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Civil Conflict and Human Capital in Developing Countries

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Si tu planifies un an à l'avance, plante une graine. Si tu planifies à dix ans, plante un arbre.
Si c'est à cent ans, forme les gens. Si tu sèmes une graine, tu feras une récolte unique.
Si tu forme les gens, tu feras une centaine de récolte.
— Guan Zhong

A mes parents...

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Introduction Générale

1 DE L'INTERET DES CONFLITS CIVILS

Paix, sécurité et développement sont trois défis actuels majeurs auxquels le monde est confronté. Selon l'Institut pour l'Économie et la Paix (IEP), l'indice mondiale de la paix (GPI) indique une baisse significative de la sécurité dans le monde, notamment depuis 2008 (Ojielo, 2014) . En effet, sur la dernière décennie le niveau moyen de paix s'est détérioré de 3,78% et les coûts liés aux violences s'élèvent à 11,3% du PIB mondial (soit 9.800 milliards de dollars).

Un large éventail de facteurs menace la paix dans le monde : l'intensification des activités terroristes et des conflits armés au Moyen-Orient et en Afrique, la montée des tensions régionales en Europe orientale et en Asie du Nord-Est, les tensions politiques accrues en Europe et en Amérique latine notamment.

L'insécurité prend des formes multiples dont les plus extrêmes sont les conflits armés. Ceux-ci diffèrent selon leur intensité, leur durée et leur extension territoriale. Ils peuvent être internes ou internationaux et représentent une menace majeure pour la paix. Alors que les conflits armés internationaux opposent deux États, on entend par conflit civil, un conflit armé interne opposant un État souverain et un ou plusieurs acteurs non étatiques organisés [1]. Selon Gleditsch et al. (2002), la notion de conflit civil renvoie également à un conflit violent ou une guerre civile entraînant plus de 1000 pertes en vie humaine au cours d'une année civile.

1. Ces conflits se distinguent des conflits intercommunautaires qui sont des conflits violents ou émeutes n'impliquant pas les États ; de la répression étatique contre des individus qui ne sont pas considérés comme organisés ; de la violence entre acteurs non étatiques.

Bien que les conflits armés internationaux aient globalement baissé depuis la fin de la guerre froide, les conflits civils sont devenus la forme de conflit armé la plus répandue dans le monde (Marshall and Benjamin, 2014; Pinker, 2011). En effet, selon de récentes statistiques, 34 pays sur 37 ont été le théâtre de conflits civils en 2016 (Dupuy and Rustad, 2018). En revanche, un seul des conflits en 2017 était une guerre internationale opposant l'Inde et le Pakistan (sur le territoire contesté du Cachemire). Par ailleurs, au cours de ces dernières années, un nombre croissant de conflits armés internes se sont internationalisés. Des États extérieurs fournissent une aide militaire et matérielle à l'une des parties du conflit civil. Selon Dupuy and Rustad (2018), les États-Unis sont le pays le plus impliqué dans des conflits civils internationalisés. Cette implication s'effectue à travers la présence de troupes américaines dans les pays en conflit [2].

Une fois déclenchés, les conflits civils deviennent indifférenciables quant à leurs conséquences. Ceci est avant tout lié à la logique délibérément destructrice de toute guerre. Ainsi, quelles que soient les méthodes d'intervention des organismes internationaux visant à assurer la sécurité des civils [3] et en particulier celle des femmes et des enfants, il n'y a pratiquement aucune guerre où la destruction se limite à des objectifs militaires (al Shazali, 1993). D'ailleurs, il est courant que le nombre de victimes civiles d'une guerre excède celui des victimes militaires. Les conflits civils et les violences qu'ils occasionnent déplacent des personnes, détruisent les infrastructures de toutes sortes, les services, les biens et les moyens d'existence, altèrent la cohésion sociale, ou encore ralentissent l'accumulation du capital humain (éducation, santé). De plus, les survivants de ces conflits souffrent durablement de nombreux traumatismes psychologiques et sociaux. Face à ces conséquences, les conflits civils méritent une place en tant qu'objet d'étude dans le domaine de l'économie du développement, en ce sens qu'ils se révèlent être, à travers différents mécanismes, une source de développement à rebours.

Les conflits civils ont un impact important en termes de pertes humaines et de blessés [4] mais, ils ont également un coût économique significatif. Selon une étude de Collier (1999), le taux de croissance des pays est généralement inférieur de 2,2 points de pourcentage pendant une guerre civile par rapport au taux observé en temps de paix. De plus, cette étude indique qu'à l'issue d'une guerre civile, durant généralement sept années, les revenus sont inférieurs d'environ 15% à ce qu'ils auraient été sans guerre. Cela implique une hausse de 30% de l'incidence de la pauvreté absolue.

2. Selon Dupuy and Rustad (2018), les États-Unis sont impliqués dans 7 conflits civils dans le monde.

3. Les civiles désignent les personnes non armées qui n'appartiennent pas aux différentes catégories des combattants.

4. Près de 69000 personnes ont perdu la vie au cours d'un conflit courant 2017 selon Dupuy and Rustad (2018)

Il en résulte une perte totale estimée à 60% du PIB pendant le conflit. Les résultats des travaux menées par Hoeffler (2003) indiquent qu'une guerre civile d'une durée de cinq années réduit le taux de croissance annuel moyen de plus de 2 points de pourcentage et induit une augmentation du taux de mortalité infantile d'environ 2% par an. D'autres travaux révèlent que non seulement les conflits civils induisent une baisse du taux de croissance annuelle, du revenu par habitant, mais également induisent une hausse de la dette extérieure, une modification de la structure des échanges commerciaux et une baisse des exportations. En effet, sur un échantillon de 14 pays ayant connu une période de guerre civile, Stewart et al. (2001) ont fait les constats suivants : le taux de croissance moyen du PIB par habitant s'était établi à -3,3% ; ils observent en outre que sur 16 pays en conflit, 15 avaient vu leur revenu par habitant diminuer ; 13 pays sur 17 avaient connu une chute de la production alimentaire ; la dette extérieure en pourcentage du PIB avait augmenté dans tous les pays étudiés touchés par un conflit ; la structure des échanges commerciaux avait changé dans 12 pays sur 18, et la croissance des exportations avait ralenti. Des études de cas récentes soulignent les dégâts macroéconomiques considérables des conflits civils. Les travaux de Gobat and Kostial (2016) sur le conflit syrien a permis de constater qu'en 2016, le PIB syrien aurait chuté de plus de 50% par rapport à 2010 avant le déclenchement des hostilités. Cette perte aurait été de 25 à 35% pour la seule année 2015 dans le cas du Yémen, tandis que pour le cas de la Libye, la croissance du PIB a chuté de 24% avec l'intensification de la violence en 2014 (Phil et al., 2017).

Par ailleurs au niveau régional, les conflits civils constituent une source d'instabilité en raison du risque de répercussion. En effet, les conflits peuvent s'étendre à des États voisins engendrant ainsi des conséquences négatives telles qu'un ralentissement de l'activité économique (par exemple, en raison d'incertitudes accrues ou de perturbations commerciales) ou encore l'apparition de pression sociales (en raison notamment d'un afflux important de réfugiés) dans les pays voisins (voir Murdoch and Sandler 2002 ; Gomez and others 2010 ; Qureshi 2013). Au-delà de l'impact sur la croissance économique, il convient également de prendre en compte l'effet des conflits civils sur les finances publiques.

Contrairement à la situation de paix, les situations de conflit civil soumettent l'économie à des chocs et à des contraintes majeures. Elles sont susceptibles d'affecter l'économie dans son ensemble et les comportements des agents économiques en particulier, notamment lorsqu'il y a une modification de la contrainte budgétaire de l'État. En général, en raison de l'impact économique

des conflits civils, la contrainte budgétaire inter-temporelle [5] est sujette à d'importantes modifications. En effet, en situation de conflit civil, les gouvernements sont souvent amenés à fournir un effort financier : c'est « l'effort de guerre ». Cela se traduit par une augmentation des dépenses militaires au détriment des dépenses sociales qui elles, se réduisent. Il en résulte deux principales conséquences.

La première conséquence concerne la production nationale. Autrement dit, les conditions qui fondent la production nationale sont fortement perturbées par le contexte de guerre à travers de deux effets direct et indirect. L'effet direct se traduit par une diminution de la fourniture de services publics en raison d'une réduction des dépenses sociales. Une telle situation peut provoquer un ralentissement de l'activité économique à court et moyen terme. L'effet indirect se traduit quant à lui par une hausse de la demande d'investissement militaire (dépense militaire). Il résulte un effet négatif sur la production de biens de consommation et d'investissements privés. L'effort de guerre réduit dans ce cas, la production de biens de consommation et d'investissement privé d'autant plus que l'enrôlement dans l'armée détourne une partie significative de la main-d'œuvre et induit ainsi des tensions sur le marché du travail. À cela s'ajoute les destructions potentielles de l'appareil productif ainsi que sa désorganisation (transport, communication, etc.).

La seconde conséquence concerne la demande, c'est-à-dire la consommation [6]. L'investissement privé et la consommation tendent à être réduits en raison d'une hausse des impôts et à un appel accru à l'épargne (par exemple, pour la souscription aux bons de la défense nationale [7] notamment) : c'est l'effet d'éviction des dépenses privées par les dépenses publiques. Pour les gouvernements, même si les taux d'imposition peuvent être augmentés, l'assiette fiscale c'est à dire la somme des revenus et des bénéfices imposables, risque en revanche d'être sensiblement réduite. Il en résulte, un mouvement simultané d'augmentation de la dépense publique (essentiellement militaire) et de réduction des ressources fiscales (le contexte de guerre peut induire une désorganisation de l'administration fiscale qui à son tour, pourrait se répercuter sur le rendement de l'appareil de collecte de l'impôt). La contrainte budgétaire devient de plus en plus serrée et le recours à l'emprunt et à la création monétaire devient en général indispensable. En fin de compte, on constate que tous les

5. La contrainte budgétaire inter-temporelle désigne la combinaison des consommations courantes et futures accessible grâce au budget

6. Nous faisons référence à la demande dans la zone contrôlée par l'État

7. Il s'agit de mettre l'épargne a contribution par le biais d'emprunts nationaux. Cette initiative répond à une double nécessité : financer une guerre particulièrement couteuse du fait de sa durée, de l'ampleur des moyens nécessaires et de son intensité.

facteurs qui influent sur les conditions de financement de l'effort de guerre tendent à renforcer la contrainte budgétaire des gouvernements.

2 DE L'IMPORTANCE DU CAPITAL HUMAIN

Il n'y a pas de controverse sur l'importance du capital humain dans le processus de développement des pays tant par ses effets économiques (productivité des salariés, capacités en recherche et développement, etc.) que par son apport fondamental en bien-être. Il joue un rôle essentiel pour les individus, pour les économies, pour les sociétés et pour la stabilité de la planète. Selon l'Organisation de Coopération et de Développement (OCDE), le capital humain constitue un bien immatériel (OCDE, 2001). Il recouvre l'ensemble des aptitudes, talents, qualifications et expériences accumulés par un individu. Il détermine en partie sa capacité à travailler ou à produire de façon efficace pour lui-même et pour sa nation (OCDE, 1998). Ces aptitudes sont liées notamment à l'état de santé et au savoir (éducation). L'investissement en capital humain consiste donc en l'ensemble des dépenses effectuées dans l'éducation, la formation (infrastructures scolaires, les frais de formations et de scolarités) et dans les soins médicaux (infrastructures sanitaires et frais des soins). Il vise à soutenir et à améliorer la productivité, l'innovation et l'employabilité.

L'augmentation de la productivité est un indicateur de la croissance économique et cela peut être réalisé par un investissement accru dans le travail et le capital. Toutefois, l'investissement en capital ne peut être pleinement utilisé que si l'économie dispose d'une main-d'œuvre saine et instruite. Ainsi, la santé et l'éducation jouent toutes deux un rôle vital dans l'amélioration de la productivité et de la croissance économique. En raison de leur double rôle d'intrants et de produits, elles jouent un rôle central dans le développement économique. Les effets économiques de l'investissement sur l'éducation et la santé sont analysés de deux manières : dans une perspective de croissance économique et dans une perspective sociale.

2.1 Effet économique de l'investissement sur l'éducation

Dans les premiers modèles de croissance, comme celui de Solow (1957), la croissance de long terme dépendait du progrès technique sans que son origine soit réellement analysée, même si l'on mentionnait le rôle important de l'éducation. Les travaux de Romer (1990) et de Lucas (1988), dans le cadre des nouvelles théories de la croissance endogène apportent une nouvelle dimension à la recherche des facteurs de la croissance. Ces travaux indiquent que les pays riches sont ceux dont les populations ont le plus bénéficié d'investissements importants dans l'éducation.

Si le rôle de l'éducation est bien établi, les mécanismes par lesquels elle influence la croissance économique ne sont pas clairement définis. Nelson and Phelps (1966) essayent d'apporter un éclairage en soulignant qu'un de ces mécanismes passe par le niveau d'éducation. En effet, selon ces auteurs, c'est le niveau d'éducation qui stimule la croissance économique en accélérant l'assimilation du progrès technique. L'explication réside dans le fait que les technologies les plus performantes sont adoptées et mises en œuvre plus rapidement par les économies les mieux dotées en travailleurs hautement qualifiés. Autrement, la capacité à intégrer de nouvelles informations et à adapter ses comportements à celles-ci déterminent les possibilités de croissance d'une économie. Cette hypothèse est soutenue par Romer (1990) qui souligne également l'importance du niveau d'éducation. En effet, il montre qu'une augmentation de la croissance économique est le fait de l'accumulation de connaissances à travers les facteurs capital et travail (le nombre de travailleurs très qualifiés).

Par ailleurs, selon d'autres études, dans une économie moderne, la croissance économique repose sur l'existence d'une population active ayant un bon niveau d'éducation. Aghion and Cohen (2004) révèlent en effet que, quel que soit le type d'économie en présence (économie d'imitation ou économie d'innovation), la proportion de la population active atteignant un niveau d'éducation de qualité est un facteur déterminant de la croissance. De plus, ils proposent de faire une différence dans les niveaux d'éducation en fonction du type d'économie en présence. Ainsi, ils constatent que les économies d'imitation se situant loin de la frontière technologique[8], avec un potentiel élevé d'assimilation des technologies produites ailleurs, doivent investir prioritairement dans les premiers niveaux scolaires (l'enseignement primaire et secondaire). Cela, afin de favoriser les imitations et l'application des nouvelles techniques. En revanche, pour ce qui est des économies d'innovation, ces auteurs proposent que les investissements soient orientés dans l'enseignement supérieur afin de fournir à l'économie une main d'œuvre hautement qualifiée capable de contribuer à l'innovation technologique.

La relation entre éducation et croissance économique n'a rien d'univoque : elle repose plutôt sur des effets réciproques. En effet, l'éducation permet aux individus d'accéder à des emplois plus complexes et mieux rémunérés et, simultanément, l'existence de tels emplois les incitent à poursuivre leurs études. Autrement, les pays qui ont des niveaux d'éducation élevés tendent à s'enrichir et peuvent ainsi dépenser davantage pour accroître l'éducation. Outre le rôle de l'éducation sur la

8. La frontière technologique désigne l'ensemble des technologies (combinaison des facteurs de production) existantes les plus efficaces. Elle évolue grâce au progrès technique, et donc à l'investissement en recherche et développement (R&D) des pays les plus avancés.

croissance économique, des études menées aussi bien dans les pays développés qu'en développement ont mis en évidence le lien positif entre l'investissement dans l'éducation et les gains individuels. Ainsi, les travaux de Mincer (1974) et Becker (1975) posent explicitement l'hypothèse que les travailleurs sont rémunérés à leur productivité marginale. Les plus éduqués, supposés être plus productifs, sont les mieux payés. Ces résultats sont confirmés par les études de Psacharopoulos (1994) qui révèle que chaque année d'éducation supplémentaire augmente en moyenne d'environ 10% le revenu individuel.

2.2 Effet économique de l'investissement sur la santé

Si l'effet économique de l'éducation sur les revenus et la croissance économique a été bien établi, celui de la santé a été mis en évidence un peu plus tard (Gunnar, 1952). Cela est en partie dû aux aspects non monétaires de ses avantages (prolongement de la longévité, réduction de la souffrance et absence d'invalidité). La relation entre état de santé et croissance peut être analysée aussi bien sous un angle macroéconomique que microéconomique.

Sous l'angle macroéconomique, la majeure partie des travaux empiriques s'inscrit dans le domaine de l'économie du développement (Kocoglu and De Albuquerque, 4 25). Elle vise à évaluer les facteurs déterminant les différences de croissance entre pays riches et pays pauvres. La quasi-totalité de ces travaux concluent que la santé à un impact important sur la croissance. En particulier, ils soulignent qu'une augmentation de cinq ans de l'espérance de vie se traduit par 0,3 à 0,5 point de croissance (voir Barro (1996); Bhargava et al. (2001); Jamison et al. (2004); Aghion (2008)). Un deuxième résultat important de ces travaux révèle que l'impact de la santé sur la croissance est marginalement décroissant, devenant nul au-delà d'un certain niveau de santé (Bhargava et al., 2001; Jamison et al., 2004). Il peut même y avoir un niveau de santé au-delà duquel les avantages de l'amélioration de l'état de santé ne compensent pas les coûts de l'amélioration, ce qui entraîne des rendements marginaux négatifs. Pour Acemoglu and Johnson (2008), ces résultats (rendements négatifs) sont imputables aux effets négatifs de la taille de la population sur la croissance [9]. Cependant, ces conclusions sont remises en cause par Aghion (2008). Les études menées par ces derniers révèlent une relation positive entre l'amélioration de l'espérance de vie et la croissance écono-

9. Selon leur modèle, 1% d'augmentation de l'espérance de vie conduit à une augmentation de la population de 1,5%. La théorie classique de la croissance considère que les améliorations de l'état de santé auraient deux effets négatifs sur le revenu par tête : dilution du stock de capital (effet Solow) et réduction de la quantité de terre par travailleur (effet Malthus) ce qui engendrent respectivement une réduction des ratios capital/travail et terre/travail.

mique [10]. Au-delà de ces résultats hétérogènes, l'impact positif de l'amélioration de l'état de santé sur la croissance au niveau agrégé semble prévaloir. Toutefois, ces résultats doivent être pris avec précaution (Kocoglu and De Albuquerque, 4 25) [11]. De plus, cet impact ne fait pas encore totalement consensus, même si un tel lien a pu être constaté dans des études microéconomiques [12].

