	1.2	0.2
+	Coffee	Conventional	Robusta;Washed	Worldwide	SPO	FOB	1 pound	USD	1.05	0.2
+	Coffee	Conventional	Robusta;Washed	Worldwide	SPO	FOB	1 pound	USD	1.25	0.2

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Search: coffee

URL: https://www.fairtrade.net/standard/minimum-price-info

FT Premium Utilization: A Case in Point

Funding safe activities for kids

Fairtrade producers want to enrich their communities through their work.

The Fairtrade Premium gives them extra funds to bring their ideas to life.

In the banana-growing villages of Santa Marta in Colombia, there aren't many after-school activities for children – aside from hanging out in billiards halls.

To provide local kids with more options, members of the Coobafrio cooperative decided to invest some of the Fairtrade Premium they earned from their banana sales into some fun and healthy alternatives. The cooperative established a football school (seen here), an athletics club, a big band, and other after-school activities that give kids safe places to play and learn.

URL: https://www.fairtrade.net/impact/fairtrade-premium-overview

Related literature

❑ A large number of theoretical papers analyze child labor and explore measures to reduce its incidents (e.g. Basu & Van 1998, Basu 1999, Davies 2005, Dinopoulos & Zhao 2007, etc).

❑ Theoretical studies construct the mechanism of fair trade and investigate its impacts (Richardson & Stähler 2014, Podhorsky 2015, Gelder et al. 2021, Strelchenko & Abe 2021).

▪ Despite some descriptive studies discussing the effects of fair trade on child labor (Baradaran & Barclay 2011; Krasnozhon, Simpson, & Block 2015), **previous analytical studies on fair trade do not address the problem of child labor in their analysis**.

Objectives and Novelty of the study

❑   This study analytically examines the impact of fair trade on child labor in a small open economy (developing country), capturing the behavior of a fair-trade firm, which employs only adult workers, and a non-fair-trade firm, which may employ both adults and children.

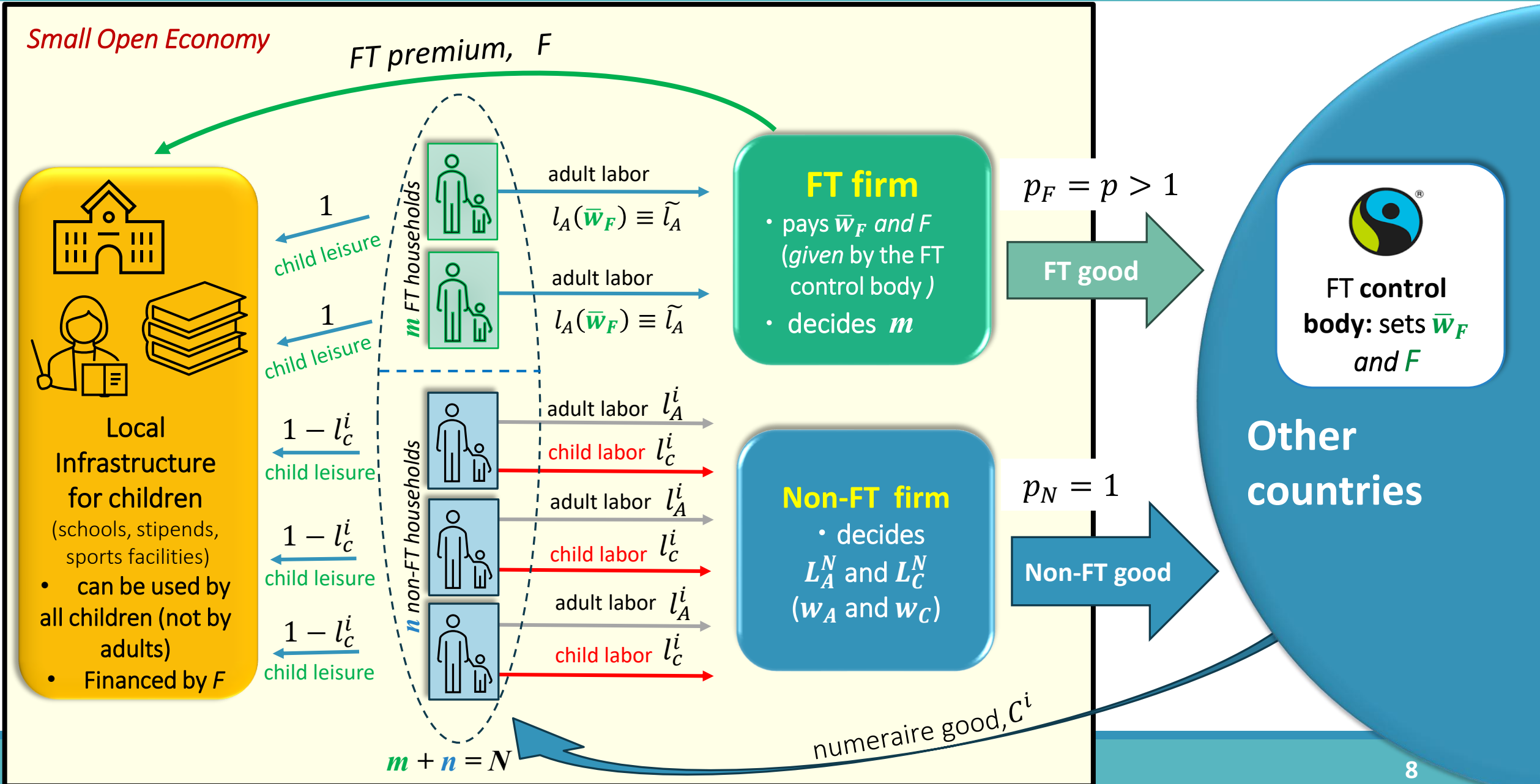❑   This study adds to the knowledge on efficient measures to combat child labor.