Sous l'angle microéconomique, l'état de santé affecte la croissance par un mécanisme indirect qui passe par trois principaux canaux : l'offre de travail, la productivité et le comportement d'épargne. De nombreuses études établissent qu'un mauvais état de santé entrave non seulement la participation des individus au marché du travail (Cai and Kalb, 2006; Pelkowski and Berger, 2004; Cai, 2010) mais également la mobilité et les transitions professionnellesBound et al. (2010). En outre, l'état de santé influe sur les heures de travail en raison de l'absentéisme et du retrait précoce du marché du travail (Deschryvere, 2006; Disney et al., 2006). Les liens entre santé et productivité ne sont pas examinés de façon directe. Dans la plupart des études microéconomiques, la productivité est estimée par le salaire. Les études empiriques concluent en général à un effet positif de l'état de santé sur le taux de salaire et par extension sur la productivité au niveau individuel(Andrén and Palmer, 2001). En ce qui concerne l'épargne, sa relation avec la santé n'a été que très peu étudiée empiriquement. Les rares études qui existent indiquent qu'une amélioration de l'espérance de vie accroit l'incitation à l'épargne favorisant ainsi, l'investissement et la croissance (Smith, 1999).

Les effets économiques de l'investissement sur l'éducation et la santé dans une perspective sociale se traduisent par une amélioration de la qualité de vie, une réduction des disparités de genre et entre groupes sociaux (pauvres/riches). On peut faire valoir aussi leur rôle de renforcement de la cohésion (stabilité politique) et de la démocratie ainsi que leur contribution à l'intégration des États dans l'économie mondiale.

Une des caractéristiques de l'investissement sur l'éducation et la santé est qu'il est en grande partie générée par les pouvoirs publics. Son financement est fortement dépendant des ressources de l'État. Ainsi, bien que les gouvernements soient conscients de leur importance, des considérations

10. Dans leurs travaux, ils montrent que l'amélioration de l'espérance de vie de 10 ans aurait apporté entre 1940 et 1980, 1,4 point de croissance en plus en moyenne par an, au PIB par tête

11. Les analyses étant menées au niveau pays, les résultats obtenus pourraient être entachés de problèmes d'endogénéité et de multicolinéarité des variables, ainsi que de biais liés à des variables omises. Il est ainsi difficile de trouver au niveau des pays une source de variation de l'état de santé empiriquement utilisable qui ne soit pas corrélée avec le terme d'erreur dans l'équation qui détermine le revenu ou le PIB.

12. Dans des études spécifiques, la santé n'est pas toujours positivement corrélée à la croissance, la relation étant même négative parfois (voir Knowles and Owen (1995); Beraldo et al. (2005)

politiques y font souvent obstacles (Banque Mondiale, 2019). En effet, Il se peut que les hommes politiques ne soient pas incités à promouvoir des politiques qui, parfois, ne portent leurs fruits qu'après plusieurs décennies. De plus, des évènements tels que le déclenchement de conflits civils armés constituent un obstacle majeur à l'investissement dans l'éducation et la santé.

3 IMPLICATION DES CONFLITS CIVILS SUR LE CAPITAL HUMAIN

Les énormes dégâts que la guerre civile inflige aux économies des pays en développement et les pertes qu'elle cause présentent un intérêt particulier pour les économistes du développement, car leur compréhension soulève des enjeux majeurs de politique publique nationale et internationale. Les facteurs explicatifs des guerres civiles sont multiples : facteurs culturels et sociaux, militaires, politiques et économiques [13]. La littérature sur les causes économiques de la guerre civile est souvent associée aux travaux de Paul Collier et de ses co-auteurs (voir par exemple Collier and Hoeffler (1998), Collier (1999) et Collier and Sambanis (2005). Dans la plupart des cas, cette littérature souligne que la guerre civile résulte d'intérêts divergents entre un État souverain et un ou plusieurs groupes non étatiques organisés [14].

Un des mécanismes fondamentaux par lesquels les guerres civiles peuvent influencer le processus de développement de long terme est l'accumulation du capital humain (Schultz, 1961; Lucas, 1988; Galor and Weil, 2000; Minoiu and Shemyakina, 2014). D'un point de vue théorique, il n'y a pas de consensus sur les effets à long terme des conflits violents. Aux modèles néoclassiques qui prédisent une croissance de rattrapage rapide dans la période post-conflit, s'opposent ceux qui soulignent plutôt des effets destructeurs à long terme.

Pour les premiers (modèles néoclassiques), en dépit des tueries et des destructions causées par les violences, la période post-conflit s'accompagne souvent d'une paix durable, d'une revalorisation de la performance économique, de la politique de développement, surtout d'une amélioration de la santé et de l'éducation des enfants en particulier. Conformément à la théorie néoclassique de la croissance, la destruction du capital physique lors des violences, est surmontée à long terme par des investissements plus importants dans les zones affectées ce qui permet à l'économie dans son ensemble de retrouver son sentier de croissance régulière (voir Blattman and Miguel (2010) Bellows

13. Voir Hugon (2001)

14. Pour les modèles théoriques, voir Hirshleifer (2001), Garfinkel and Skaperdas (2008) et Skaperdas (1992) puis Collier and Hoeffler (2004) et Fearon and Laitin (2003) pour le niveau empirique.

and Miguel (2009)). En effet, l'offre et la demande de capital physique baissent au moment du conflit armé en raison de la destruction des infrastructures publiques et privées mais également, de l'incapacité des pouvoirs publics à fournir des biens publics. En revanche, après la période de guerre, la demande de capital physique augmente plus rapidement que l'offre en raison de l'activité de production menée par le retour des déplacés de guerre ou par les survivants. Ainsi, la faiblesse de l'offre de capital physique encouragera à investir et à produire aussi efficacement que possible. En conséquence, le niveau technologique de la production augmentant, un niveau de compétences élevé sera exigé conduisant ainsi, à une augmentation de la demande de main-d'œuvre éduquées et en bonne santé.

Des preuves de cette reprise rapide de la croissance post-conflit sont fournies par les études de Davis and Weinstein (2002) et Brakman et al. (2004). Ces derniers, examinant l'impact des effets de la seconde guerre mondiale dans certaines villes du Japon et de l'Allemagne ont révélé que, toutes les villes affectées avaient tendance à enregistrer les taux de croissance les plus rapides après la guerre. Des résultats similaires sont observés dans le cas de conflits civils notamment entre les provinces du Rwanda après le génocide de 1994 (Justino and Verwimp, 2013) et dans le cas de la Sierre Leone (Bellows and Miguel, 2009). Ces études révèlent en effet, une reprise politique et économique rapide post-conflit dans ces pays.

Le second modèle considère que, même si la croissance économique converge au niveau global, les effets néfastes à long terme des guerres civiles pourraient persister dans certaines régions. En effet, des études récentes ont montré que les conséquences de la guerre sur l'éducation, la santé et le travail au niveau individuel et au niveau des ménages, peuvent être observées des décennies après le conflit. Elles peuvent même contribuer à l'émergence de pièges de pauvreté parmi des groupes de population spécifiques affectés par la violence.

Des études empiriques ont montré que les guerres civiles ont des effets largement négatifs et durables sur la santé des enfants dans les zones de guerre. Bundervoet et al. (2009) analysant l'impact de la récente guerre civile au Burundi sur l'état de santé des enfants montrent qu'un mois supplémentaire d'exposition à la guerre diminue le ratio taille sur âge des enfants de 0,047 écart-type par rapport aux enfants non affectés par la guerre. Ces résultats sont soutenus par Alderman et al. (2006) lorsqu'ils examinent l'impact de la guerre civile au Zimbabwe dans les années 1970. Ils montrent qu'en moyenne, les enfants de l'échantillon touchés par les chocs auraient été 3,4 cm plus grands si ces chocs négatifs n'avaient pas eu lieu. De même, les travaux de Minoiu and Shemyakina (2014) dans le cas de la guerre civile ivoirienne révèlent que, les enfants des régions

les plus touchées par le conflit ont subi des problèmes de santé importants par rapport à ceux des régions moins touchées.

La littérature empirique sur les effets microéconomiques des guerres civiles montre qu'en général, les guerres ont un impact négatif sur l'éducation. Soler (2016) explore la relation entre conflit civil et performance scolaire en Colombie par le biais d'une analyse pseudo-panel. Les résultats obtenus montrent une relation négative et significative entre l'intensité et la présence de conflits et les niveaux de performance en mathématiques et en langues. Des résultats similaires sont observés par **?** dans le cas du Rwanda où ils constatent que les enfants exposés au conflit ont perdu environ une demi-année de scolarité et sont moins susceptibles d'achever les grades scolaires notamment la troisième et la quatrième année d'éducation. Rodríguez and sánchez (2012) dans le cas de la Colombie constatent que les conflits armés réduisent la durée moyenne de scolarisation de 8,78% pour tous les enfants colombiens. Shemyakina (2011) constate une réduction de l'éducation des filles après la guerre civile au Tadjikistan au début des années 1990, mais aucun impact sur l'éducation des garçons. Ces résultats seraient imputables à un investissement plus important des ménages dans l'éducation des enfants de sexe masculin après la guerre afin de retrouver leur niveau de revenu à long terme. Swee (2015) pour sa part, constate que la guerre a des effets importants sur les inscriptions au secondaire, mais pas sur le primaire, ce qui reflète probablement le recrutement d'enfants plus âgés dans des groupes armés ou dans l'armée.

Par ailleurs, d'importantes études ont mis en évidence la relation positive entre la santé, l'éducation et les salaires Strauss and Thomas (1998). En effet, une mauvaise nutrition entrave les performances scolaires qui à leur tour impactent négativement l'insertion sur le marché du travail et les revenus à l'âge adulte.

4 FOCUS SUR L'AFRIQUE SUB-SAHARIENNE (ASS)

L'ASS compte 48 pays qui se répartissent en 4 sous-régions géographiques : Afrique de l'Ouest, Afrique de l'Est, Afrique Centrale et l'Afrique Australe. Sa population en constante augmentation est majoritairement employée dans le secteur de l'agriculture. Celui-ci occupe une grande place dans l'économie et constitue de ce fait, une puissance économique considérable. Bien que ce profil devrait donner à l'ASS un avantage concurrentiel, les signes d'une faible productivité due à un faible développement du capital humain sont préoccupants (Bloom et al., 2014).

Dès l'aube des indépendances jusqu'au début des années 80, l'ASS a accompli d'énormes progrès en matière de promotion du capital humain grâce à l'amélioration des services de santé et d'éducation publiques. Alors que les indicateurs de développement de l'éducation se situaient loin derrière ceux des autres continents dans les années 60, le taux brut de scolarisation (TBS) a quasiment doublé au cours des trente années qui suivirent (Ko-Chih, 2001) [15]. Sur la même période, l'espérance de vie a augmenté passant de 40 à 48 ans, tandis que le taux de mortalité infantile a baissé de plus de 25% (Hussain et al., 2000).

Cependant, ces acquis d'après indépendance ont été réduit à néant en raison des programmes d'ajustements structurels (PAS) sur la décennie 80-90, des deux chocs pétroliers de 1973 et 1979 et par les conflits violents qui continuent de sévir dans cette partie de l'Afrique. Selon l'Institut International de Recherche sur la Paix de Stockholm (SIPRI), l'ASS a été le théâtre d'environ 41% des guerres civiles se déroulant dans le monde durant les années 90 (SIPRI, 2000). Certains pays comme l'Angola, le Mozambique et le Soudan n'ont pratiquement pas connu de période sans guerre civile depuis leur accession à l'indépendance. D'autres par contre, qui étaient jadis considérés comme des îlots de stabilité dans les années 70, tels que la Côte d'Ivoire et le Libéria, n'y ont pas échappé puisque des guerres civiles y ont éclaté. Aujourd'hui encore, sur la période 2000-2016, on estime que près de la moitié des pays de l'ASS a connu au moins un épisode de guerre civile et de violence [16]. L'intensité et la durée variables de ces conflits rendent ce continent instable et impliquent qu'on s'y intéresse notamment en termes d'évaluation des conséquences économiques à moyen et à long termes pour l'Afrique (Gleditsch et al., 2002).

Les conséquences les plus manifestes de ces guerres civiles pour la population sont l'afflux massif de réfugiés et de personnes déplacées, l'insécurité alimentaire, les décès, l'intensification de la pauvreté liée à la perte des outils de productions et de revenus, la propagation de maladies tels que le VIH/SIDA, le paludisme etc., l'apparition de handicaps physiques et de traumatismes psychologiques, la destruction des services sociaux essentiels en particulier, les infrastructures de santé et d'éducation. Il s'en suit : une baisse de la demande d'éducation pendant la situation de conflit ou quelques années après, une réduction des effectifs scolaires en raison des abandons scolaires et une détérioration de la qualité de l'enseignement. Par exemple, au Burundi et au Congo, il a été observé une baisse du taux d'inscription de 5% après les événements de conflits (Sommers, 2002). Les survivants de ces conflits sont souvent exclus du monde de travail et vivent

15. En 1960, le taux de scolarisation dans le primaire était de 36% en ASS contre 73% en Amérique latine et 67% en Asie

16. Selon les statistiques issues de la base de données Marshall (2017)

dans des conditions précaires (chômage, famine, pauvreté, maladie, etc.). Les conséquences au niveau étatique se traduisent pour l'essentiel par une instabilité généralisée et un déficit budgétaire. Une situation qui conduit à une réduction des dépenses sociaux notamment, celle en éducation et en santé. Les cas des conflits civils au Burundi et au Congo illustrent bien cette situation. En effet, les ressources dépensées pour maintenir un élève à l'école pour une année ont diminué de 11,2 millions pendant la période de guerre(Sommers, 2002).

Tous ces facteurs combinés et les conséquences qui en résultent font de l'Afrique sub-saharienne la partie du monde dont le développement humain est le plus faible. Ce classement est dû au fait que l'espérance de vie, l'achèvement des cycles d'éducation et les taux de scolarisation combinés y sont les plus faibles. Selon le Programme des Nations Unies pour le Développement (PNUD), sur les 10 pays dont l'indice de développement est le plus faible, 9 ont traversé des périodes de conflit armé au cours des 20 dernières années. Les enfants de ces pays (en situation de conflit) ont trois fois moins de chance d'aller à l'école et le risque de mortalité infantile avant l'âge de cinq ans est deux fois plus élevé.

4.1 Les ménages affectés par les conflits civils

Quelles que soient leur nature et leur intensité, les conflits civils entraînent des violences avec de profondes répercussions sur les conditions de vie des ménages. Selon les cas, les conséquences de ces conflits civils sur le ménage peuvent être réduites ou importantes. Cette différence d'impact dépend de plusieurs éléments. Le premier est la localisation du ménage. En effet, un ménage vivant dans la zone de conflit ou à proximité, présente un risque accru d'être affecté. Ce constat est confirmé par Arcand and et Wouabe Eric Djimeu (2009) dans le cas de la guerre civile en Angola. Ils montrent que les ménages vivant à proximité des quartiers généraux des parties en conflit sont ceux qui subissent le plus les conséquences.

Parallèlement à la localisation du ménage, les conséquences des conflits civils dépendent également des caractéristiques économiques et humaines de ses membres. Les niveaux d'éducation et de santé, le capital social des membres, notamment celui du chef de ménage, l'appartenance ethnique et religieuse mais également la structure du ménage, la détention d'actifs tels que le bétail ou la terre sont des facteurs explicatifs de l'exposition, de la vulnérabilité et de la résilience des ménages. Par exemple, pendant les guerres civiles au Rwanda et au Burundi, la détention de bétail a eu des conséquences négatives pour les ménages propriétaires car ces derniers ont été pris pour cible par les groupes armés (Bundervoet et al., 2009; Verpoorten, 2009).

4.2 Les stratégies d'atténuation

La nature et l'ampleur des conséquences évoquées plus haut déterminent en grande partie, la manière dont différents individus et ménages réagissent aux chocs induits par la guerre. Il y a peu de consensus entre les stratégies adoptées en temps de guerre et celles adoptées après la guerre. Cependant, la littérature suggère que la plupart des stratégies connues sont considérablement restreintes pendant les conflits violents (Justino, 2011) [17].

En situation post conflit, les ménages sont amenés à faire un choix entre une gestion interne et une gestion externe. La gestion interne au ménage consiste à l'utilisation d'actifs physiques ou financiers (le recours à la vente d'actifs tels que le bétail et des terres), la diversification ou la spécialisation économique. En revanche, l'utilisation des relations sociales et communautaires, telles que la famille, les voisins, les amis, les coopératives et associations (coopérative des producteurs locaux par exemple) est une stratégie externe de gestion qui implique des individus qui ne font pas partie du ménage.

Plusieurs stratégies d'adaptation sont mises en œuvre par les ménages en réponse aux conséquences induites par la situation de conflit civil. L'une de ces stratégies consiste à privilégier les activités économiques à faible rendement et susceptibles d'être moins risquées. Cette stratégie est préférée par les ménages vivant en zone de conflit ou dans des camps de réfugié ayant accès à la terre et par ceux disposant de peu d'actifs et vivant en zone rurale. Cette stratégie vise à assurer la subsistance de la famille et améliorer l'état nutritionnel des membres du ménage [18]. Des études menées dans des pays en situation de conflit civil notamment en Ouganda et au Rwanda soulignent l'utilisation de cette stratégie. En effet, Deininger (2003) rapporte que les troubles civils en Ouganda dans les années 90 ont non seulement réduit le nombre de nouvelles entreprises chez les particuliers mais, celles qui existaient ont aussi cessé leurs activités pour laisser place à une forme d'agriculture de subsistance. Dans le cas du conflit civil rwandais, McKay and Loveridge (2005) ont constaté qu'un retour à des modes de production plus autarciques et une focalisation sur les cultures de subsistance étaient associés à une amélioration de l'état nutritionnel des enfants après le conflit.

17. Certains ménages peuvent décider de migrer pendant le conflit civil vers des zones sécurisées d'autres par contre peuvent décider de rester et survivre (Wood, 2003; Steele, 2007). Cela implique souvent la participation et le soutien aux groupes armés en fournissant des soldats, des abris, de la nourriture et des informations.

18. Voir Brück (2004), Brčk (2004) et McKay and Loveridge (2005)

Les stratégies d'adaptation peuvent également conduire certains ménages à recourir à la migration. En effet, la migration et les transferts de fonds qui en résultent constituent la forme la plus courante de stratégie d'adaptation des ménages en situation de non conflit (OCDE, 2005). Bien que la violence soit une motivation importante à la migration en particulier la migration forcée, les incitations économiques ainsi que l'offre d'éducation et de santé dans les zones sécurisées peuvent conduire certains ménages en zone de conflit à migrer .

D'autres stratégies mises en œuvre consistent en la répartition de la main d'œuvre au sein des ménages. Dans la plupart des cas, ceux-ci y ont recours lorsqu'ils font face à une réduction inattendue de leurs ressources du fait de perte en vie humaine, blessures, handicaps physiques ou mentaux de personnes adultes du ménage. Une situation susceptible de faire basculer ces ménages auparavant vulnérables, dans des formes extrêmes de pauvreté. Le recours au travail des enfants constitue donc une alternative pour ces derniers en vue compenser la réduction inattendue des ressources financières dont disposent le ménage en temps de conflit (Justino, 2010b). Cependant, le recours au travail des enfants comme un mécanisme de sécurité économique, implique que ces derniers soient retirés de l'école. Il en résulte un renforcement des formes structurelles et persistantes de pauvreté car, ne pas avoir accès à l'éducation durant l'enfance, a des effets négatifs importants sur le bien-être. De plus, cette pauvreté est aggravée lorsque l'état de santé des enfants est affecté par le conflit.

Des études récentes ont montré que la hausse de la mortalité, les chocs économiques négatifs et la réduction de la qualité de l'éducation dus à la violence, sont les principaux moyens par lesquels les conflits armés réduisent les niveaux d'éducation au niveau des ménages et augmentent le travail des enfants (Rodríguez and sánchez, 2012). Akresh and de Walque (2008), Merrouche (2006), Shemyakina (2011) et Swee (2015) confirment ces études en présentant le travail des enfants comme une explication à la baisse du niveau d'éducation et de scolarisation observée dans des contextes de guerre civile.

Il existe enfin des stratégies publiques visant à aider les ménages les plus affectées. Elles sont fondées sur une gestion publique de la situation post-conflit. Ces stratégies d'adaptation sont prises en charge soit par un État providence, soit par la communauté internationale ou les organisations non gouvernementales (ONG) en vue d'accompagner les ménages les plus vulnérables. Elles consistent généralement en des politiques de transferts et visent à atténuer les conséquences négatives des violences. En effet, dans un contexte de reconstruction post-conflit, les politiques de transfert peuvent consister pour la communauté internationale, les ONG et les gouvernements des

États à augmenter les ressources allouées à des secteurs tels que la santé et l'éducation, fournir des actifs aux ménages pour la promotion de l'agriculture et l'entreprenariat, reconstruire les infrastructures publiques dévastées par la guerre civile, ou encore, à utiliser les ressources pour prendre des mesures préventives en s'attaquant aux déterminants des guerres civiles en Afrique subsaharienne. C'est par exemple le cas des programmes de réinsertion des ex-combattants. Une combinaison de ces stratégies devrait guider les politiques à affecter les ressources aux personnes les plus affectées par les violences.

5 PROBLEMATIQUE, PLAN ET CONTRIBUTIONS DE LA THESE

La présente recherche s'inscrit dans la problématique générale de la formation du capital humain dans les pays en voie de développement en situation post-conflit. Elle vise à contribuer à une meilleure compréhension des effets des conflits civils sur l'éducation. Pour cela, à partir des manifestations de la guerre civile sur la vie des ménages, il s'agit d'abord de déterminer les conséquences induites des conflits civils et ensuite, de s'interroger sur l'efficacité des politiques d'action publique (politique de transfert) pour limiter le poids des conflits armés sur la formation du capital humain.

Cette problématique relativement large est réduite à trois questions spécifiques auxquelles les trois études de cas menées apportent une réponse contextuelle. La première question est de savoir à l'intérieur d'un ménage, comment est prise la décision de compenser les conséquences du conflit civil. Spécifiquement, il s'agit de comprendre comment le fait d'être une victime de conflit civil détermine la décision d'allocation du temps des enfants en matière de scolarisation et de travail des enfants. La deuxième question vise à comprendre l'impact des conflits civils sur les performances scolaires. Plus précisément, il s'agit de comprendre comment le fait d'être une victime de conflit civil affecte le niveau d'éducation atteint par les enfants d'âge scolaire. Enfin, la dernière question de cette thèse vise savoir comment un programme de développement, correspondant à une stratégie de politique de transfert public, pourrait atténuer les effets néfastes de la guerre civile sur la formation du capital humain. Dans le cas présent, le programme considéré est un programme d'alimentation en milieu scolaire au Libéria. Son impact sur le travail des enfants est estimé.

L'objectif général de cette thèse est de contribuer à une meilleure compréhension de l'influence des guerres civiles sur la formation du capital humain, moteur essentiel de la croissance économique et du développement à long terme. Comprendre doit permettre à terme d'apporter des réponses

appropriées pour améliorer durablement le bien-être des ménages les plus affectés et *in fine*, atténuer les effets persistants de la guerre.

Cette thèse est structurée en trois (3) chapitres. Les chapitres 1 et 2 explorent d'une part, l'effet du conflit civil ivoirien sur les choix opérés par les ménages en matière de scolarisation et de travail des enfants et d'autre part, l'effet de ce conflit sur le niveau d'éducation atteint par les enfants d'âge scolaire obligatoire. Quant au chapitre 3, il analyse l'effet d'un programme d'alimentation scolaire sur le travail des enfants au Libéria.

Le chapitre 1 intitulé *« Reallocating Children's Time in Developing Countries : Evidence from Côte d'Ivoire »* analyse l'effet des conflits civils sur la répartition du temps des enfants d'âge scolaire (10-14 ans) dans le cas de la Côte d'Ivoire. Spécifiquement, il s'agit de comprendre, comment les ménages victimes du conflit civil ivoirien effectuent en situation post-conflit, leurs choix entre scolarisation et travail des enfants. Ces choix sont à priori considérés comme deux formes particulières d'allocation du temps des enfants, l'une visant la formation du capital humain, l'autre constituant un recours à la main d'œuvre pour les besoins économiques immédiats du ménage. Dans ce chapitre, nous tentons de montrer comment en situation de conflit violent, le ménage est amené à faire un arbitrage entre ces deux formes d'allocation. Les données utilisées dans ce chapitre proviennent de l'Enquête de Niveau de Vie des ménages (ENV) de 2008. A partir d'une modélisation économétrique tenant compte de l'interdépendance des deux formes d'allocation du temps (scolarisation et travail des enfants), nous constatons que : (i) le temps des enfants est principalement alloué au travail au détriment de la scolarisation si ces derniers sont issus d'un ménage victime du conflit civil. En particulier, la probabilité de travailler des enfants issus d'un ménage victime du conflit civil augmente d'environ 14%. (ii) ces choix sont modulés selon le genre et le lieu de résidence. En effet, les résultats montrent que les enfants de sexe masculin sont plus susceptibles d'être impliqués dans du travail hors ménage que ceux de sexe féminin. Toutefois, ces dernières sont sollicitées dans les tâches domestiques. Enfin, les enfants vivant en milieu urbain contribuent plus au travail des enfants que leurs homologues en milieu rural. La conclusion principale de ce chapitre est qu'en situation de conflit violent, la répartition du temps des enfants est assujettie à un compromis important. Le statut de victime de conflit civil étant défavorable à la formation du capital humain au sein du ménage

Le deuxième chapitre intitulé *« Civil Conflict and Education Attainment : Evidence from Côte d'Ivoire »* s'intéresse à la performance scolaire des enfants d'âge scolaire obligatoire en situation de conflit. Il s'agit d'évaluer l'effet de la guerre civile sur le niveau d'éducation atteint par les enfants

d'âge scolaire obligatoire au moment du conflit civil dans le cas ivoirien. A partir des données de l'ENV 2008, l'objectif est de comprendre comment les conflits civils affectent les performances scolaires. En utilisant une méthode d'estimation en double différences, nous constatons que le niveau d'éducation moyen atteint par les individus d'âge scolaire obligatoire au moment du conflit est moindre par rapport à celui des individus du même âge mais, non affecté par le conflit civil. De plus, les résultats révèlent que cette baisse est plus importante pour les enfants de sexe masculin, les enfants vivant en milieu rural et ceux vivant dans des ménages dont le chef de ménage est alphabète. Enfin, les principaux résultats sont robustes à l'inclusion de diverses variables de contrôle, à un changement du groupe de comparaison ainsi qu'à une mesure alternative de l'éducation. La conclusion principale de ce chapitre est que les conflits civils impactent négativement l'achèvement des grades scolaires.

Le dernier chapitre intitulé *« School Feeding Program and Child Labor in a Post-Conflict Country : Evidence from Liberia »* traite de l'efficacité d'une politique de transfert social sur la formation du capital humain. Il s'agit dans ce dernier chapitre d'analyser comment un programme d'alimentation scolaire assimilable à une politique de transfert public peut contribuer à réduire le recours au travail des enfants dans le cas du Libéria. Il existe une vaste littérature sur l'efficacité des programmes d'alimentation notamment sur l'éducation et la santé des apprenants. Cependant, peu d'études ont examiné leur impact sur le travail des enfants. Ce chapitre vise donc à évaluer l'impact d'un programme alimentaire scolaire sur la réduction du travail des enfants au Libéria. L'idée étant de savoir si un programme comme celui-ci initialement dédié à l'éducation est susceptible de contribuer à la réduction du travail des enfants. Nous utilisons les données issues de l'enquête sur les indicateurs de base du bien-être social au Libéria de 2007. A partir de la méthode d'appariement des scores de propension, les résultats obtenus indiquent que le programme d'alimentation scolaire au Libéria conduit à une baisse significative de l'incidence du travail des enfants. En outre, l'analyse révèle que ce programme est principalement efficace pour réduire le travail des enfants de sexe masculin, des enfants vivant dans des ménages déplacés par la guerre et les enfants vivant dans des ménages dont le chef de ménage est alphabète. Enfin, les résultats sont robustes à l'utilisation de différentes techniques d'appariement et au choix des variables de contrôle.

Bien qu'un grand nombre de travaux soit dédiés à la problématique générale de la formation du capital humain dans les pays en développement en situation post-conflit, peu d'études ont été consacrés à la Côte d'Ivoire et au Libéria. Les quelques rares études faites sur la Côte d'Ivoire n'abordent pas suffisamment certains aspects importants liés à la problématique générale du capital

humain. Cette thèse contribue à la littérature existante à travers les chapitres qui la constituent. Ces derniers s'inscrivent dans une démarche microéconomique. En cela, ils s'appuient sur les instruments théoriques et empiriques habituellement au service de cette discipline. Les analyses effectuées sont basées sur l'utilisation de données d'enquêtes ménages post-conflits réalisées respectivement en Côte d'Ivoire et au Libéria. La contribution de cette thèse se situe à trois niveaux.

D'abord, nous contribuons à la littérature en mettant l'accent sur la Côte d'Ivoire et le Libéria, deux pays qui n'ont pas fait l'objet de recherches approfondies sur ce sujet. Il existe une vaste littérature analysant l'impact de la violence sur le capital humain. Pour l'essentiel, on distingue celle examinant la question dans certains pays d'Afrique Sub-saharienne tels que le Rwanda (voir les travaux de Akresh and de Walque (2008) et Akresh et al. (2011), le Burundi (voir Bundervoet et al. (2009) et Verwimp and Van Bavel (2005)), la Sierra Leone (voir Bellows and Miguel (2009)), le Zimbabwe (voir (Alderman et al., 2006)), l'Ouganda (voir (Blattman and Miguel, 2010)), l'Éthiopie (voir (Akresh et al., 2012)) et l'Angola (voir Arcand and et Wouabe Eric Djimeu (2009)) . Le reste de la littérature couvre l'Europe, l'Amérique latine, le Proche Orient et l'Asie (voir par exemple les travaux de Shemyakina (2011) dans le cas du Tadjikistan ; de Singh and Shemyakina (2016) dans le cas du Pendjab ; de (Di Maio and Nandi, 2013) dans le cas du conflit israélo-palestinien ; de Chamarbagwala and Morán (2011) dans le cas du Guatemala ; de Diwakar (2015) dans le cas de l'Iraq ; de León (2012) dans le cas du Pérou ; de Rodríguez and sánchez (2012) dans le cas de la Colombie ; de Valente (2011) dans le cas du Népal ; de Justino et al. (2014) dans le cas de l'Indonésie). Si la Côte d'Ivoire a fait l'objet de quelques études sur le capital humain en situation post conflit (voir les travaux de Minoiu and Shemyakina (2014) puis de (Dabalen and Paul, 2012) et (Dabalen and Paul, 2014)), ce n'est pas le cas pour le Libéria.

La Côte d'Ivoire et le Libéria sont deux pays d'Afrique de l'ouest membre de l'Union Africaine (UA), de la Communauté Économique des États d'Afrique de l'Ouest (CEDEAO) et de l'Union du Fleuve Mano [19]. Ils partagent une frontière commune dans la partie ouest de la Côte d'Ivoire et des similitudes culturelles et ethniques. De plus, ce sont deux pays qui ont connu chacun une guerre civile et qui ont donc de part et d'autre accueilli des populations réfugiées. Ils présentent néanmoins des différences importantes pour notre analyse.

Le Libéria a vécu 14 ans de guerre civile (de 1989 a 2003) qui a coûté la vie a environ 300 mille personnes, des civils pour la plupart et contraint des centaines de milliers de libériens à

19. L'Union du fleuve Mano est le regroupement de quatre pays d'Afrique de l'Ouest à des fins de coopération et d'intégration régionale. Elle regroupe le Libéria, la Côte d'Ivoire, la Guinée et la Sierre Leone.

des déplacements tant a l'intérieur qu'a l'extérieur du pays. Sur le plan économique, les années de guerre ont anéanti les capacités productives du pays et une part importante de la population (5%) a été anéantie ; 75% des infrastructures scolaires et 95% des équipements de sante ont été détruits. Quatorze ans après la fin de la guerre, le Libéria fait toujours partie des pays ayant un « développement humain faible ». En effet, selon le Programme des Nations Unies pour le Développement (PNUD), en 2017, le Libéria occupait la 181ème place des pays du monde (sur 188) selon son indice de développement humain (qui mêle l'espérance de vie, le niveau d'éducation et le revenu par habitant).

Après avoir une longue stabilité économique, financière et politique entre les années 1960 et 1980, la Côte d'Ivoire a sombré dans une crise économique et politiques à partir des années 90. Le coup de force militaire de 2002 entrainera avec lui de lourdes conséquences aussi bien sur le plan humanitaire que sur le plan socio- économique. Selon l'Institut National de la Statistique (INS), entre 2002 et 2008, période du conflit armé, le taux de pauvreté a connu une hausse significative passant de 38,4% à 48,9% soit une augmentation moyenne de 5% par an et une détérioration des conditions de vie des ménages [20]. Toujours selon l'INS, le taux de morbidité a augmenté de 9% sur la période 2002-2008 et 7% de la population ont été déplacées du fait de la guerre. Bien que la Côte d'Ivoire soit classée parmi les pays ayant un « développement humain faible » (170ème place sur 189), l'économie ivoirienne a progressé à un rythme moyen de 8% par an depuis la fin des différentes crises notamment celle en date de 2011, ce qui en fait l'un des pays les plus dynamiques du monde sur cette période Mondiale (2019)

Ensuite, la contribution de cette thèse part du constat selon lequel, bien qu'il existe une littérature florissante sur les effets négatifs des conflits armés sur le capital humain, peu d'études analysent le comportement des ménages induit par les conséquences des conflits civils. Les stratégies de survies des ménages en situation post-conflit sont peu explorées dans la littérature. Dans un contexte où les marchés de crédit et d'assurance sont absents, les infrastructures économiques et sociales détruites et le capital social affaibli du fait du conflit, le recours au travail des enfants est une option pour les ménages. Ceci implique que les enfants d'âge scolaire soient mis à contribution dans la stratégie d'adaptation. Ainsi, cela pose la question du travail des enfants qui est un phénomène néfaste pour le bien-être à long terme. Cette thèse contribue ainsi à la littérature empirique, en explorant les choix opérés par les ménages victimes des conflits civils en matière de scolarisation et de travail des enfants. Des études antérieures, comme celles de (Di Maio and Nandi, 2013) dans le

20. Voir le rapport de l'INS (2008), Enquête sur les Conditions de Vie des Ménages.

cas du conflit civil israélo-palestinien et de Rodríguez and sánchez (2012) dans le cas du conflit civil colombien sont les rares études à s'être penchées sur la relation conflit civil et travail des enfants sans toutefois prendre en compte l'ampleur de l'arbitrage qui pourrait exister entre les décisions de travail et de scolarisation. Par ailleurs, cette thèse évalue également l'effet des conflits civils sur les performances scolaires des enfants d'âge scolaire obligatoire.

Enfin, nous contribuons à la littérature en évaluant l'efficacité des programmes sociaux sur la formation de capital humain en situation post-conflit. Étant donné l'accentuation de la pauvreté à laquelle font face de nombreux ménages dans les situations d'après conflits, la mise en œuvre de programmes visant à aider les ménages plus vulnérables est nécessaire. La littérature sur l'évaluation des programmes sociaux tels que les transferts monétaires, les programmes alimentaires, les programmes de vaccinations, etc. dans les pays en développement est relativement peu dense. Dans la plupart des cas, elle analyse l'efficacité de ces programmes sociaux sur l'éducation. Malgré la popularité et la mise en œuvre généralisée des programmes d'alimentation scolaire, peu d'études se sont intéressées à leur impact sur le travail des enfants. Cette thèse évalue l'effet des programmes d'alimentation scolaire au Libéria sur la réduction du travail des enfants. En effet, il est largement admis que les programmes d'alimentation scolaires augmentent l'assiduité et les performances scolaires des enfants. Cependant, leurs effets sur le travail des enfants n'a pas encore fait l'objet d'une étude empirique. Dans cette thèse, nous montrons que les décideurs publics et la communauté internationale économiseraient des ressources si avec les programmes d'alimentations scolaires, ils arrivaient à non seulement améliorer l'éducation mais aussi, réduire le travail des enfants. Cette contribution est d'autant plus pertinente qu'elle est la première du genre à analyser la question du travail des enfants au Libéria et évaluer l'efficacité d'un programme social dans ce domaine.

Chapitre 1

Reallocating Children's Time in Developing Countries : Evidence from Côte d'Ivoire

1 INTRODUCTION

Children's rights and more particularly the child labor and its implications on human capital formation are a growing global concern as evidenced the 2014 Nobel Peace Prize attribution. One of the main characteristics of the persistence of child labor is the low enrolment rate, especially in developing countries (Burra, 1989). To address the challenges of low school enrolments in developing countries, a number of actions including Education for All (EFA) have been initiated to provide education for all school-age children. Despite significant progress, many challenges remain, particularly due to the influence of many socio-economic factors such as personal, family, political and economic characteristics. About 60 million children in the world do not have access to primary school and more than half of them live in sub-Saharan Africa despite a decrease between 2000 and 2015 (UNESCO, 2015).

Given these facts, it is important to identify the barriers to school enrollment and academic achievement of children. Various socio-economic and cultural factors have already been identified. However, little attention has been paid the induced effect of civil conflicts on household decisions about school investment. Almost one third of developing countries have experienced civil warfare and violence during 2000-2008 (Shemyakina, 2011; Marshall, 2010).