Novelty:

- Introduction of fair trade into a formal model with child labor, addressing both demand and supply sides of child labor.

- Analysis of the effects of key fair trade components: **FT world prices, FT wages (FT input prices), and FT premium**

- Derivation of a condition that ensures the child-labor-reducing impact of local infrastructure financed by the FT premium.

The Model

- A small open economy with a given number of households, *N.*

- All households consist of 1 adult and 1 child. Every child and every adult has an endowment of time equal to 1.

- There are **m FT households**, that do not force their children to work, and **n non-FT households**, whose adults force their children to work. *m and n are endogenous.*

- **Two firms** - a **non-FT firm** that employs both adults and children and produces a non-FT good and **an FT firm** that employs only adults and produces an FT good.

- FT firm pays **FT wage** and **FT premium** (set by *the FT control body)* and gets **world FT price**

- FT premium is used to finance local infrastructure for children

Sketch of the model of a Small Open Economy (Developing country)

Households' Preferences

Following Basu, Das, and Dutta (2010) and Dumas (2013), we use additively separable form of **utility function for each household** :

$$U^i = u_A\left(1 - l_A^i\right) + F u_C\left(1 - l_c^i\right) + C^i, \qquad i = 1, \ldots, N \qquad (1)$$

- $u_A\left(1 - l_A^i\right)$ is the utility derived from the adult's leisure time, where l_A^i is the adult labor supply of i household in terms of time.
  - $u_A' > 0, \quad u_A'' < 0$
- $u_C\left(1 - l_c^i\right)$ is the utility derived from the leisure time of a child, where l_c^i is the child labor supply of i household in terms of time.
  - $u_C' > 0, \quad u_C'' < 0.$
- C^i – numeraire good (imported) consumed by i household .
- F – local infrastructure

Local infrastructure (1)

- **One major barrier to the eradication of child labor** is the underdevelopment of local infrastructure (schools, stipends, sports facilities, etc.)

- According to the "World Cocoa Foundation," poor local infrastructure increases the involvement of children in hard work

  o Local infrastructure may increase the opportunity costs of child labor, thereby creating a micro foundation for a decline in child labor

Local infrastructure (2)

- FT premium (F) is paid by the FT firm to develop the local infrastructure.

- This infrastructure can be used by all children, regardless of the household type.

- We assume that children's leisure is valuable for households only in the presence of local infrastructure. Otherwise, neither type of household would extract utility from their children's leisure.
    - To exclude this case, we assume $F > 0$.

The non-FT households (1)

- The budget constraint of the non-FT households:

$$C^i = w_A l_A^i + w_C l_c^i, \qquad i = 1, \dots, n$$

where w_A is the wage of the non-FT adults, w_C is the wage of the children employed by the non-FT firm.

- Maximization of utility (1):

First-order conditions:

$$-u_A' + w_A = 0 \qquad (2)$$

$$-u_c' + \frac{w_C}{F} = 0 \qquad (3)$$

non-FT households are symmetric

Labor supplies
of non-FT adults and of children:

$$l_A^i = l_A(w_A), \qquad i = 1, \dots, n,$$

$$l_C^i = l_C(w_C/F), \qquad i = 1, \dots, n.$$

The non-FT households (2) – labor supplies

Using Equations (2) and (3):

The adult labor supply increases with the non-FT adult wage	$$\frac{\partial l_A}{\partial w_A} > 0$$
The child labor supply increases with the children's wage	$$\frac{\partial l_C}{\partial w_C} > 0$$
The child labor supply decreases with the FT premium (local infrastructure)	$$\frac{\partial l_C}{\partial F} < 0$$

The FT households

- FT households do not allow children to work, whereas adults are employed by the FT firm.

→ their only source of income is the FT wage, denoted as $\overline{w}_F$

Each FT household maximizes:

$$U^i = u_A\left(1 - l_A^i\right) + F u_C(1) + C^i, \qquad i = 1, \dots, m.$$

The budget constraint: $C^i = \overline{w}_F l_A^i, \quad i = 1, \dots, m$

- Labor supply:

$$l_A^i = l_A(\overline{w}_F) \equiv \widetilde{l_A}, \qquad i = 1, \dots, m,$$

$$l_C^i = 0, \qquad i = 1, \dots, m.$$

The FT firm (1)

- The FT firm employs only adults and produces the FT good. The world price of the FT good is $p > 1$.

- The FT firm pays the FT wage, $\overline{w}_F$, and the FT premium, F. Both are decided by the FT control body $\rightarrow$ **the FT firm anticipates both as given.**

- The total labor supply of FT adults is given by $L_A^F = m l_A(\overline{w}_F) \equiv m \widetilde{l_A}$.

- **FT firm's profit:**

$$\pi^F = p f(L_A^F) - (\overline{w}_F + F) L_A^F$$

where $f' > 0$ and $f'' < 0$.

The FT firm (2)

- The FT firm does not decide the labor supply of a single FT household because the FT wage is fixed. But **it controls the number of FT households, $\boldsymbol{m}$**.

- First-order condition:

$$f'\left(m\widetilde{l_A}\right) = \frac{\bar{w}_F + F}{p} \qquad (11)$$

- Equilibrium number of FT households:

$$m^* = m(p, \bar{w}_F, F) = \frac{L_A^{F^*}(p, \bar{w}_F, F)}{l_A(\bar{w}_F)} \qquad (12)$$

Total supplies of the non-FT adult and child labor

- All households whose adults are not employed by the FT firm become n non-FT households:

$$n^* = N - \frac{L_A^{F^*}(p, \overline{w}_F, F)}{l_A(\overline{w}_F)}$$

Total supplies of the non-FT adult and child labor	The inverse supplies
$L_A^N = n^* l_A(w_A),$	$w_A = w_A(L_A^N/n),$
$L_C^N = n^* l_C(w_C/F).$	$w_C = w_C(L_C^N/n, F).$

The non-FT firm (1)

- The non-FT firm employs both adults and children to produce the non-FT good (world price is 1).

- **The non-FT firm's profit** :

$$\pi^N = h\left(L_A^N, L_C^N\right) - w_A\left(L_A^N/n^*\right)L_A^N - w_C\left(L_C^N/n^*, F\right)L_C^N$$

The non-FT firm (2)

- The non-FT firm chooses L_A^N and L_C^N to maximize the profit

- The first-order conditions:

$$h_A - w_A(L_A^N/n^*)\left(1 + \frac{1}{\varepsilon_A}\right) = 0, \qquad (18)$$

$$h_C - w_C\left(L_C^N/n^*, F\right)\left(1 + \frac{1}{\varepsilon_C}\right) = 0, \qquad (19)$$

where $\varepsilon_i, \quad i = A, C$ are the constant elasticities of the non-FT adult and child labor supplies

Equilibrium →

$L_A^{N^*} = L_A^N(n^*, F, \varepsilon_A, \varepsilon_C),$	$w_A^* = w_A(p, \overline{w}_F, F, N, \varepsilon_A, \varepsilon_C)$
$L_C^{N^*} = L_C^N(n^*, F, \varepsilon_A, \varepsilon_C)$	$w_C^* = w_C(p, \overline{w}_F, F, N, \varepsilon_A, \varepsilon_C).$

The effects of the *FT world price* on the number of FT households and on children's total working hours