The economic, political and social repercussions of violence are significant (Justino, 2011) and the most affected population are females, seniors and children. Violent conflicts can interrupt children's education (the destruction of school facilities, the targeting of teachers, increased fear and insecurity, changes in family structures and changes in household assets and incomes) and can also have a negative effect on the health and nutritional status (starvation, malnutrition, the outbreak of infectious diseases, post-war trauma, and the destruction of health facilities) [1]. In addition, civil conflicts displace people, endangers civil liberties and destroy the productive assets. All this leads to a reduction of the household's well-being and directly shapes household schooling decisions, the intra-household allocation of the labor supply and the decision of making a child enter the labour force.

This study explores the role that civil conflicts consequences plays in the school-work tradeoff, and to what extent–if any at all–child labor displaces schooling. We consider that schooling and work are two particular forms of allocation of children's time. One is aimed at human capital formation, the ultimate goal of which is to improve productivity and income in adulthood. And the other is the use of children's labor for the immediate productive needs of the household. The main issue that arises is the level of trade-off between these two forms of allocation given the severity of the consequences of the civil war.

Côte d'Ivoire is an appropriate context of study for several reasons. For almost two decades after its independence, Côte d'Ivoire was one of the richest economies in Western Africa and acquired a reputation for political and economic success within the region. Between the period 1960 and 1980, the country maintained strong and sustained economic growth of more than 7 percent per annum. Over the same period, average GDP per capita was about $1330 (in 2005 US dollars), nearly 6.3 percent of that of the United States. Strongly dependent on primary commodities such as cocoa and coffee (more than 50 percent of total export in 2000), the Ivorian economy experienced an abrupt and lengthy decline in the 1980s, due in large part to the deterioration of the terms of trade (Bogetic et al., 2007). By the time the country devalued its currency in 1994, its ten year average GDP growth had fallen to 0.50 percent. The first sign of trouble began with the failure to manage the political transition after the death of long-standing President Felix Houphouet-Boigny in 1993. In the 1990s, the concept of « Ivoirité » became the major political discourse and in 1994 the new Electoral Code restricted the right to vote and presidential candidacy nominations to

1. See Justino (2011), Shemyakina (2011), Minoiu and Shemyakina (2014), Akresh and de Walque (2008), Akresh et al. (2012), and Bundervoet et al. (2009)

only Ivorian nationals with complete Ivorian parenthood. This led to an attempted coup in 1999 which plunged the country into a vicious cycle of instability, so common in Sub-Saharan African states. In September 2002 another attempt to overthrow the then President was perpetrated by an initially unknown armed group which attacked the main cities of the country including Abidjan the capital city. Although the rebels, who would later be known as the Patriotic Movement of Côte d'Ivoire (MPCI), failed to overthrow the government, they were able to tighten their grip over the north half of the national territory, the southern part under government control. A buffer zone, manned by 8000 UN troops (UNOCI) and 4000 troops from the French Licorne Forces, was established along the frontline. The consequences on the supply and demand for education have been significant. This situation has disrupted the functioning of the Ivorian education system and caused serious material damage and scattered human resources. Access to school was limited and several children were unable to complete the different grades in which they were enrolled. It was estimated in 2004 that as many as 700,000 children had been out of school since the beginning of the crisis and 80% of government-paid teachers abandoned their posts in the northern and western parts of the country (Sany, 2010). The subsequent deterioration in household living conditions had forced many households to focus on their daily survival rather than their future well-being. Using the children's productive capacity immediately in the labour market remain one of coping strategy for these households (Grootaert, 1998; Basu and Van, 1998). Due to financial difficulties these households can not meet their children's school enrollment needs. Thus, child labor could be a significant source of income. Maitra and Ray (2002) show that if children combine work and school, they contribute on average about 20% of household income. This rate represents one-third of income if children are sent only to the labour market.

Building on this background, the objective of this study is to highlight the effects of the 2002-2007 civil conflict consequences on allocation of children's time. Data analyzed herein are based on the 2008 Côte d'Ivoire Living Standards Measurement Surveys (LSMS) data, also known as « Enquête sur le Niveau de Vie des Ménages (ENV) ». After the data processing, the sample used for this analysis is made up of 6,238 children aged from 10 to 14 years old living in 4,161 households across 19 regions of Côte d'Ivoire.

The results based on bivariate probit model show that : (i) children's time is allocated to child labor to the detriment of school enrollment if they live in a household who is a civil conflict-related victim. In particular, we find that a child is about 14% more likely to work and 1.15% less likely to attend school. (ii) In addition, our analysis reveals that these choices are differentiated according to

gender and place of residence. Indeed, male children are more likely to be involved in work outside the household than female children. The latter are more involved in domestic tasks within the household. Finally, children living in urban areas contribute more to work than their counterparts in rural areas.

The rest of the paper is organized as follows : The next section highlights the literature review. Historical background is presented in section two. Section three describes data. In section four, we present the empirical framework. Finally, our results are presented in section six followed by a conclusion.

2 LITERATURE REVIEW

This paper contributes to a large literature that stresses the impact of negative shocks on well-being. Most of shocks studied in the literature include the decline in crop income (Beegle et al., 2006; Jacoby and Skoufias, 1997), loss of employment of the household head (Duryea et al., 2007; Skoufias and Parker, 2006) and various natural disasters (Guarcello et al., 2010). The results of most of these studies suggest that exposure to a negative shock affect the time allocation of children by increasing the probability of work and decreasing school attendance. However, there is no consensus on the magnitude of these estimated effects. There is also some research on the impact of macroeconomic shocks and political instability on children's status (Lim, 2000; Skoufias and Parker, 2006; Mendoza, 2009). Civil conflicts can be considered as another type of a negative shock which affects the household with a differential impact on human capital accumulation and labor market outcomes. The existing economic literature focuses on how civil conflicts affects school enrollment and attainment.

Among the studies that have previously analyzed the role of civil conflicts on education is Akresh and de Walque (2008), which estimated the impact of the 1994 Rwandan genocide on the educational outcomes of different cohorts of children. They find that children exposed to the genocide experienced a drop in educational achievement of almost one-half year of completed schooling, and were 15 percentage points less likely to complete the third or fourth grade. More recently, Chamarbagwala and Morán (2011) study the effect of civil conflicts on the education. They measure exposure to civil war by the number of human rights violations reported. They find that conflict exposure had a strong negative impact on the education of indigenous children exposed to the war during their school age.

There is a growing literature on the gender-specific effect of armed conflict on schooling that finds diverse effects. Shemyakina (2011) deals with the Tajikistan conflict effect on schooling outcomes of children aged 6-15. She uses physical damage to households' dwellings as conflict exposure. She finds that conflict exposure had a negative effect on the enrolment of girls and no effect on the enrolment of boys. She argues that households affected by conflict invested more in the schooling of boys because it may make more economic sense to educate boys. Similarly, Chamarbagwala and Morán (2011) and Walsh (2000) find that exposure to civil conflict causes a larger negative impact on the enrollment of girls as opposed to boys. They explain this finding by the fact that expected returns to education for girls are generally lower and that security fears are higher than for

boys. Conversely, other studies such as Swee (2015) and Kecmanovic (2013) find that the negative effect on schooling is driven by males. In addition to the negative effects mentioned above, civil conflicts can have a specific direct impact through soldiering engagement. Blattman and Miguel (2010) explore children's implication operating as child soldiers in Uganda's civil conflict on the human capital accumulation. They find that labor productivity and educational outcomes of the recruited boys are reduced due to the time they have spent with the rebel forces. They also note that these boys are never able to catch up with their peers.

Regarding the relationship between civil conflict and child labor, the literature is less important. However, Di Maio and Nandi (2013) and Rodríguez and sánchez (2012) are currently the few papers which explore the impact of a civil conflict on child labor. For the first one mentioned, authors study the impact of changes in the local labour market and in the Israeli-Palestine conflict on child labor and school attendance of Palestinian children aged 10-14. Using a bivariate probit model for child labor and schooling outcomes, they find that an increase in market wage increases child labor. They also find that increases in the military restriction imposed by Israel increases child labor, and modifies the relationship between market wage and child labor. The second one combines household and violence data sets. Using a duration analysis methodology, they estimate the effect that exposure to civil conflict has on school drop-out decisions of Colombian children aged 6-17. They find that the conflict increases child labor by inducing them to drop out of school and enter the labour market early.

Recently, researchers have explored the Ivorian civil conflict impact on various socio-economic aspects including education, health and poverty. For example, Minoiu and Shemyakina (2014) examine the causal impact of the 2002-2007 civil conflict in Côte d'Ivoire on children's health. They find that children from regions more affected by the conflict suffered significant health setbacks compared with children from less affected regions. They argue that conflict-related household victim is an important channel through which armed conflict negatively impacts child health. Similarly, Dabalen and Paul (2014) examine the Ivoirian civil conflict effect on food security. They find that households in the worst-hit conflict areas and individuals who are the direct victims of the conflict having lower dietary diversity. There is also few researchs on the effect of Ivorian violent conflict on education. Dabalen and Paul (2012) evaluates the causal effects of civil war on years of education in the context of a school-going age cohort that is exposed to armed conflict in Côte d'Ivoire. They find that the average years of education for a school-going age cohort is 0.94 years fewer compared with an older cohort in war-affected regions. Regarding the Ivorian conflict effect on

welfare, Soumahoro (2014) examines the effects of an export tax reduction for cocoa beans on the living standards of farming households. He finds that farmers in low tariff districts significantly increased their consumption expenditure relative to farmers in high tariff districts.

3 HISTORICAL BACKGROUND

For almost two decades after its independence, Côte d'Ivoire experienced unprecedented economic prosperity due to sound economic management, improved trade relationships with the developed countries (particularly Western Europe), effective development of the cocoa and coffee industries and an ethnically inclusive political system, until the 1980s. Indeed, between 1960 and 1980, the country maintained strong and sustained economic growth of more than 7 percent per annum and over the same period, average GDP per capita was about $1,330 (in 2005 US dollars), nearly 6.3 percent of that of the United States. Strongly dependent on primary commodities such as cocoa and coffee (more than 50 percent of total export in 2000), Ivorian economy faces to his first difficulties with the deterioration of the terms of trade which lead an abrupt and lengthy decline in the 1980s (Bogetic et al., 2007). The fall in the price of cocoa and coffee in the 1980s exacerbated poverty in the country leading to an increase in poverty in the poorest regions of the north rising from 25.6 percent to 56.9 percent during this period. By the time the country devalued its currency in 1994, its ten year average GDP growth had fallen to 0.50 percent.

The configuration changes after the death of long-standing President Felix Houphouet-Boigny in 1993 with the advent of the first coups d'états during the 1990s including the first military coup in December 1999 which caused a deep sociopolitical crisis. In September 2002, another attempt of military coup whose roots can be traced back to widespread discontent over land ownership and nationality laws since in the 1990s [2] emerges. Indeed, the scarcity of employment opportunities due to the decline of the economy has led landowners in the South to demand the return of their land. Thus, multiple attacks in several cities, including Abidjan in the south, Bouaké in the centre and Korhogo in the north, have been carried out by rebel forces mainly representing the Muslim regions in the north of the country. But this action having failed did split the country in two, each controlled by rivals. The central, northern and western parts of the country were under the control of rebel forces [3] and government control was restricted to the southern part. A buffer zone, manned

2. in particular the new Electoral Code restricted the right to vote, affecting the large population of foreign origin living on the territory of Côte d'Ivoire and presidential candidacy nominations to only Ivorian nationals with complete Ivoirian parenthood

3. called Forces Armeées des Forces Nouvelles consisted of a coalition of four former rebel groups

by 8000 UN troops (UNOCI) and 4000 troops from the French Licorne Forces, was established along the frontline.

The consequences for the population's welfare have been tragic especially. The access to basic public services such as school [4], electricity and water, health clinics were severely disrupted in the part under the control of rebel forces. Likewise, accessible basic services in government zone have knew an overheated due to the massive displacements caused by the civil war [5]. For instance, school infrastructures such as schools in the South are burdened with the large numbers of IDP (internally displaced people) children who have fled the violence in the North to continue their education in the southern school system. This overcrowding has probably shaped schooling decisions and have influenced school drop-out of children. In addition, the Ivorian civil war was marked by a serious economic impact at the household level, such as the loss of jobs, livestock and farms. According to the National Statistics Institute, about 28.4% of the affected population lost their economic activities and 4.4% their jobs. Deaths have been also reported in some households. GDP growth was negative between 2002 and 2007 (on average -1.5 percent) with a poverty rate that has risen sharply, a significant portion of the population living below the poverty line of 2 dollars per person per capita and per day [6].

The peace process negotiated and signed in 2007 in Ouagadougou resulted in a power sharing agreement between the government and the rebel forces and this has enabled the official end to the conflict. The economic, social and politique implications of these peace agreements recommend the return of the administration to the North, the economic and schooling activities recovery in affected regions that is possible thank to implementation of the Disarmament, Demobilization and Reintegration (DDR) and finally, make possible the organization of elections at the nearest feasible date. All these consequences related to civil war could lead households to change their consumption behaviour and therefore, adopt solutions that involve family workforce including child labor.

4. 50 percent of school-age children were deprived of education by 2004 (Sany, 2010)

5. This displacement concerned globally about 7 percent of the population (National Institute of Statistics report, 2008)

6. World Bank (2010)

4 DATA AND DESCRIPTIVE STATISTICS

4.1 Data

Data used in this study are from Côte d'Ivoire households Living Standards Measurement Surveys, also known as *Enquête sur le Niveau de Vie des Ménages (ENV)*. This survey was administered jointly by the National Institute of Statistics and the World Bank between June and Agust 2008. The ENV 2008 is a nationally representative survey that covers all the socio-economic aspects of the lives of each person in a household living in Côte d'Ivoire. It was specifically designed to evaluate the welfare impact of war on individuals and households. We limit our sample to children aged 10 to 14 [7] who are related to the head of the household and for whom complete information on schooling, labor participation and a number of parent's characteristics are available

4.2 Child labor and schooling in the Data

There is no as such a clear and universally accepted definition of child labor owing to the fact that the nature and magnitude of the work varies across countries and even places in a country. Often it is difficult to differentiate between "child work" and "child labor". The International Labor Office (ILO) relates the former with coercion and intolerable forms of exploitative while the latter is mostly taken to be an activity that doesn't harm the child. It can be assimilated to a form of education and/or socialisation (Invernizzi, 2003).

With regard to the measurement of child labor, international standards attempt to define it by mental, physical, social and even moral consequences and harms. ILO defines child labor as any child between 5 and 17 years old economically active below the minimum age for admission to employment or engaged in one of the worst forms of child labor. Excluded from this definition children in authorized light work and children engaged in non-economic activities. Activities described as non-economic activities such as domestic chores are likely to underestimate the magnitude and the direct implications on school enrollment, especially for young girls. In low income countries, girls bear a larger share of these tasks than do boys. Hence, the unequal opportunity for schooling between boys and girls is likely to be underestimate if one takes this definition to analyze policy relevant issues. In addition, it appears that child labor, regardless of its form, has negative implications for the child's schooling (Schlemmer, 1996).

7. Because Ivorian legislation prohibits children aged 15 or under from working in the labor market, children above 14 years old are excluded from our sample.

We consider a child to be working i.e, participating in economic activities if he/she is engaged in paid or unpaid, inside or outside the household during the last week or 12 months preceding the survey [8]. Although our definition of child labor includes paid activities, in our sample, more than 88% of the working children are involved in unpaid family activities. In addition, working decisions are from parents in more than 80% of cases (see table A.1 in appendix A).

The educational system of Côte d'Ivoire consists of 6 years of compulsory primary education. The official age for primary school is between 6 and 12 years old. However, to take into account repetitions, the maximum age for primary education is set at 14 years old. The second outcome variable concerns school attendance. We consider that a child is enrolled in school if he/she declares to be enrolled in the year of the survey (2008). We consider those who are enrolled in classical school. They represent 96.92% of the study sample. Thus, those who are enrolled in Franco-Arab and Koranic schools are excluded from the sample (3.08%). In addition, for most of those who are enrolled in school, we note that more than 86% are from public schools, 11.80% private schools and 0.74% other schools (see table A.2 in appendix A). Our final sample consists of 6,238 children from 4,161 households.

4.3 Measure of civil conflict

As most of our attention is devoted to the impact of civil conflict, we begin by defining a measure of civil conflict. Although the Living Standards Measurement Surveys (LSMS) implemented by the World Bank since the 1980s have focused on providing high quality data to policy makers to assess the effectiveness of interventions designed to improve the living standards of individuals, households and communities, the micro-level empirical research use them to assess the effects of conflict and violence. Indeed, many LSMS surveys increasingly include conflict-related questions, providing important informations for conflict research [9]. The ENV 2008 Côte d'Ivoire survey has been drawn up with these considerations.

In the case of Côte d'Ivoire, in addition to its traditional role as a public decision-making tool, the ENV 2008 has two specific characteristics that make it essential in this process. First, this is the first national survey conducted since the end of the civil conflict, about 6 years later. Second, the

8. The reason for the reference period is that, although the child may not have worked the week before or even several weeks before, he/she may have been employed in the past and may be just in a cyclical unemployment, waiting for an opportunity to return to work

9. For an excellent description on the development, changes and experiences with LSMS refer to Deaton (2000 : 32- 40)

main characteristic of the ENV 2008 survey is the new section on the « impact of the war ». This section includes a range of questions that are commonly used to evaluate the welfare impact of war on individuals and households.

For example, household respondents were asked : « How did your income change over the years of crisis ? »/ « Has the current crisis affected your life ? » In addition, the survey included a set of questions on the physical impact and casualty of the war, such as « Have you registered a death or illness linked to the crisis ? »/ « Have you been displaced during the war ? »/« Have you suffered any violence linked to the crisis ? ». We group the responses into binary variables. These variables include whether the head of household has been forced to flee, has been displaced, has lost its ownership, income dropped, hosted displaced person, health impaired, has recorded deaths or has been victim of violence. These variables based on household responses are summary in table B.2 in Appendix B.

We resort to multiple component analysis (MCA) method to define a conflict-related victim index. This index is a combination of the variables listed above. The conflict-related victim index is rescaled so that it ranges between 0 and 1, with higher values corresponding to the severity of the consequences of the conflict. More details regarding the results of the MCA are available in Appendix B.