Differentiating (11) and using F.O.C. of the FT firm

$$\frac{dm^*}{dp} = -\frac{f'}{p\widetilde{l}_A f''} > 0.$$

Lemma 1. *A rise in world prices on FT goods reduces the number of non-FT households (the number of working children) in an open small economy.*

*As the total number of households is exogeneous (and $N = m + n$) → the effects of p, $\overline{w}_F$, and F on $n*$ are opposite in sign to those on $m*$

The effects of the *FT world price* on the number of FT households and on children's total working hours

- Totally differentiating (18) and (19) to obtain:

$$H \begin{pmatrix} dL_A^N \\ dL_C^N \end{pmatrix} = \begin{pmatrix} \pi_{AP}^N \\ \pi_{CP}^N \end{pmatrix} dp + \begin{pmatrix} \pi_{A\bar{w}_F}^N \\ \pi_{C\bar{w}_F}^N \end{pmatrix} d\bar{w}_F + \begin{pmatrix} \pi_{AF}^N \\ \pi_{CF}^N \end{pmatrix} dF \qquad (24)$$

H is the Hessian matrix of π^N. $\pi_{AA}^N < 0, \pi_{CC}^N < 0$ and $det\ H \equiv |H| > 0$ to ensure the SOC.
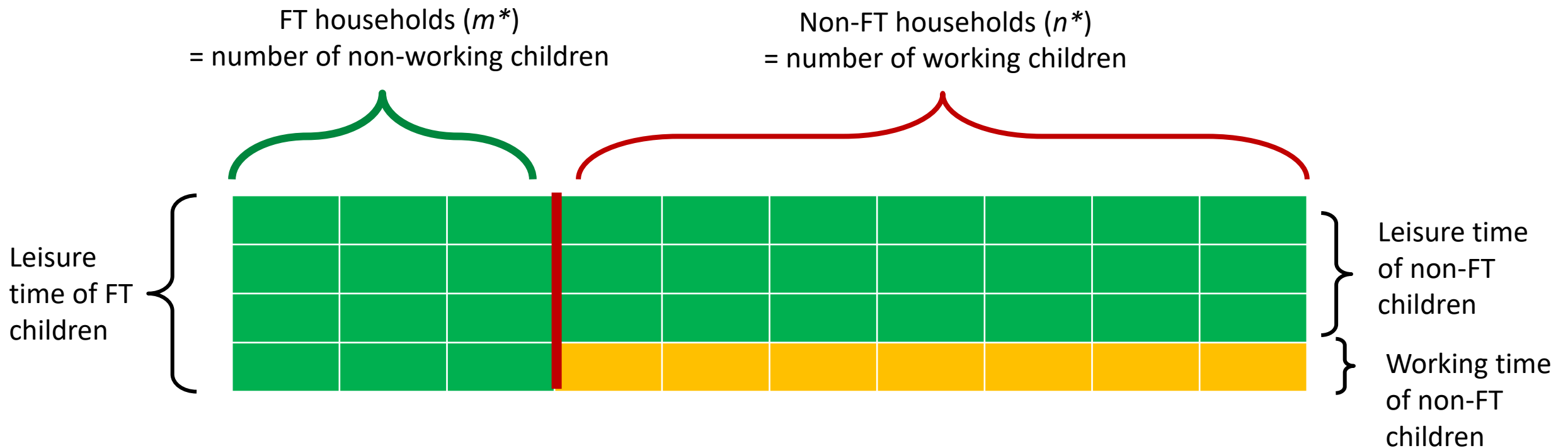
$$\frac{dL_C^{N^*}}{dp} = \frac{\pi_{AA}^N \pi_{CP}^N - \pi_{CA}^N \pi_{AP}^N}{|H|} > 0$$

Proposition 1. An increase in the FT world price reduces the number of working children (a share of non-FT households); however, it increases the total working hours of children in developing country.