4.4 Descriptive analysis

Table 3.1 summarizes children's time allocation for the entire sample, gender and place of residence. In the total sample, 65.63% of children aged 10–14 report to be enrolled in school in 2008. About 43% participate in economic activities. Table 3.1 also reveals that some children attend school only or combine school and work or work only. Others, however, are reported inactives, i.e. neither school nor work. 44.34% are only enrolled in school ; almost 21% are only engaged in work ; 21.30% combine work and school and finally, about 14% are reported idles. If we consider activities by gender, the Table 3.1 shows that girls are disadvantaged in school enrollment relative to boys. About 60% of girls are enrolled in school and about 43% of them combine school and work. As for boys, 71.71% are only enrolled in school. They are 23.81% who combine work and school. Regarding the work, girls are more involving in work only (24.20%) than boys (18.00%). Regarding the place of residence, children from rural area are more involving in work (57.44%) than those living in urban area (25%). In contrast, the latter are in favor of school enrollment (72.36%). More specifically, 59.84% of children from urban area are only enrolled in school ; few combine school

and work (12.52%) and 12.45% are only engaged in work. However, more than 15% report being inactive.

TABLE 1.1 – Work and schooling rates, by gender and location(%)

	All	Girl	Boy	Rural	Urban
Work Only	20.97	24.20	18.00	28.45	12.45
School Only	44.34	40.46	47.90	30.73	59.84
Work and School	21.29	18.54	23.81	28.99	12.52
Idle	13.40	16.80	10.29	11.83	15.19
Total Work[1]	42.26	42.74	41.81	57.44	24.97
Total School[2]	65.63	59.00	71.71	59.72	72.36

Table 3.2 breaks down working activities between domestic and market works. Domestic works refer to activities performed inside the household while market works are performed outside the household. Among those who are reported working, we note that most of them are involved in market works (72.19%). 37.96% of girls report working inside the household, compared to 18% of boys, revealing that if domestic tasks are considered, then the ILO definition considering only market work underestimates child labor incidence, and more so for girls. Regarding the market activities, boys are more engaged (81.70%) than girls (62.04%).

TABLE 1.2 – Working activities by gender (%)

	All	Girl	Boy
Domestic works (inside household)	27.81	37.96	18.30
Market works (outside household)	72.19	62.04	81.70
Total	2,636	1,275	1,361

Table 3.3 presents the basic statistics on child and household characteristics. The average age of children interviewed is about 12 years old ; most of them are boys (about 52%) and about 70% are daughter or son of the household head. Regarding the household characteristics, we note that about 1 in 5 households is considered as conflict-related victim. The average age of head is about 48 years

1. The line "Total work" refers to children who work only and those who combine work and school.
2. The line "Total study" refers to children who attend school on the one hand, and those who work and study on the other.

old ; 82.28% are married ; most of them are male and 42.60% are literates. With regard to household environment in which the child lives, we note that most of them are rural dwellers (about 53.3% live in rural area). Regarding the religious and ethnic affiliation, it appears that most of households belong to Akan ethnic group and are Muslims and 18.20% are non-ivorians. Table 1.3 also reveals that a child lives in a household with an average 8 persons. We also note the presence of preschool children, children aged 5-9 and 10-14 in the household. With regard to the household's standard of living, we note that 33% of households are classified as rich and 53.70% own a farmlands. We also note that most households live close to primary schools (75.20%) ; more than half have access to public transports (53%) ; have access to water and live close to product market.

Table 1.3 – Description and Summary statistics

Variable	Description	Mean	Std. dev	Min	Max
Child's characteristics					
Child's age	Age in completed years of the child	11.866	1.416	10	14
Child of the head	1 if the child is a daughter or son of the household head, 0 otherwise	0.691	0.462	0	1
Child's gender	1 if child is a boy ; 0 otherwise	0.522	0.5	0	1
Household's characteristics					
Conflict victim	Conflict-related victim index	0.197	0.228	0	1
Head's gender	1 if head is a male ; 0 otherwise	0.810	0.393	0	1
Age of head	Age in completed years of the household head	47.848	12.277	0	99
Married head	1 if household head is married ; 0 otherwise	0.828	0.377	0	1
Literate head	1 if household head is literate ; 0 otherwise	0.426	0.494	0	1
Rural household	1 if household is living in rural area ; 0 otherwise	0.533	0.499	0	1
Krou	1 if household is belong to Krou ethnic group ; 0 otherwise	0.113	0.317	0	1
Mandé du nord	1 if household is belong to Mandé du nord ethnic group ; 0 otherwise	0.178	0.382	0	1
Mandé du sud	1 if household is belong to Mandé du sud ethnic group ; 0 otherwise	0.072	0.259	0	1
Voltaique	1 if household head is belong to Voltaique ethnic ; 0 otherwise	0.152	0.359	0	1
Akan	1 if household head is belong to Akan ethnic ; 0 otherwise	0.302	0.459	0	1
Non-ivorian	1 if household is non-ivorian ; 0 otherwise	0.182	0.386	0	1
Christian	1 if household is a Christian ; 0 otherwise	0.369	0.482	0	1
Muslim	1 if household is a Muslim ; 0 otherwise	0.409	0.492	0	1
Other religion	1 if household is a other religion ; 0 otherwise	0.222	0.416	0	1
Household size	Number of individuals in the household	8.173	4.161	2	37
Number of pre-school children	Number of individuals aged 0-4 in the household	0.948	1.099	0	10
Number of children 5-9	Number of individuals aged 5-9 in the household	1.173	1.127	0	7
Number of children 10-14	Number of individuals aged 10-14 in the household	1.968	1.149	1	9
Household wealth	Wealth index obtained by MCA method on durable goods and assets	0.329	0.271	0	1
Farmland	1 if household is has farmlands ; 0 otherwise	0.537	0.499	0	1
Access to public transports	1 if the household has access to public transports ; 0 otherwise	0.53	0.499	0	1
Close to primary school	1 if the household is close to a primary school ; 0 otherwise	0.752	0.432	0	1
Close to secondary school	1 if the household is close to a secondary school ; 0 otherwise	0.292	0.455	0	1
Close to a water source	1 if the household is close to a water source ; 0 otherwise	0.935	0.246	0	1
Close to product market	1 if the household is close to a consumer product market ; 0 otherwise	0.814	0.389	0	1

In Figure 1.1, we present the distribution of activities by the level of consequences of the conflict experienced. As can be seen, the decisions taken by the conflict-affected household are in favour of work even if it can be combined with school. We note that school-only is not a priority as it comes in third option of the conflict-affected households. We unfortunately have no information on the number of hours spent in each activity which prevent us to know exactly the intensity of each categories.

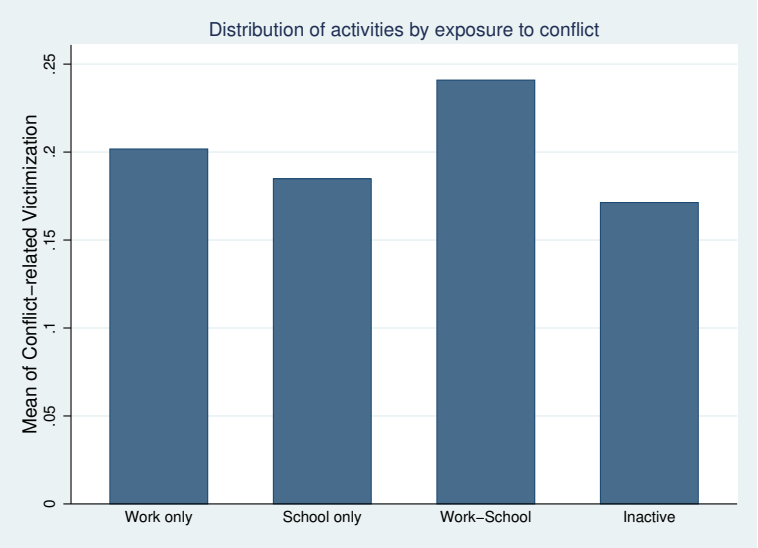

FIGURE 1.1 – Distribution of children's participation in activities

5 EMPIRICAL FRAMEWORK

5.1 Choice and Justification of Econometric Model

This section briefly describes the econometric model used to analyse the effect of civil conflicts on children's time allocation. The aim is to find an appropriate method that reflects the household decision-making process about children's time allocation between school and work. According to Dumas (2004), the interactions between work and schooling can be estimated in different ways. The simplest option is to introduce the work variable into schooling's equation (or vice versa). This, in order to directly estimate the impact of one over the other. Because labor supply is endogenous to the school's decision, this strategy raises an estimation issues. Indeed, it is reasonable to assume that work and schooling decisions are made at the same time (at time of choice). To deal with the endogeneity issue, we can rely on the instrumental variable technique, which consists in finding an instrument for the working variable that does not directly affect the school variable. However, finding an appropriate instrumental variable remains a difficult exercise that requires a priori additional informations on the labor market such as the type and level of the wages [10]. In practice, these additional informations are often not available and most child labor is not paid work.

Other approachs have been used in the previous literature to model household decisions. Among them, we distinguish the univariate probit and logit models (Patrinos and Psacharopoulos, 1997; Ray, 2000). The disadvantage of these methods is that the possible interdependence between these two decisions is not taken into account. In addition, these models assume child labor as the inverse of schooling–which is problematic because it ignores the possibility of a child combining work and school, or the possibility of a child being idle (Duryea and Arends-Kuenning, 2003; Guarcello et al., 2003). To deal with this limit, some of literature on child labor uses multinomial logit, bivariate and, sequential probit models. These take into account the joint nature of decision-making. The multinomial logit model is appropriate if the decision-making process is considered simultaneous. However, there are disadvantages of this approach. Indeed, this model assumes that the choices must be independent. Also known as I*ndependence of Irrelevant Alternatives* (IIA), this assumption says that the inclusion or exclusion of alternatives should not affect household choices. Several tests

10. Huong and Ross (2015) investigates the impact of child labor on children's educational outcomes in rural Vietnam. To solve endogeneity issue of child labor, they use the average wage of unskilled female workers within a commune as instrument variable

have been proposed to test this assumption beforehand. The two most common are the Hausman-McFadden test (1984) and the Small-Hsiao test (1985).

For sequential (ordered) probit model, it is used when the hierarchical process of decision-making is considered relevant. This approach implies that order of choices be clearly defined. In the sequential decision-making process households first decide whether or not the child should go to school. Then, if he has to combine school and work or if he has to work only and finally, if he has to be inactive. To establish such a hierarchy, we should make strong assumptions about household behavior, as there is no clear order between the alternatives (Wahba, 2006). The order depends mainly on characteristics and motivations of the household.

The sequential probit model may, however be invalid and possibly bias the results as the household decision-making model is simultaneous rather than sequential. The bivariate probit model seems to be the appropriate approach of estimating the schooling and working decisions jointly. Indeed in this model, schooling and working equations are simultaneously estimated. It relaxes assumption of Independence of Irrelevant Alternatives (IIA). This model has been widely used in empirical studies dealing with the determinants of child labor and school attendance (Canagarajah and Coulombe, 1999; Nielsen, 1998; Duryea and Arends-Kuenning, 2003; Guarcello et al., 2003; Wahba, 2006)

Following Cameron and Trivedi (2005), the bivariate probit model allows to model the households' decisions as follow :

Let define Cw_i^* and Sc_i^* as two latent variables underlying the working and schooling decisions, respectively. Latent parental utility from allocating child i's time on school and child labour is :

$$Cw_i^* = h_{i1}(.) + u_{i1} \tag{1.1}$$

$$Sc_i^* = h_{i2}(.) + u_{i2} \tag{1.2}$$

where Cw_i^* and Sc_i^* are the corresponding observed dependent variables such that :

$$\begin{cases} Cw_i = 1 & \text{if} \quad Cw_i^* > 0 \\ \quad = 0 & \text{otherwise} \\ Sc_i = 1 & \text{if} \quad Sc_i^* > 0 \\ \quad = 0 & \text{otherwise} \end{cases} \tag{1.3}$$

$[u_1, u_2]$ the error terms are assumed to be orthogonal to the predictors. We assume that the $[u_1, u_2] \sim \mathcal{N}(0, V)$ and $\mathcal{N}$ stand for the bivariate normal distribution where V is a symmetric matrix with typical elements $\rho_{kl} = \rho_{lk}$ for $k, l = \{u_{i1}, u_{i2}\}$ and $kl \neq 0$, and $\rho_{kl} = 1$, for all k.

The fact that the two decisions are linked implies that there exists μ_i such as :

$$\begin{aligned} u_{i1} &= \mu_i + \varepsilon_{1i} \\ u_{i2} &= \mu_i + \varepsilon_{2i} \end{aligned} \tag{1.4}$$

In other words, the error term of each model consists of a unique part to each model ε_i and a second common to both μ_i.

ρ is the correlation coefficient of the errors between u_{i1} and u_{i2} in decision-making process. It represents the unobserved correlation between child's activities. If error terms u_{i1} and u_{i2} are uncorrelated, i.e $\rho = 0$, the two equations can be estimated separately using unobserved effects probit model. When $\rho \neq 0$, household faces four alternative choices such as the choice probabilities for child i are :

$$\begin{aligned} p_{10i} &= Pr[Cw_i = 1, Sc_i = 0] = \Phi[h_{i1}(.) > 0, h_{i2}(.) < 0, \rho] \\ p_{11i} &= Pr[Cw_i = 1, Sc_i = 1] = \Phi[h_{i1}(.) > 0, h_{i2}(.) > 0, \rho] \\ p_{01i} &= Pr[Cw_i = 0, Sc_i = 1] = \Phi[h_{i1}(.) < 0, h_{i2}(.) > 0, \rho] \\ p_{00i} &= Pr[Cw_i = 0, Sc_i = 0] = \Phi[h_{i1}(.) < 0, h_{i2}(.) < 0, \rho] \end{aligned}$$

Where $\Phi()$ is standardized bivariate normal distribution function and p_{10i}, p_{11i}, p_{01i}, p_{00i} represent respectively the probability that children participate to work-only (works without schooling), the probability that they combine school and work, the probability that they are only enrolled in school (school-only) and, finally the probability that they are inactive (neither work nor school). The probit bivariate model is used to calculate the marginal effects required to obtain the relative magnitude of some effects [11].

The index function h_{ij} (with $j = 1, 2$) for child i has the following form :

11. Marginal effects on the joint probabilities are calculated at the mean value of continuous explanatory variables. For dummy explanatory variables, marginal effects on the three (joint) outcomes are computed by taking the difference in the joint probabilities evaluated at the two values of the dummy variable.

$$h_{ij}(.) = \alpha_j + \beta_j X'_{ij} + \eta_j X'_{hj} + \delta_j Conflict\ victim_h \tag{1.5}$$

where α_j is the constant, X'_{ij} is a vector of individual child characteristics and X'_{hj} is a vector of household variable. $Conflict\ victim\ index_h$ refers to conflict-related victimization over 2002-2007 period. The outcome variable $h_{ij}(.)$ states work and schooling activities measured in 2008. It follows that any suspicion of inverse causality between the outcome variable and our variable of interest can not be raised. δ_j measures the imapct of conflict on children's time allocation. In line with the literature, we also explore the effect of conflict for different sub-samples. For that we estimate equation by gender, and for the place of residence sub-sample.

5.2 Estimation Strategy

The indicator of victim status as measured in this study is largely imperfect since it is carried out by the household itself. In fact, a household's perception of its own victim status may not be exact in relation to the reality of the facts. It is thus possible that this perception is based first of all on the memory of past events. However, several studies and experiments have shown that memory is defective and produces an erroneous representation of events (Demazière, 1998). The duration, magnitude and frequency of civil conflict events may be incorrectly recalled, making it impossible to obtain an objective measure of victim status.

In this context, a limitation related to our measure of civil conflict is the self-selection into victim. Indeed, those who self-report being victims might inadvertently be targets for violence due to their characteristics. In this setting, the conflict-related victim index may not be a reliable measure if some household heads attribute their experiences of post-conflict hardship to the conflict itself which could correspond to an over-report. In addition, memory loss or denial could lead some people to underestimate their war-related traumas. Individuals from such households could experience worse economic and education outcomes. Similarly, issues of media coverage or fear can distort the victim status as perceived by the household. Moreover, in the case of victim compensation, some households are more likely to report economic forms of victimization. Furthermore, there are other types of victimization that may be underestimated by the household. These include forms of victimization that are not necessarily visible or difficult to report, such as depression or sexual violences.

The potential bias that might arise due to these factors is a measurement error of the conflict-related victim index. This could lead to an underestimation of its actual impact on our outcome variables.

The existing literature provides little guidance on the biases associated with self-reported victimization data and the extent to which these may systematically be associated with observables (Minoiu and Shemyakina, 2014). To check the extent to which conflict-related victim status is correlated with observables, we regress the conflict-related victim index as a function of the observable characteristics of the heads of households including household characteristics (Dillon, 2012; Dabalen and Paul, 2014; Minoiu and Shemyakina, 2014). Formally, we estimate the following specification :

$$Conflict\ victim_h = \beta_0 + \eta X_h' + \varepsilon_h \tag{1.6}$$

where $Conflict\ victim_h$ is the conflict-related victim index, X_h are household characteristics and ε_h is the error term. If the determinants of the conflict-related victim are not statistically significant, this implies that there is no correlation between being a victim of conflict and observable household characteristics. We explore whether rural vs. urban households differ in their observables regarding the fact to report being victim of violence. To mitigate the influence of unobservable characteristics, we control for a wide range of household characteristics including regional fixed effects.

5.3 Explanatory variables

The set of key variables used in this study are described in more detail here. Previous studies have used a wide variety of explanatory variables in studying the determinants of schooling and child labor. In line of previous literature, we use the child, parents and household characteristics.

At the child's characteristics level, the age, gender and relation to head have been distinguished to have an impact on the probability to work (Grootaert, 1998; Deb and Rosati, 2004; Cogneau and Jedwab, 2012; Bhalotra and Heady, 2003). However, the magnitude and direction of these effects differ from one country to another and according to the type of work [12]. Our model has considered these variables as control variables.

Another dimension that affects allocation of the children's time relates to the parents' characteristics. Since the decision to send a child to work is made by the parents, we included age, gender of head of the household, education and marital status. Indeed, literate parents are more likely to recognize the benefits of education and can therefore support their children's education (Emerson and Souza, 2008). Likewise, the gender of household head affects allocation of children's time. While it is commonly accepted that a female-headed household is more likely to favor to children's education (Cardoso and de Souza, 2009; Rubalcava et al., 2009), Patrinos and Psacharopoulos (1997), Bhalotra and Heady (2003) and Mallick and Rafi (2010) find an opposit finding in which they show that female-headed households employ additional household members including school-going children in income-generating activities.

There are also several household characteristics that are exhaustively studied in the literature. For example, the decision to send a child to work depends on the economic status of the household. As such, it is essential to control household income. We did not include household income directly for two reasons : first, it may be endogenously determined by the decision to send a child to work. Second, studies reveal that in societies where the population depends on self-employment, subsistence agriculture, or other informal employment, income is inaccurately measured and may

12. Theoretically, older children are more likely to work (usually paid), which increases the opportunity cost of the child's time. Regarding the gender's effect, many studies have addressed gender differences in child labor leading to mixed results according to the political, social or cultural environment. If, in many countries, boys are preferred in school, they are also sought after in physical activities, especially in rural areas. Gender's effects also depend on the measure of child labor used. When domestic tasks are taken into account, girls' participation is higher than boys. As for relation to the head, an interesting hypothesis is that the children of the household head are preferred and hence less likely to work.

not reflect household welfare (Deaton, 1997; Fafchamps and Wahba, 2006; Zapata et al., 2011). Thus, consider variables that are relatively less endogenous could be a solution. Our study has considered ownership of durable assets as a fairly exogenous proxy for economic status to capture the effect of differences in wealth. In addition, we have included the possession of land.

Then, we add the size and composition of the household. These variables are likely to determine if a child will be sent to work or school. For example, we might expect that a larger household reduces parent's ability to send their children to school. Regarding the composition of household, we include pre-school children (aged 0-4) ; school-age children (aged 5-9 and 10-14). An increase of pre-school children is equivalent to a lump-sum reduction in household full income as they are too young to work. Thus theoretically, we expect that full income raises the probability of full-time work, lowers that of full-time study, and has ambiguous effect on that of part-time work (Grootaert, 1998; Ray, 2000; Emerson and Souza, 2008). Theoretically, an increase in the number of school-age children raises the probability of part-time work, and lowers that of full-time study , but has no effect on full-time work.

Further to this, the household's place of residence, its proximity to primary and secondary schools, ethnicity group, nationality and religious filiation were included as control variables. We also include variables that capture the access to water, product market and public transports. Finally, we include fixed effects at the regional level in order to control for permanent differences across regions, such as education supply-side factors (availability of schools) and local labor market conditions that might affect child labor demand or supply, such as adult and child wages, unemployment rates, and economic activity.

6 ESTIMATION RESULTS

6.1 Selection into victim status

Table 3.4 reports results of the specification that investigates the extent to which household victim status is correlated with observables described in the equation 1.6. The results are reported for the full sample and place of residence. The coefficient associated with head's gender is negative and statistically significant at the 10 percent level (Columns 3) suggesting that a male-headed household is less to report being victim of violence especially in urban area. The krou ethnic group, who lives primalrly in the south-central and southwest regions are more likely to systematically report being victim of violence than the Akan ethnic group (reference category). By contrast, households belong

to the mandé du nord and voltaique ethnic groups are less likely to systematically report being victim of violence than the Akan ethnic group (reference category). These effects are statistically significant at the least at 1 percent level. Similarly, our results also reveal that non-ivorians are significantly less likely to be victimized (significant at the 1 percent in all columns). We would have expected the opposite effect given that the root causes of the Ivorian conflict are related to nationality issues.

Our results also reveal that education of the head of household significantly affects the self-selection into victim. Indeed, coefficients associated with literate are positive and statistically significants (Colums 1-3) suggesting that literate parents are also more likely to be victimized. Coefficients associated to the religious affiliation are negatives and statistically significants (at least at 5 percent) suggesting that Christian and Muslim household are less likely to be victimized. With regard to household living standards, the coefficients associated to the household wealth and the possesion of the farmlands are positives and statistically significant at least at the 10 percent. This suggest that the richest ones are more likely to report being victims of violence. Further, households with access to public transport report being conflict-victim ; households with children aged 5-9 are more likely to be victimized.

Considering the above, it could be concluded that observable household characteristics are correlated with civil conflict-induced victim. Including such controls in our most of specifications, we could mitigate the effects of self-reporting bias [13]

13. Similar strategy was implemented by Bellows and Miguel (2009), Dillon (2012),Minoiu and Shemyakina (2014) and Dabalen and Paul (2014).

Table 1.4 – Determinants of the Self-reporting into victim status

VARIABLES	Full sample	Rural sample	Urban sample
	[1]	[2]	[3]
Head's gender : (Male)	-0.0115	-0.0140	-0.0140*
	(0.0081)	(0.0094)	(0.0084)
Age of the head	-0.0002	-0.0002	-0.0002
	(0.0002)	(0.0002)	(0.0002)
Rural household	-0.0429***		
	(0.0077)		
Head is married	-0.0068	-0.0089	-0.0089
	(0.0084)	(0.0091)	(0.0089)
Ethnic : Krou	0.0262**	0.0291***	0.0291***
	(0.0120)	(0.0094)	(0.0100)
Ethnic : Mandé du nord	-0.0850***	-0.0785***	-0.0785***
	(0.0101)	(0.0101)	(0.0097)
Ethnic : Mandé du sud	0.0002	0.0035	0.0035
	(0.0137)	(0.0142)	(0.0138)
Ethnic : Voltaique	-0.0674***	-0.0634***	-0.0634***
	(0.0091)	(0.0095)	(0.0104)
Non-Ivorian	-0.0295***	-0.0255***	-0.0255***
	(0.0086)	(0.0087)	(0.0084)
Religion : Christian	-0.0254***	-0.0254***	-0.0254***
	(0.0074)	(0.0079)	(0.0078)
Religion : Muslim	-0.0217**	-0.0199**	-0.0199**
	(0.0086)	(0.0094)	(0.0089)
Head is literate	0.0255***	0.0270***	0.0270***
	(0.0068)	(0.0056)	(0.0069)
Household size	0.0001	0.0003	0.0003
	(0.0010)	(0.0011)	(0.0011)
Number of children 0-4	-0.0004	-0.0011	-0.0011
	(0.0028)	(0.0028)	(0.0030)
Number of children 5-9	0.0107***	0.0096***	0.0096***
	(0.0032)	(0.0032)	(0.0029)
Number of children 10-14	0.0011	-0.0001	-0.0001
	(0.0029)	(0.0029)	(0.0029)
Household Wealth	0.0423***	0.0652***	0.0652***
	(0.0127)	(0.0110)	(0.0123)
Head has farmland	0.0227***	0.0113*	0.0113*
	(0.0061)	(0.0063)	(0.0066)
Access to transport	-0.0227***	-0.0234***	-0.0234***
	(0.0055)	(0.0051)	(0.0058)
Close to a primary school	0.0044	0.0023	0.0023
	(0.0065)	(0.0066)	(0.0065)
Close to a secondary school	-0.0023	0.0111	0.0111
	(0.0075)	(0.0070)	(0.0071)
Close to a water source	0.0038	0.0029	0.0029
	(0.0111)	(0.0115)	(0.0117)
Close to a market	-0.0027	0.0032	0.0032
	(0.0074)	(0.0075)	(0.0079)
Constant	0.2158***	0.1905***	0.1905***
	(0.0187)	(0.0191)	(0.0179)
Regional FE	Yes	Yes	Yes
Observations	6,233	6,233	6,233
R-squared	0.2448	0.2411	0.2411

Note : Dependant variable is the conflict-victim index. The reference category of ethnic and religion are Akan group and other religion respectively. Robust standard errors in parentheses, are bootstrapped with 200 replications. *Significant at 10%, **Significant at 5%, ***Significant at 1%. Regressions are at the household.

6.2 Baseline Results

We are analyzing the role that civil conflicts plays in the school and work decisions of Ivorian families. Table 3.5 presents the results of the validity from the bivariate probit model as well as the average marginal effects [14]. Though we report results for several control variables, we only discuss the effects of civil conflict on household decision-making in schooling and labor for children aged 10 to 14.

Our results show that coefficient (Rho) indicating the correlation between residuals of equations (6.4) and (2.2) is –0.3272 and statistically significant (at the 1 percent level) which justifies our specification choice. This negative coefficient implies that both schooling and working decisions are affected in opposite directions by omitted variables included in residual term. In addition, the p-value associated with the Chi-square statistic is null, suggesting that we reject the null hypothesis that the coefficients are jointly equal to 0. Columns 2-5 of the Table 3.5 present the marginal effects on the probability that children are enrolled in work-only, both work and school, school-only or inactive, for all children.

As expected, estimated coefficients associated with our interest variable are all significant at least at the 10 percent level. Our results show that a child aged 10-14 is more likely to work exclusively but can also combine work and school attendance if he or she belongs to a civil conflict-affected household. However, he/she is less likely to attend school and to be idle. In particularly, a child living in a household more affected by civil conflict has a 4.98% of probability of working full time ; 8.78% of probability of combining both work and school attendance ; 9.93% of probability of not being enrolled in school, and 3.82% of probability of not being inactive compared to its counterpart living in household not affected by civil conflict. This means, a child is about 14% more likely to be involved in child labor and 1.15% less likely to attend school if he or she lives in household more affected by civil conflict.

This result is consistent with those found by Rodríguez and sánchez (2012) in the case of Colombian armed conflict where they shown that exposure to armed conflict increases the risk of school drop-out and the effect is stronger for children older for whom a trade-off between child labor and schooling emerges. The above results can be explained by three channels of transmissions : firstly, household labour allocation. Indeed, conflict-affected households tend replace dead, injured

14. We do not present coefficients of the bivariate Probit estimations, indicating the direction of the effect of the explanatory variables. These coefficients are not directly interpretable.

or physically and mentally disabled adult workers with children in order to compensate for the unexpected reduction in the financial resources available to households during wartime. Thus, as it is widely reported in the development economics literature, children are used as a form of economic security mechanism (Basu and Van, 1998; Rodríguez and sánchez, 2012). The second explanation is related to significant declines in national education expense, the destruction of industries and school infrastructures. This situation affect the returns to education and play a large role in households' decisions, including removing children from school and putting them into the labour market. This is the case when job opportunities for skilled labour become scarce. Another channel beyond the scope of economics could be the psychological impact on children of being directly affected by conflict. Indeed, there is a relationship between traumatic experiences of children and educational outcomes (Akresh and de Walque, 2008). Children who go through traumatic experiences have lower educational outcomes in general and they could leave school in the long term. Finally, these results suggest that children represent an adjustment variable for general household well-being in the absence of social assistance program for conflict-affected households.

TABLE 1.5 – Work and school enrollment. Bivariate probit regressions (marginal effects)

	Working only	Working and Study	Study only	Idle
	[2]	[3]	[4]	[5]
Conflict victim	**0.0498***	**0.0878*****	**-0.0993****	**-0.0382***
	(0.0261)	**(0.0280)**	**(0.0411)**	**(0.0217)**
Child's age	0.0244***	0.0086**	-0.0386***	0.0057*
	(0.0028)	(0.0035)	(0.0042)	(0.0029)
Child of the head	-0.0918***	0.0816***	0.1163***	-0.1060***
	(0.0102)	(0.0110)	(0.0138)	(0.0107)
Child's gender (Male)	-0.0956***	0.0377***	0.1299***	-0.0720***
	(0.0080)	(0.0111)	(0.0124)	(0.0088)
Head's gender : (Male)	0.0165	-0.0656***	0.0006	0.0485***
	(0.0157)	(0.0191)	(0.0251)	(0.0119)
Age of the head	-0.0003	0.0010	0.0002	-0.0009**
	(0.0004)	(0.0007)	(0.0007)	(0.0005)
Rural household	0.0862***	0.1210***	-0.1633***	-0.0439***
	(0.0149)	(0.0192)	(0.0236)	(0.0147)
Head is married	0.0064	0.0316	-0.0176	-0.0205
	(0.0152)	(0.0214)	(0.0252)	(0.0167)
Ethnic : Krou	-0.0373**	0.0008	0.0577*	-0.0212
	(0.0168)	(0.0287)	(0.0326)	(0.0176)
Ethnic : Mandé du nord	0.0579**	-0.0052	-0.0797**	0.0271
	(0.0230)	(0.0284)	(0.0317)	(0.0224)
Ethnic : Mandé du sud	-0.0138	0.0193	0.0140	-0.0196
	(0.0212)	(0.0323)	(0.0364)	(0.0207)
Ethnic : Voltaique	0.0943***	0.0033	-0.1269***	0.0293
	(0.0220)	(0.0260)	(0.0274)	(0.0207)
Non-Ivorian	0.0549***	-0.0269	-0.0719***	0.0438**
	(0.0178)	(0.0235)	(0.0248)	(0.0202)
Religion : Christian	-0.0356***	0.0287	0.0443**	-0.0374***
	(0.0134)	(0.0192)	(0.0221)	(0.0136)
Religion : Muslim	0.0358**	-0.0075	-0.0505*	0.0221
	(0.0169)	(0.0226)	(0.0262)	(0.0170)
Head is literate	-0.0609***	0.0256	0.0834***	-0.0481***
	(0.0109)	(0.0167)	(0.0186)	(0.0110)
Household size	-0.0049*	-0.0066	0.0092**	0.0023
	(0.0026)	(0.0041)	(0.0044)	(0.0028)
Number of children 0-4	0.0113*	0.0073	-0.0189*	0.0003
	(0.0060)	(0.0083)	(0.0101)	(0.0055)
Number of children 5-9	0.0091	0.0041	-0.0146	0.0015
	(0.0056)	(0.0082)	(0.0091)	(0.0058)
Number of children 10-14	0.0108	0.0276***	-0.0240*	-0.0143**
	(0.0067)	(0.0090)	(0.0110)	(0.0061)
Household Wealth	-0.2255***	-0.0377	0.3452***	-0.0821***
	(0.0265)	(0.0341)	(0.0438)	(0.0234)
Head has farmland	0.0480***	0.0786***	-0.0941***	-0.0325***
	(0.0133)	(0.0151)	(0.0219)	(0.0108)
Access to transport	-0.0081	-0.0090	0.0146	0.0025
	(0.0100)	(0.0132)	(0.0159)	(0.0097)
Close to a primary school	-0.1289***	0.0873***	0.1651***	-0.1235***
	(0.0146)	(0.0134)	(0.0176)	(0.0135)
Close to a secondary school	-0.0429***	0.0127	0.0611**	-0.0309**
	(0.0123)	(0.0181)	(0.0212)	(0.0126)
Close to a water source	0.0270	-0.0025	-0.0406	0.0162
	(0.0174)	(0.0289)	(0.0312)	(0.0196)
Close to a market	0.0201	-0.0075	-0.0280	0.0153
	(0.0126)	(0.0172)	(0.0217)	(0.0117)
Observation	6,233	6,233	6,233	6,233
Rho		**-0.3272*****		
		0.0325		
Prob>chi2		0.0000		

*Significant at 10%, **Significant at 5%, ***Significant at 1%. Boostrapped robust standard errors in parentheses (200 replications), clustered at the household level. Marginal effects are the partial derivatives of the characteristics, evaluated to in relation to the average of the other characteristics. Dependante variables are "School and Work". Estimations include regional fixed effects. The reference category of ethnic group and religion are Akan group and other religion respectively.

6.3 Results across Sub-samples

We explore heterogeneity in the baseline results by separating children by gender and from different types of households i.e children from rural vs. urban area households. Table 3.6 reports marginal effects of gender differentials in children's time allocation and validity of the bivariate probit model. As in the baseline results, the bivariate probit results for work and school show that correlation coefficient (Rho) between errors is statistically significant, justifying, once again, the use of bivariate probit model.

We find that female and male children are more likely to work full time. However, the sign is not statistically significant for males' work. In particularly, a female living in a household more affected by civil conflict has a 6.15% of probability of working full time (statistically significant at the 10% level) compared to its counterpart living in household non-affected by the conflict. Similarly, results also show that male from a household more affected by civil conflict has a 11.86% of probability of combining work and school attendance (statistically significant at the 5 percent level) compared to its counterpart living in household non-affected by the conflict. Regarding the school attendance, we find that victim status of household has a negative effect on the enrolment of female and male. Indeed, the probability of attending school decreases by 8.67% and 10.83% (statistically significant at the 10 percent level) respectively if they live in a conflict-affected household by civil conflict. Finally these finding indicate that male and female are 11.86% and 6.15% more likely to be engaged in child labor respectively if they live in a household more civil conflict-affected household. By contrast they are 1.03% and 8.67% less likely to attend school respectively.

It appears that males are most affected by the conflict-affected household status than females. It is tempting to consider an adjustment by males when household well-being deteriorates. This result suggests that males' activity is probably a paid activity outside the household, unlike that of females, who are more likely to be mainly domestic and internal to the household. This finding is confirmed by the impact of the presence of young children (aged 0 to 4 years) in the household, which positively affects females' activity and negatively their schooling. Not only this allows adults and males to perform a paid work but also to protect females because, young females may be perceived as more vulnerable to attacks and abuses, and in particular, rape. This result is also consistent with sociological analyzes of household decisions on the role of females in society. In fact, females are supposed to be wives and therefore housework should prepare them to be ready to take on this role, hence their low schooling.