The sketch of the effect of an increase in *FT world price*
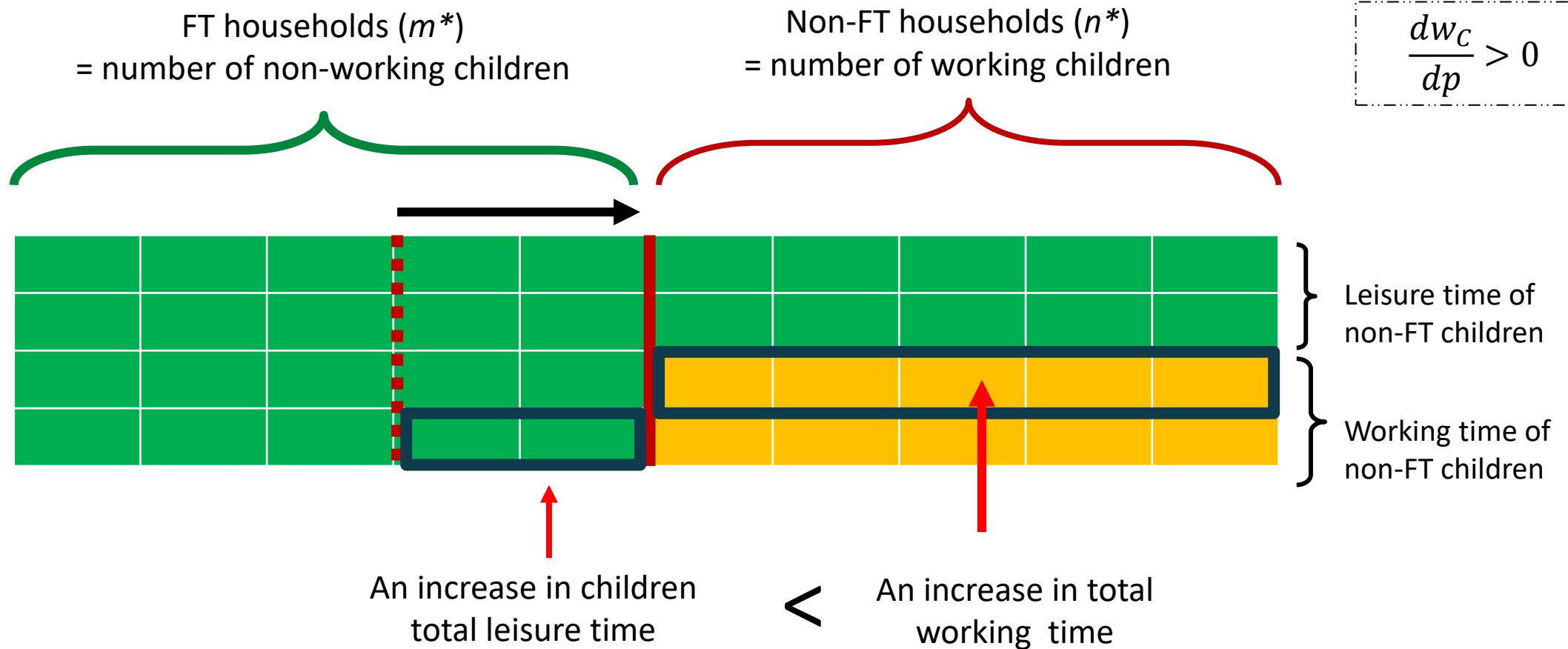## Prior to the increase in p

FT households ($m*$)
= number of non-working children

Non-FT households ($n*$)
= number of working children

Leisure time of FT children

Leisure time of non-FT children

Working time of non-FT children

The sketch of the effect of an increase in *FT world price*
After the increase in p

$$\frac{dL_C^{N*}}{dp} > 0$$

$$\frac{dw_C}{dp} > 0$$

FT households ($m*$)
= number of non-working children

Non-FT households ($n*$)
= number of working children

Leisure time of non-FT children

Working time of non-FT children

An increase in children total leisure time $<$ An increase in total working time

The effects of the FT wage on the number of FT households and on children's total working hours

Differentiating Equation (11) with respect to $\overline{w}_F$ yields:

$$\frac{\partial m^*}{\partial \overline{w}_F} = \frac{1}{p\widetilde{l_A}f''} < 0$$

Lemma 2. *A rise in the minimum FT wages increases the number of non-FT households in a small open economy.*