TABLE 1.6 – Work and school enrollment. Bivariate probit regressions (marginal effects)

	Boy				Girl			
	Work-Only	Work-School	School-Only	Idle	Work-Only	Work-School	School-Only	Idle
	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Conflict victim	**0.0323**	**0.1186****	**-0.1083***	**-0.0426**	**0.0615***	**0.0612**	**-0.0867***	**-0.0361**
	(0.0295)	**(0.0502)**	**(0.0585)**	**(0.0278)**	**(0.0369)**	**(0.0392)**	**(0.0499)**	**(0.0382)**
Child's age	0.0161***	0.0130**	-0.0320***	0.0029	0.0330***	0.0026	-0.0446***	0.0089**
	(0.0036)	(0.0052)	(0.0063)	(0.0034)	(0.0044)	(0.0049)	(0.0059)	(0.0046)
Child of the head	-0.0287**	0.0669***	0.0194	-0.0577***	-0.1494***	0.1042***	0.1940***	-0.1488***
	(0.0125)	(0.0178)	(0.0217)	(0.0134)	(0.0180)	(0.0143)	(0.0208)	(0.0172)
Head's gender : (Male)	0.0123	-0.0774**	0.0238	0.0414***	0.0280	-0.0498*	-0.0308	0.0526**
	(0.0166)	(0.0346)	(0.0370)	(0.0137)	(0.0231)	(0.0260)	(0.0337)	(0.0207)
Age of the head	-0.0003	0.0010	0.0001	-0.0007	-0.0005	0.0012*	0.0005	-0.0013*
	(0.0004)	(0.0009)	(0.0009)	(0.0005)	(0.0006)	(0.0007)	(0.0009)	(0.0007)
Rural household	0.0702***	0.1639***	-0.1908***	-0.0433***	0.0989***	0.0777***	-0.1378***	-0.0389
	(0.0152)	(0.0254)	(0.0291)	(0.0166)	(0.0186)	(0.0214)	(0.0252)	(0.0205)
Head is married	-0.0101	0.0349	0.0016	-0.0263	0.0222	0.0236	-0.0314	-0.0144
	(0.0183)	(0.0297)	(0.0347)	(0.0192)	(0.0234)	(0.0270)	(0.0335)	(0.0268)
Ethnic : Krou	-0.0190	-0.0379	0.0491	0.0078	-0.0499**	0.0329	0.0655*	-0.0486*
	(0.0198)	(0.0369)	(0.0408)	(0.0243)	(0.0230)	(0.0333)	(0.0358)	(0.0266)
Ethnic : Mandé du nord	0.0067	0.0163	-0.0185	-0.0045	0.1189***	-0.0282	-0.1420***	0.0513*
	(0.0261)	(0.0390)	(0.0490)	(0.0218)	(0.0331)	(0.0285)	(0.0340)	(0.0309)
Ethnic : Mandé du sud	-0.0331*	0.0291	0.0382	-0.0343*	0.0072	0.0069	-0.0101	-0.0041
	(0.0196)	(0.0466)	(0.0501)	(0.0188)	(0.0345)	(0.0345)	(0.0460)	(0.0307)
Ethnic : Voltaique	0.0840***	0.0338	-0.1370***	0.0192	0.0949***	-0.0125	-0.1147***	0.0323
	(0.0302)	(0.0370)	(0.0436)	(0.0225)	(0.0311)	(0.0280)	(0.0340)	(0.0283)
Non-Ivorian	0.0614**	-0.0011	-0.0925**	0.0321	0.0401	-0.0406*	-0.0533*	0.0537**
	(0.0238)	(0.0344)	(0.0398)	(0.0207)	(0.0253)	(0.0228)	(0.0313)	(0.0245)
Religion : Christian	-0.0400***	0.0402	0.0444	-0.0447***	-0.0285	0.0185	0.0372	-0.0273
	(0.0132)	(0.0279)	(0.0285)	(0.0142)	(0.0208)	(0.0240)	(0.0290)	(0.0218)
Religion : Muslim	0.0314	0.0051	-0.0523	0.0159	0.0401	-0.0268	-0.0522	0.0389*
	(0.0196)	(0.0317)	(0.0364)	(0.0184)	(0.0252)	(0.0255)	(0.0335)	(0.0231)
Head is literate	-0.0482***	0.0270	0.0649**	-0.0437***	-0.0817***	0.0244	0.1097***	-0.0524***
	(0.0125)	(0.0236)	(0.0263)	(0.0124)	(0.0164)	(0.0207)	(0.0228)	(0.0185)
Household size	-0.0003	-0.0088*	0.0047	0.0045*	-0.0096**	-0.0035	0.0132**	-0.0001
	(0.0026)	(0.0049)	(0.0056)	(0.0024)	(0.0038)	(0.0043)	(0.0052)	(0.0039)
Number of children 0-4	0.0042	0.0052	-0.0093	-0.0002	0.0182**	0.0084	-0.0251**	-0.0015
	(0.0055)	(0.0122)	(0.0117)	(0.0064)	(0.0087)	(0.0104)	(0.0120)	(0.0094)
Number of children 5-9	0.0011	0.0151	-0.0089	-0.0072	0.0178**	-0.0091	-0.0233**	0.0147*
	(0.0066)	(0.0105)	(0.0129)	(0.0059)	(0.0084)	(0.0087)	(0.0114)	(0.0082)
Number of children 10-14	0.0087	0.0303**	-0.0284**	-0.0106*	0.0137	0.0248**	-0.0200	-0.0185*
	(0.0065)	(0.0126)	(0.0137)	(0.0064)	(0.0091)	(0.0106)	(0.0123)	(0.0101)
Household Wealth	-0.2437***	-0.0326	0.4073***	-0.1310***	-0.2194***	-0.0510	0.2985***	-0.0280
	(0.0290)	(0.0479)	(0.0569)	(0.0269)	(0.0347)	(0.0362)	(0.0477)	(0.0318)
Head has farmland	0.0510***	0.1157***	-0.1372***	-0.0296**	0.0415**	0.0418**	-0.0585**	-0.0248
	(0.0138)	(0.0229)	(0.0269)	(0.0141)	(0.0186)	(0.0187)	(0.0253)	(0.0172)
Access to transport	-0.0038	-0.0186	0.0150	0.0074	-0.0136	0.0025	0.0181	-0.0070
	(0.0113)	(0.0194)	(0.0227)	(0.0105)	(0.0142)	(0.0192)	(0.0193)	(0.0178)
Close to a primary school	-0.1114***	0.0794***	0.1431***	-0.1111***	-0.1417***	0.0963***	0.1827***	-0.1373***
	(0.0177)	(0.0205)	(0.0262)	(0.0171)	(0.0199)	(0.0161)	(0.0208)	(0.0205)
Close to a secondary school	-0.0299**	0.0087	0.0445	-0.0233*	-0.0560***	0.0183	0.0762***	-0.0385**
	(0.0137)	(0.0255)	(0.0282)	(0.0138)	(0.0170)	(0.0193)	(0.0252)	(0.0176)
Close to a water source	0.0355*	-0.0013	-0.0590	0.0248	0.0125	0.0078	-0.0176	-0.0027
	(0.0183)	(0.0402)	(0.0436)	(0.0193)	(0.0297)	(0.0312)	(0.0420)	(0.0309)
Close to a market	0.0183	-0.0112	-0.0241	0.0170	0.0231	-0.0058	-0.0313	0.0141
	(0.0138)	(0.0252)	(0.0284)	(0.0134)	(0.0211)	(0.0195)	(0.0303)	(0.0181)
Observation	3,251	3,251	3,251	3,251	2,982	2,982	2,982	2,982
Rho		**-0.2891*****				**-0.2833*****		
		(0.0416)				**(0.0373)**		
Prob>chi2		0.0000				0.0000		

* Significant at 10%, ** Significant at 5%, *** Significant at 1%. Boostrapped robust standard errors in parentheses (200 replications), clustered at the household level.

Marginal effects are the partial derivatives of the characteristics, evaluated to in relation to the average of the other characteristics. Dependante variables are "School and Work". Estimations include regional fixed effects. The reference category of ethnic group and religion are Akan group and other religion respectively.

The results on household place of residence are reported in the Table 3.7. The validity of the bivariate probit model as well as marginal effects are also presented in this table. As in the baseline results, the bivariate probit results for work and school show that correlation coefficient (Rho) between errors is statistically significant, justifying, once again, the use of bivariate probit model.

We find that the coefficients associated with our interest variable in urban sample are positives and statistically significant at least at the 5% level for children who work-only and combine work and study. Indeed, we find that a child living in a more conflict-affected household has 7.73% of probability of working only compared to its counterpart living in household non-affected by the conflict. He/she has 11.07% of probability of combining study and work if he/she lives in a a household more affected by civil conflict. Finally, the probability of attending school decreases by 12.93%. Our result suggests that the victims of civil conflict are particularly urban households. Children in these households overall are 16.8% more likey to work and 1.86% less likely to attend school. We find no statistically significant effect of conflict in rural area. Our result tells us that civil conflict did not significantly affect the allocation of children's time in rural areas. Such result could be explained by the effects of remittances but also by the internal migrations. Indeed, it is clear that with the conflict situation, many rural households have had to lose their agricultural land and production tools. Under these conditions, household survival depends on migration to urban areas where children's contribution to income is more significant.

TABLE 1.7 – Work and school enrollment. Bivariate probit regressions (marginal effects)

	Rural				Urban			
	Work-Only	Work-School	School-Only	Idle	Work-Only	Work-School	School-Only	Idle
	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Conflict victim	**-0.0001**	**0.0271**	**-0.0112**	**-0.0158**	**0.0573****	**0.1107*****	**-0.1293****	**-0.0387**
	(0.0456)	**(0.0537)**	**(0.0509)**	**(0.0313)**	**(0.0229)**	**(0.0371)**	**(0.0532)**	**(0.0357)**
Child's age	0.0321***	-0.0067	-0.0308***	0.0053*	0.0162***	0.0156***	-0.0380***	0.0062
	(0.0052)	(0.0053)	(0.0054)	(0.0032)	(0.0027)	(0.0039)	(0.0062)	(0.0041)
Child of the head	-0.0644***	0.0978***	0.0311*	-0.0645***	-0.0781***	0.0458***	0.1979***	-0.1656***
	(0.0190)	(0.0193)	(0.0186)	(0.0139)	(0.0112)	(0.0125)	(0.0194)	(0.0168)
Child's gender (Male)	-0.1112***	0.0980***	0.0753***	-0.0621***	-0.0697***	-0.0162	0.1668***	-0.0809***
	(0.0147)	(0.0161)	(0.0148)	(0.0101)	(0.0093)	(0.0121)	(0.0196)	(0.0146)
Head's gender : (Male)	0.0067	-0.0504	0.0163	0.0275	0.0142	-0.0543**	-0.0288	0.0688***
	(0.0306)	(0.0364)	(0.0345)	(0.0183)	(0.0145)	(0.0251)	(0.0372)	(0.0193)
Age of the head	0.0002	0.0002	-0.0003	-0.0001	-0.0004	0.0014**	0.0010	-0.0020***
	(0.0007)	(0.0008)	(0.0008)	(0.0005)	(0.0004)	(0.0007)	(0.0009)	(0.0006)
Head is married	-0.0306	0.0423	0.0156	-0.0272	0.0217	0.0361*	-0.0498	-0.0080
	(0.0321)	(0.0320)	(0.0322)	(0.0215)	(0.0134)	(0.0211)	(0.0343)	(0.0240)
Ethnic : Krou	-0.0734**	0.0865**	0.0362	-0.0493***	-0.0300**	-0.0572**	0.0649*	0.0223
	(0.0298)	(0.0383)	(0.0375)	(0.0170)	(0.0141)	(0.0230)	(0.0388)	(0.0326)
Ethnic : Mandé du nord	0.1148**	-0.0922**	-0.0807**	0.0580*	0.0069	0.0092	-0.0159	-0.0002
	(0.0479)	(0.0386)	(0.0405)	(0.0320)	(0.0184)	(0.0277)	(0.0427)	(0.0281)
Ethnic : Mandé du sud	-0.0387	0.0475	0.0190	-0.0278	-0.0180	-0.0054	0.0452	-0.0219
	(0.0321)	(0.0520)	(0.0416)	(0.0253)	(0.0183)	(0.0338)	(0.0485)	(0.0293)
Ethnic : Voltaique	0.1905***	-0.0711**	-0.1474***	0.0281	0.0066	0.0091	-0.0151	-0.0006
	(0.0404)	(0.0329)	(0.0300)	(0.0236)	(0.0202)	(0.0313)	(0.0466)	(0.0301)
Non-Ivorian	0.1380***	-0.0651**	-0.1077***	0.0347	-0.0169	-0.0366*	0.0361	0.0173
	(0.0317)	(0.0303)	(0.0266)	(0.0215)	(0.0160)	(0.0218)	(0.0412)	(0.0292)
Religion : Christian	-0.0721**	0.0613**	0.0495	-0.0387***	-0.0091	0.0145	0.0230	-0.0284
	(0.0230)	(0.0275)	(0.0267)	(0.0146)	(0.0135)	(0.0232)	(0.0330)	(0.0225)
Religion : Muslim	0.0176*	-0.0165	-0.0115*	0.0104	0.0408**	0.0172	-0.0973**	0.0393
	(0.0302)	(0.0302)	(0.0334)	(0.0182)	(0.0174)	(0.0267)	(0.0397)	(0.0260)
Head is literate	-0.0718***	0.0372	0.0605**	-0.0259**	-0.0393***	0.0104	0.0960***	-0.0672***
	(0.0199)	(0.0239)	(0.0247)	(0.0129)	(0.0115)	(0.0160)	(0.0264)	(0.0171)
Household size	-0.0018	0.0017	0.0011	-0.0011	-0.0072**	-0.0114***	0.0164***	0.0022
	(0.0050)	(0.0058)	(0.0055)	(0.0034)	(0.0022)	(0.0039)	(0.0054)	(0.0037)
Number of children 0-4	0.0142	-0.0159	-0.0082	0.0099	0.0082	0.0246***	-0.0177	-0.0150
	(0.0093)	(0.0129)	(0.0107)	(0.0075)	(0.0060)	(0.0089)	(0.0144)	(0.0095)
Number of children 5-9	-0.0017	-0.0045	0.0037	0.0025	0.0141**	0.0121	-0.0333***	0.0071
	(0.0102)	(0.0131)	(0.0110)	(0.0077)	(0.0053)	(0.0086)	(0.0127)	(0.0088)
Number of children 10-14	0.0060	0.0224*	-0.0157	-0.0128*	0.0091	0.0138	-0.0209	-0.0020
	(0.0114)	(0.0128)	(0.0121)	(0.0074)	(0.0058)	(0.0102)	(0.0137)	(0.0098)
Household Wealth	-0.2530***	0.0866	0.2279***	-0.0614*	-0.1651***	-0.0892***	0.3933***	-0.1390***
	(0.0532)	(0.0600)	(0.0577)	(0.0348)	(0.0226)	(0.0336)	(0.0504)	(0.0340)
Head has farmland	0.0448**	0.0839***	-0.0795***	-0.0492***	0.0443***	0.0594***	-0.0981***	-0.0056
	(0.0207)	(0.0229)	(0.0249)	(0.0169)	(0.0145)	(0.0221)	(0.0300)	(0.0180)
Access to transport	-0.0442**	-0.0124	0.0513**	0.0053	0.0180*	0.0087	-0.0432*	0.0165
	(0.0175)	(0.0217)	(0.0201)	(0.0126)	(0.0092)	(0.0149)	(0.0222)	(0.0169)
Close to a primary school	-0.1579***	0.1469***	0.1068***	-0.0958***	-0.0957***	0.0318**	0.2230***	-0.1591***
	(0.0235)	(0.0185)	(0.0214)	(0.0151)	(0.0181)	(0.0148)	(0.0270)	(0.0223)
Close to a secondary school	-0.0913**	0.0736	0.0646	-0.0469**	-0.0170*	0.0157	0.0429**	-0.0416**
	(0.0287)	(0.0498)	(0.0427)	(0.0208)	(0.0091)	(0.0157)	(0.0217)	(0.0173)
Close to a water source	0.0141	0.0076	-0.0182	-0.0035	0.0213	-0.0048	-0.0533	0.0369
	(0.0386)	(0.0391)	(0.0432)	(0.0235)	(0.0146)	(0.0337)	(0.0403)	(0.0256)
Close to a market	0.0206	-0.0130	-0.0161	0.0085	0.0312**	-0.0183	-0.0759**	0.0629***
	(0.0206)	(0.0218)	(0.0229)	(0.0125)	(0.0124)	(0.0288)	(0.0351)	(0.0211)
Observation	3,317	3,317	3,317	3,317	2,916	2,916	2,916	2,916
Rho		**-0.2317*****				**-0.3762*****		
		(0.0381)				**(0.0460)**		
Prob>chi2		0.0000				0.0000		

*Significant at 10%, **Significant at 5%, ***Significant at 1%. Boostrapped robust standard errors in parentheses (200 replications), clustered at the household level.

Marginal effects are the partial derivatives of the characteristics, evaluated to in relation to the average of the other characteristics. Dependante variables are "School and Work". Estimations include regional fixed effects. The reference category of ethnic group and religion are Akan group and other religion respectively.

6.4 Domestic versus Market-oriented work

The child labor literature assumes that market work is more harmful for children's schooling outcomes than domestic activities (Zapata et al., 2011). We explore whether the type of work children undertake – domestic or market – affects them differently. Domestic work is defined as the main work performed by a child inside the household and market work refers to the child's main activity performed outside the household.

Tables 3.8 and 3.9 present results by the type of work. As in the previous Tables, results from bivariate probit for domestic work and school attendance show that the coefficient correlation (Rho) between the errors is negative and statiscally significant at the 1% level in all specifications justifying, once again, the use of the bivariate probit model. The empirical results reveal that children living in a more conflict-affected household are 2.94% more likely to perform domestic works only ; 6.38% more likely to combine domestic work and school attendance and, finally 7.57% less likely to be enrolled in school. These effects are all statistically significant at least at the 10% (columns 1–3). In other words, they are 9.32% more likely to perform domestic works and 1.19% less likely to attend school.

The analysis of the differences between boys and girls however, reveals that the participation of the former is lower. For girls, the probability of involving in domestic chores is by 11.17%. They are 4.32% less likely to be in school. More specifically, the results show that girls have 5.26% more likely to perform only the domestic works, 5.91% more likely to combine school attendance and domestic works and finally, they have 10.73% less likely to attend school if they live in household who experienced a high degree of victimization. Boys' participation in domestic tasks is not exclusive since they have 6.58% more likely of combining school and domestic works. This effect is statistically significant at the 5% level (column 6).

Regarding the market work, the overall results (Table 3.9) suggest that children combine market work and school attendance. More specifically, the results show that children living in a household more affected by civil conflict are 6.76% (statistically significant at the 5% level, column 2) more likely to combine market work and school attendance. With respect to gender, we find that only males are involved in market work. Indeed, the coefficient associated to the variable « conflict victim » is positive and statistically significant at the 5% level (column 6) suggesting that males living in a more conflict-affected households are 9.40% more likely to combine school attendance and market work. However, our results reveal no significant effect for females implication in the

market work. This reinforces the idea that females are more likely to be primarily involved in domestic chores within the household. Indeed, most of domestic activities carried out by females are also performed by males. In contrast, remunerated activities performed outside the household are carried out only by males. This household decision on time allocation is motivated by the need to smooth out consumption.