The effects of the FT wage on the number of FT households and on children's total working hours
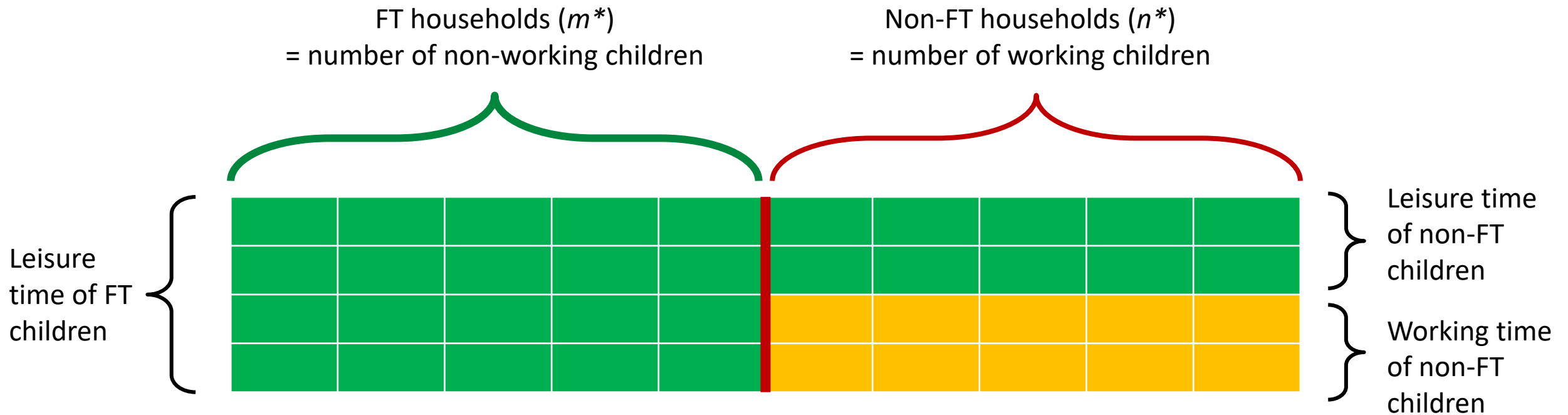
Analyzing the effect of $\overline{w}_F$ on the total children working hours, from Equation (24) we have

$$\frac{dL_C^{N*}}{d\overline{w}_F} = \frac{\pi_{AA}^N \pi_{C\overline{w}_F}^N - \pi_{CA}^N \pi_{A\overline{w}_F}^N}{|H|} < 0 \qquad (28)$$

Proposition 2. A rise in the FT wage increases the number of working children (the share of non-FT households); however, it reduces children's total working hours in a small open economy.

The sketch of the effect of an increase in the FT wage
Prior to the increase in $\overline{w}_F$
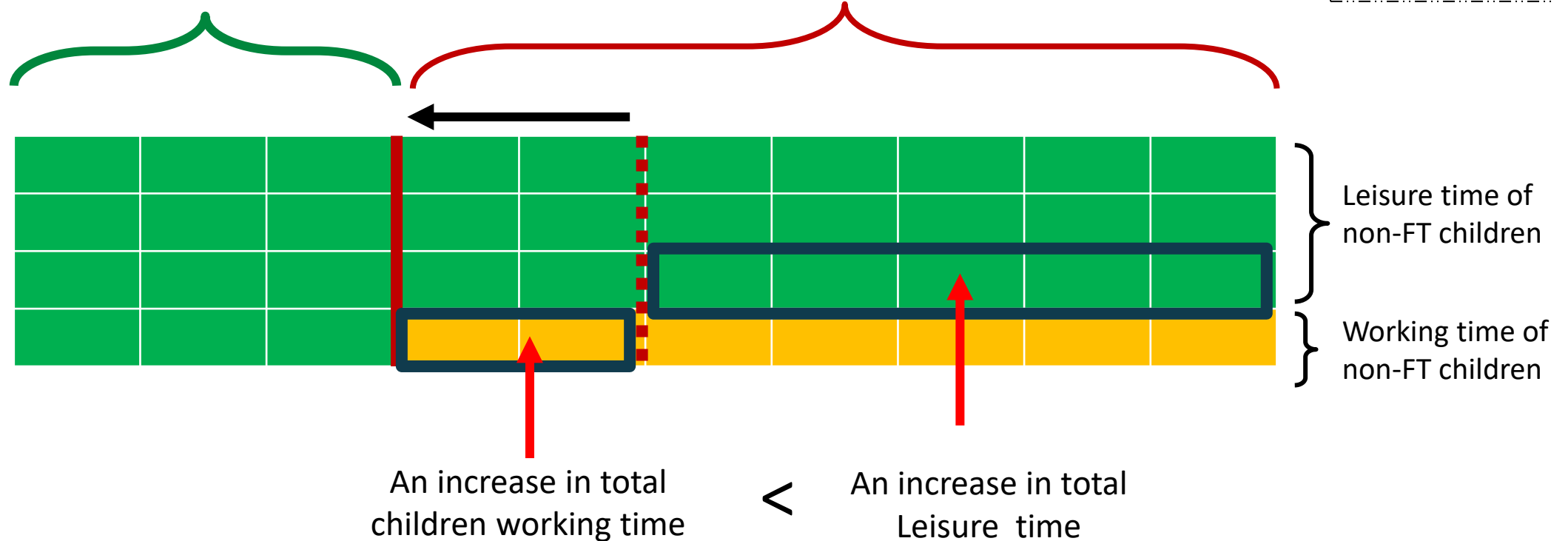
FT households ($m*$)
= number of non-working children

Non-FT households ($n*$)
= number of working children

Leisure time of FT children

Leisure time of non-FT children

Working time of non-FT children

The sketch of the effect of an increase in the FT wage
After the increase in $\overline{w}_F$

$$\frac{dL_C^{N*}}{d\overline{w}_F} < 0$$

$$\frac{dw_C}{d\overline{w}_F} < 0$$

FT households ($m*$)
= number of non-working children

Non-FT households ($n*$)
= number of working children

Leisure time of non-FT children

Working time of non-FT children

An increase in total children working time

$<$

An increase in total Leisure time

The effects of the *FT premium* on the number of FT households

Differentiating Equation (11) with respect to *F* yields:

$$\frac{\partial m^*}{\partial F} = \frac{1}{p\widetilde{l_A}f''} < 0$$

Lemma 3. *A rise in the FT premium increases the number of non-FT households (number of working children) in a small open economy.*

The effects of the *FT premium* on children's total working hours (1)

From Eq. (24):

$$\frac{dL_C^{N*}}{dF} = \frac{\pi_{AA}^N \pi_{CF}^N - \pi_{CA}^N \pi_{AF}^N}{|H|}$$
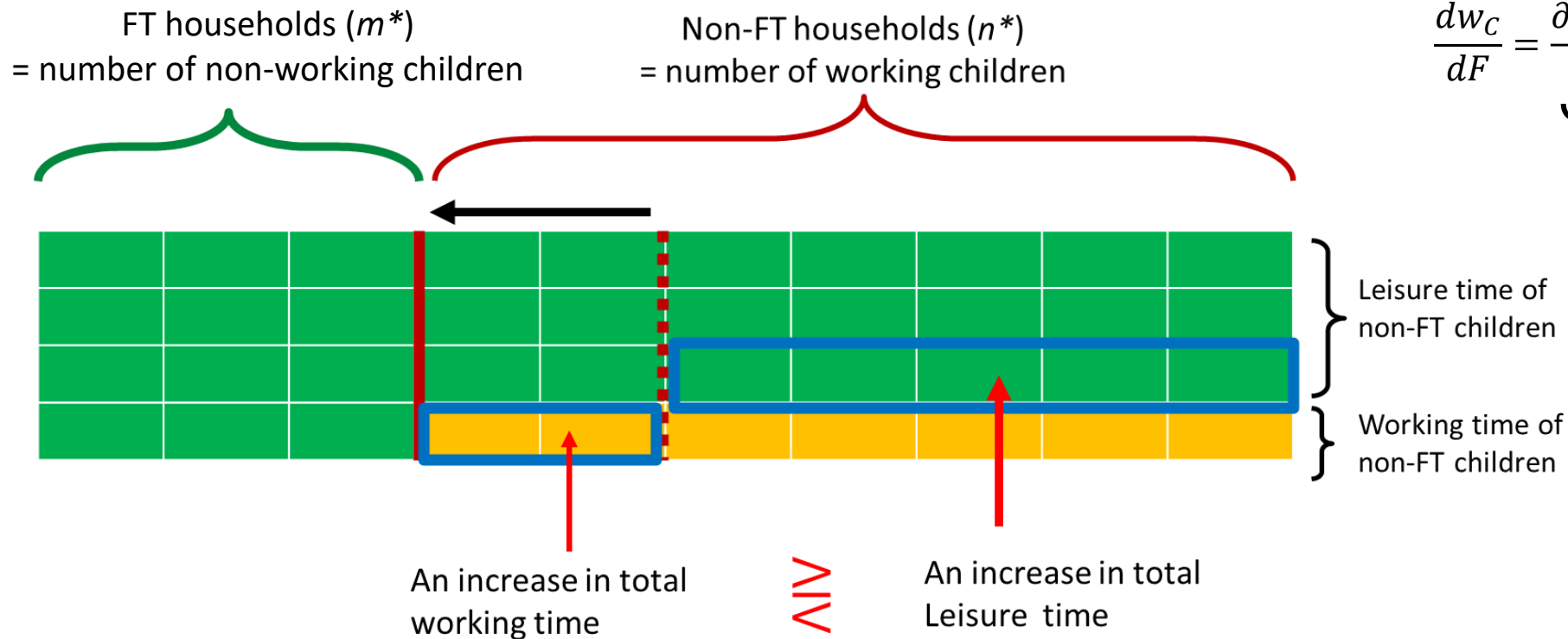
where the sign of π_{CF}^N is ambiguous:

$$\pi_{CF}^N = -\left(\frac{\partial w_C\left(L_C^N/n^*, F\right)}{\partial n^*} \frac{dn^*}{dF} + \frac{\partial w_C\left(L_C^N/n^*, F\right)}{\partial F} \right)\left(1 + \frac{1}{\varepsilon_C} \right)$$

The inverse supply of child labor $w_C\left(L_C^N/n^*, F\right)$ depends on the FT premium both directly and indirectly through the effect of F on $n^*(p, \overline{w}_F, F, N)$

The sketch of the effect of an increase in the *FT premium*
After the increase in F

$$\frac{dL_C^{N*}}{dF} \gtreqless 0$$

$$\frac{dw_C}{dF} = \underbrace{\frac{\partial w_C\left(L_C^N/n^*, F\right)}{\partial n^*}\frac{dn^*}{dF}}_{< 0} + \underbrace{\frac{\partial w_C\left(L_C^N/n^*, F\right)}{\partial F}}_{> 0}$$

FT households ($m*$)
= number of non-working children

Non-FT households ($n*$)
= number of working children

Leisure time of non-FT children

Working time of non-FT children

An increase in total working time $\gtreqless$ An increase in total Leisure time

→ In general, the effect of the FT premium on children's total working hours is ambiguous

The effects of the *FT premium* on children's total working hours (3)

- From (31) and (32) and applying $\varepsilon_C = -\dfrac{u_C'}{u_C'' l_c} > 0$ and $\varepsilon_{FT} = -\dfrac{L_A^F}{f'} f'' > 0,$

we derive the **condition under which an increase in the FT premium results in a decline in** L_C^{N*}

$$\frac{n}{N} \leq \frac{F}{F + (\bar{w}_F + F)\varepsilon_{FT}\varepsilon_c} \qquad (33)$$

If (33) is satisfied, then $\dfrac{dL_C^{N*}}{dF} < 0$

The effects of the *FT premium* on children's total working hours (4)

> ***Proposition 3.*** *A rise in the FT premium increases the number of working children (the share of non-FT households). However, it contributes to a decline in the children's total working hours if the share of the non-FT households is not greater than* $F/(F + (\bar{w}_F + F)\varepsilon_{FT}\varepsilon_c).$

- To reduce L_C^{N*} by means of local infrastructure (FT premium), the share of non-FT households must be relatively small

- The higher the values of ε_{FT} and ε_c are, the higher the share of FT households must be in the market to ensure the positive effect of the local infrastructure (FT premium).

- The income (wage) elasticity of child labor is extremely low for poor households (Basu & Van 1998 and Pellerano et al. 2020) → in low-income countries with $\varepsilon_c \to 0$, the condition (33) becomes easier to satisfy even with a relatively large share of the non-FT households, regardless of ε_{FT}.

Main Results (1)

	n^* (non-FT households, the number of working children)	L_C^{N*} (children's total working hours)
$p \uparrow$	$\downarrow$	$\uparrow$
$\overline{w}_F \uparrow$	$\uparrow$	$\downarrow$
$F \uparrow$	$\uparrow$	$\downarrow$ (under the condition)

- A growth in the world price of a fair-trade good leads to a decrease in number of working children (number of non-FT households), but it also increases children's total working hours in the developing country.

- An increase in the fair-trade wage has the opposite effect.

Main Results (2)

	n^* (non-FT households, the number of working children)	L_C^{N*} (children's total working hours)
$p \uparrow$	$\downarrow$	$\uparrow$
$\overline{w}_F \uparrow$	$\uparrow$	$\downarrow$
$F \uparrow$	$\uparrow$	$\downarrow$ (under the condition)

- The fair-trade premium, which is used to develop local infrastructure, reduces the total children's working hours when the share of non-fair-trade households is relatively low.

- In low-income countries where the wage elasticity of child labor is low, an increase in the fair-trade premium reduces the total number of children's working hours even if there is a relatively large share of the non-FT households.

Thank you!

Looking forward to your comments

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