Table 1.8 – Domestic work and school enrollment. Bivariate probit regressions (marginal effects)

	All				Boy				Girl			
	Work Only	School-Work	School Only	Idle	Work Only	School-Work	School Only	Idle	Work Only	School-Work	School Only	Idle
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[12]	[13]
Conflict victim	**0.0294****	**0.0638*****	**-0.0757***	**-0.0174**	**0.0107**	**0.0658****	**-0.0342**	**-0.0424**	**0.0526****	**0.0591***	**-0.1073***	**-0.0043**
	(0.0122)	**(0.0235)**	**(0.0410)**	**(0.0329)**	**(0.0095)**	**(0.0325)**	**(0.0532)**	**(0.0438)**	**(0.0258)**	**(0.0320)**	**(0.0630)**	**(0.0482)**
Child's age	0.0053***	0.0031	-0.0199***	0.0115***	0.0017	0.0026	-0.0100	0.0056	0.0111***	0.0034	-0.0304***	0.0159**
	(0.0015)	(0.0028)	(0.0052)	(0.0041)	(0.0014)	(0.0038)	(0.0076)	(0.0054)	(0.0032)	(0.0040)	(0.0079)	(0.0071)
Child of the head	-0.0356***	0.0300***	0.1763***	-0.1707***	-0.0085	0.0222*	0.0769***	-0.0905***	-0.0693***	0.0471***	0.2491***	-0.2270***
	(0.0067)	(0.0086)	(0.0185)	(0.0149)	(0.0056)	(0.0125)	(0.0267)	(0.0224)	(0.0134)	(0.0127)	(0.0256)	(0.0209)
Child's gender (Male)	-0.0563***	-0.0418***	0.1968***	-0.0987***								
	(0.0054)	(0.0081)	(0.0144)	(0.0119)								
Head's gender : (Male)	-0.0019	-0.0542***	-0.0123	0.0684***	-0.0007	-0.0390	-0.0041	0.0438**	-0.0004	-0.0718***	-0.0318	0.1040***
	(0.0073)	(0.0201)	(0.0250)	(0.0179)	(0.0065)	(0.0270)	(0.0374)	(0.0213)	(0.0157)	(0.0259)	(0.0394)	(0.0280)
Age of the head	0.0002	0.0013***	0.0002	-0.0018***	-0.0000	0.0010*	0.0007	-0.0016**	0.0004	0.0016**	0.0001	-0.0021**
	(0.0002)	(0.0004)	(0.0007)	(0.0006)	(0.0002)	(0.0006)	(0.0009)	(0.0007)	(0.0005)	(0.0006)	(0.0011)	(0.0009)
Rural household	0.0224***	0.0417***	-0.0620***	-0.0022	0.0087	0.0436*	-0.0345	-0.0178	0.0389**	0.0334*	-0.0849**	0.0125
	(0.0075)	(0.0156)	(0.0225)	(0.0172)	(0.0062)	(0.0237)	(0.0313)	(0.0209)	(0.0156)	(0.0185)	(0.0361)	(0.0281)
Head is married	0.0109	0.0248*	-0.0266	-0.0091	0.0026	0.0108	-0.0108	-0.0026	0.0237*	0.0391**	-0.0349	-0.0279
	(0.0072)	(0.0138)	(0.0265)	(0.0217)	(0.0060)	(0.0192)	(0.0345)	(0.0256)	(0.0131)	(0.0167)	(0.0392)	(0.0357)
Ethnic : Krou	-0.0091	-0.0080	0.0339	-0.0168	-0.0002	-0.0222	-0.0188	0.0413	-0.0206	0.0097	0.0708	-0.0600*
	(0.0080)	(0.0179)	(0.0301)	(0.0260)	(0.0077)	(0.0211)	(0.0451)	(0.0391)	(0.0155)	(0.0263)	(0.0443)	(0.0345)
Ethnic : Mandé du nord	0.0104	0.0019	-0.0405	0.0282	-0.0014	0.0163	0.0147	-0.0296	0.0343	-0.0141	-0.1107**	0.0905**
	(0.0116)	(0.0195)	(0.0368)	(0.0295)	(0.0081)	(0.0275)	(0.0451)	(0.0287)	(0.0234)	(0.0223)	(0.0509)	(0.0440)
Ethnic : Mandé du sud	0.0092	0.0374	-0.0184	-0.0282	0.0019	0.0597	-0.0099	-0.0517*	0.0145	0.0157	-0.0289	-0.0013
	(0.0113)	(0.0245)	(0.0356)	(0.0259)	(0.0093)	(0.0414)	(0.0525)	(0.0265)	(0.0232)	(0.0313)	(0.0536)	(0.0459)
Ethnic : Voltaique	0.0180	-0.0048	-0.0756**	0.0624**	0.0150	0.0036	-0.0878*	0.0692*	0.0181	-0.0065	-0.0583	0.0467
	(0.0120)	(0.0196)	(0.0343)	(0.0313)	(0.0116)	(0.0252)	(0.0481)	(0.0411)	(0.0212)	(0.0259)	(0.0456)	(0.0415)
Non-Ivorian	0.0057	-0.0296**	-0.0573*	0.0812***	0.0080	-0.0120	-0.0632	0.0673*	-0.0024	-0.0425**	-0.0439	0.0889**
	(0.0093)	(0.0134)	(0.0306)	(0.0257)	(0.0087)	(0.0209)	(0.0417)	(0.0360)	(0.0181)	(0.0195)	(0.0455)	(0.0383)
Religion : Christian	-0.0080	-0.0019	0.0322	-0.0223	-0.0017	0.0111	0.0168	-0.0261	-0.0181	-0.0117	0.0450	-0.0153
	(0.0073)	(0.0141)	(0.0247)	(0.0183)	(0.0053)	(0.0181)	(0.0298)	(0.0242)	(0.0130)	(0.0188)	(0.0311)	(0.0255)
Religion : Muslim	0.0153	0.0018	-0.0612*	0.0441*	0.0118	0.0096	-0.0697*	0.0482	0.0116	-0.0104	-0.0437	0.0424
	(0.0098)	(0.0176)	(0.0325)	(0.0254)	(0.0083)	(0.0228)	(0.0413)	(0.0314)	(0.0180)	(0.0222)	(0.0434)	(0.0347)
Head is literate	-0.0147***	0.0176	0.0741***	-0.0770***	-0.0072	0.0143	0.0552**	-0.0622***	-0.0275**	0.0183	0.0978***	-0.0885***
	(0.0054)	(0.0117)	(0.0177)	(0.0145)	(0.0049)	(0.0173)	(0.0250)	(0.0176)	(0.0113)	(0.0144)	(0.0280)	(0.0222)
Household size	-0.0042***	-0.0087***	0.0109**	0.0020	-0.0011	-0.0075**	0.0032	0.0054	-0.0086***	-0.0088***	0.0181***	-0.0007
	(0.0012)	(0.0024)	(0.0040)	(0.0030)	(0.0008)	(0.0030)	(0.0045)	(0.0035)	(0.0024)	(0.0033)	(0.0057)	(0.0046)
Number of children 0-4	0.0099**	0.0192***	-0.0272***	-0.0019	0.0024	0.0113	-0.0095	-0.0042	0.0202***	0.0258***	-0.0386**	-0.0073
	(0.0030)	(0.0059)	(0.0103)	(0.0088)	(0.0023)	(0.0074)	(0.0125)	(0.0095)	(0.0062)	(0.0079)	(0.0154)	(0.0123)
Number of children 5-9	0.0030	0.0023	-0.0107	0.0054	0.0006	0.0042	-0.0018	-0.0030	0.0072	-0.0013	-0.0227	0.0168
	(0.0027)	(0.0054)	(0.0090)	(0.0068)	(0.0022)	(0.0071)	(0.0114)	(0.0080)	(0.0057)	(0.0068)	(0.0142)	(0.0107)
Number of children 10-14	0.0054	0.0120	-0.0138	-0.0037	0.0030	0.0132	-0.0127	-0.0035	0.0075	0.0100	-0.0140	-0.0035
	(0.0036)	(0.0083)	(0.0110)	(0.0088)	(0.0024)	(0.0095)	(0.0118)	(0.0090)	(0.0065)	(0.0086)	(0.0160)	(0.0125)
Household Wealth	-0.0692***	-0.0188	0.2743***	-0.1863***	-0.0447	-0.0078	0.2888***	-0.2363***	-0.0974***	-0.0291	0.2668***	-0.1403***
	(0.0120)	(0.0231)	(0.0403)	(0.0336)	(0.0127)	(0.0339)	(0.0531)	(0.0411)	(0.0235)	(0.0323)	(0.0522)	(0.0455)
Head has farmland	0.0060	0.0062	-0.0205	0.0082	0.0103*	0.0306*	-0.0500*	0.0091	-0.0050	-0.0128	0.0039	0.0139
	(0.0071)	(0.0131)	(0.0240)	(0.0184)	(0.0054)	(0.0164)	(0.0278)	(0.0197)	(0.0129)	(0.0166)	(0.0318)	(0.0252)
Access to transport	0.0045	0.0047	-0.0153	0.0061	0.0055	0.0145	-0.0283	0.0083	-0.0000	0.0002	0.0003	-0.0004
	(0.0053)	(0.0099)	(0.0177)	(0.0129)	(0.0043)	(0.0137)	(0.0229)	(0.0159)	(0.0108)	(0.0140)	(0.0265)	(0.0208)
Close to a primary school	-0.0348***	0.0261***	0.1691***	-0.1603***	-0.0164*	0.0174	0.1247***	-0.1257***	-0.0621***	0.0372***	0.2150***	-0.1900***
	(0.0082)	(0.0098)	(0.0226)	(0.0192)	(0.0085)	(0.0142)	(0.0303)	(0.0245)	(0.0151)	(0.0138)	(0.0283)	(0.0299)
Close to a secondary school	-0.0084	0.0134	0.0438**	-0.0488***	-0.0027	0.0053	0.0204	-0.0231	-0.0177	0.0240	0.0712**	-0.0775***
	(0.0057)	(0.0129)	(0.0194)	(0.0153)	(0.0049)	(0.0184)	(0.0261)	(0.0195)	(0.0124)	(0.0170)	(0.0320)	(0.0221)
Close to a water source	-0.0035	-0.0208	0.0029	0.0214	0.0000	-0.0197	-0.0057	0.0255	-0.0095	-0.0200	0.0131	0.0164
	(0.0104)	(0.0208)	(0.0343)	(0.0241)	(0.0066)	(0.0283)	(0.0360)	(0.0273)	(0.0187)	(0.0281)	(0.0449)	(0.0399)
Close to a market	0.0140*	0.0072	-0.0571***	0.0358**	0.0088*	0.0141	-0.0553**	0.0324*	0.0189	-0.0021	-0.0610*	0.0441
	(0.0055)	(0.0123)	(0.0209)	(0.0153)	(0.0048)	(0.0165)	(0.0280)	(0.0196)	(0.0120)	(0.0192)	(0.0329)	(0.0272)
Observation	4,334	4,334	4,334	4,334	2,142	2,142	2,142	2,142	2,192	2,192	2,192	2,192
Rho		**-0.2250*****				**-0.1659*****				**-0.2391*****		
		(0.0377)				**(0.0635)**				**(0.0444)**		
Prob>chi2		0.0000				0.0053				0.0000		

*Significant at 10%, **Significant at 5%, ***Significant at 1%. Boostrapped robust standard errors in parentheses (200 replications), clustered at the household level. Marginal effects are the partial derivatives of the characteristics, evaluated to in relation to the average of the other characteristics. Dependante variables are "School and Domestic works". Estimations include regional fixed effects. The reference category of ethnic group and religion are Akan group and other religion respectively.

TABLE 1.9 – Market work and school enrollment. Bivariate probit regressions (marginal effects)

	All				Boy				Girl			
	Work Only	School-Work	School Only	Idle	Work Only	School-Work	School Only	Idle	Work Only	School-Work	School Only	Idle
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[12]	[13]
Conflict victim	**0.0355**	**0.0676****	**-0.0668**	**-0.0363**	**0.0304**	**0.0940****	**-0.0868**	**-0.0377**	**0.0305**	**0.0416**	**-0.0362**	**-0.0359**
	(0.0228)	**(0.0284)**	**(0.0432)**	**(0.0290)**	**(0.0309)**	**(0.0472)**	**(0.0654)**	**(0.0329)**	**(0.0340)**	**(0.0325)**	**(0.0589)**	**(0.0448)**
Child's age	0.0219***	0.0124***	-0.0418***	0.0074**	0.0160***	0.0144***	-0.0346***	0.0042	0.0275***	0.0088**	-0.0487***	0.0124**
	(0.0026)	(0.0032)	(0.0048)	(0.0034)	(0.0033)	(0.0055)	(0.0072)	(0.0037)	(0.0040)	(0.0043)	(0.0069)	(0.0061)
Child of the head	-0.0634***	0.0567***	0.1274***	-0.1207***	-0.0238**	0.0587**	0.0332	-0.0680***	-0.0981***	0.0551***	0.2207***	-0.1776***
	(0.0109)	(0.0114)	(0.0177)	(0.0131)	(0.0118)	(0.0193)	(0.0238)	(0.0164)	(0.0172)	(0.0134)	(0.0245)	(0.0231)
Child's gender (Male)	-0.0501***	0.0562***	0.0985***	-0.1047***								
	(0.0082)	(0.0101)	(0.0139)	(0.0101)								
Head's gender : (Male)	0.0161	-0.0372*	-0.0271	0.0481**	0.0131	-0.0560*	-0.0009	0.0437**	0.0274	-0.0143	-0.0617	0.0486*
	(0.0137)	(0.0197)	(0.0279)	(0.0147)	(0.0189)	(0.0317)	(0.0417)	(0.0182)	(0.0213)	(0.0206)	(0.0408)	(0.0254)
Age of the head	-0.0006*	0.0002	0.0012*	-0.0008	-0.0004	0.0005	0.0006	-0.0007	-0.0010*	0.0002	0.0020*	-0.0012
	(0.0004)	(0.0006)	(0.0007)	(0.0005)	(0.0004)	(0.0009)	(0.0010)	(0.0005)	(0.0005)	(0.0006)	(0.0009)	(0.0008)
Rural household	0.0895***	0.1279***	-0.1695***	-0.0478***	0.0771***	0.1622***	-0.1963***	-0.0430**	0.1011***	0.0901***	-0.1464***	-0.0449
	(0.0128)	(0.0167)	(0.0253)	(0.0161)	(0.0146)	(0.0274)	(0.0314)	(0.0207)	(0.0193)	(0.0202)	(0.0342)	(0.0286)
Head is married	0.0000	0.0223	0.0018	-0.0242	-0.0093	0.0285	0.0107	-0.0300	0.0057	0.0138	-0.0027	-0.0168
	(0.0160)	(0.0201)	(0.0297)	(0.0190)	(0.0187)	(0.0286)	(0.0384)	(0.0219)	(0.0221)	(0.0198)	(0.0403)	(0.0312)
Ethnic : Krou	-0.0287*	0.0012	0.0574*	-0.0298	-0.0184	-0.0282	0.0445	0.0022	-0.0333	0.0262	0.0770	-0.0700**
	(0.0148)	(0.0238)	(0.0317)	(0.0224)	(0.0174)	(0.0337)	(0.0398)	(0.0260)	(0.0234)	(0.0310)	(0.0472)	(0.0322)
Ethnic : Mandé du nord	0.0552***	0.0235	-0.0966***	0.0179	0.0104	0.0080	-0.0217	0.0034	0.1146***	0.0303	-0.1709***	0.0260
	(0.0211)	(0.0253)	(0.0338)	(0.0219)	(0.0244)	(0.0395)	(0.0509)	(0.0261)	(0.0340)	(0.0254)	(0.0431)	(0.0345)
Ethnic : Mandé du sud	-0.0259	-0.0101	0.0523	-0.0163	-0.0413**	-0.0214	0.0920**	-0.0293	-0.0067	-0.0064	0.0095	0.0036
	(0.0159)	(0.0244)	(0.0340)	(0.0236)	(0.0163)	(0.0356)	(0.0426)	(0.0237)	(0.0272)	(0.0304)	(0.0479)	(0.0422)
Ethnic : Voltaique	0.1008***	0.0305	-0.1642***	0.0329	0.0861***	0.0383	-0.1539***	0.0294	0.1081***	0.0255	-0.1624***	0.0288
	(0.0243)	(0.0237)	(0.0339)	(0.0214)	(0.0282)	(0.0348)	(0.0439)	(0.0262)	(0.0313)	(0.0265)	(0.0388)	(0.0349)
Non-Ivorian	0.0549***	0.0138	-0.0966***	0.0279	0.0621***	0.0130	-0.1115***	0.0363	0.0444*	0.0152	-0.0727*	0.0131
	(0.0172)	(0.0211)	(0.0281)	(0.0210)	(0.0225)	(0.0307)	(0.0385)	(0.0239)	(0.0267)	(0.0236)	(0.0408)	(0.0312)
Religion : Christian	-0.0242**	0.0210	0.0461**	-0.0429***	-0.0327**	0.0250	0.0535*	-0.0457***	-0.0131	0.0167	0.0344	-0.0380
	(0.0119)	(0.0178)	(0.0233)	(0.0157)	(0.0140)	(0.0241)	(0.0304)	(0.0165)	(0.0172)	(0.0199)	(0.0314)	(0.0277)
Religion : Muslim	0.0273	-0.0175	-0.0525	0.0427**	0.0281	-0.0010	-0.0521	0.0250	0.0247	-0.0320	-0.0674*	0.0747**
	(0.0175)	(0.0217)	(0.0320)	(0.0199)	(0.0187)	(0.0290)	(0.0390)	(0.0193)	(0.0216)	(0.0223)	(0.0369)	(0.0324)
Head is literate	-0.0518***	-0.0008	0.1004***	-0.0478***	-0.0419***	0.0107	0.0762***	-0.0450***	-0.0678***	-0.0093	0.1291***	-0.0520**
	(0.0105)	(0.0156)	(0.0202)	(0.0133)	(0.0118)	(0.0241)	(0.0269)	(0.0154)	(0.0148)	(0.0154)	(0.0269)	(0.0213)
Household size	-0.0027	-0.0037	0.0051	0.0013	0.0003	-0.0061	0.0013	0.0045	-0.0053*	-0.0012	0.0097	-0.0032
	(0.0022)	(0.0038)	(0.0043)	(0.0032)	(0.0024)	(0.0046)	(0.0054)	(0.0028)	(0.0031)	(0.0037)	(0.0053)	(0.0048)
Number of children 0-4	0.0051	-0.0005	-0.0097	0.0051	0.0031	0.0002	-0.0058	0.0026	0.0056	-0.0006	-0.0112	0.0063
	(0.0051)	(0.0084)	(0.0097)	(0.0071)	(0.0055)	(0.0112)	(0.0122)	(0.0073)	(0.0077)	(0.0088)	(0.0131)	(0.0117)
Number of children 5-9	0.0075	0.0051	-0.0143	0.0017	0.0015	0.0152	-0.0076	-0.0092	0.0123*	-0.0050	-0.0267**	0.0195*
	(0.0047)	(0.0070)	(0.0089)	(0.0063)	(0.0059)	(0.0097)	(0.0124)	(0.0072)	(0.0074)	(0.0087)	(0.0124)	(0.0112)
Number of children 10-14	0.0121**	0.0257***	-0.0227**	-0.0150*	0.0098	0.0266**	-0.0267*	-0.0097	0.0161**	0.0237**	-0.0181	-0.0217*
	(0.0054)	(0.0088)	(0.0102)	(0.0081)	(0.0069)	(0.0104)	(0.0144)	(0.0074)	(0.0078)	(0.0096)	(0.0134)	(0.0123)
Household Wealth	-0.2028***	-0.0728**	0.3865***	-0.1109***	-0.2327***	-0.0823	0.4642***	-0.1492***	-0.1817***	-0.0676*	0.3164***	-0.0671
	(0.0261)	(0.0327)	(0.0491)	(0.0296)	(0.0282)	(0.0534)	(0.0602)	(0.0338)	(0.0309)	(0.0358)	(0.0557)	(0.0493)
Head has farmland	0.0635***	0.0985***	-0.1200***	-0.0420***	0.0530***	0.1222***	-0.1379***	-0.0373**	0.0750***	0.0701***	-0.1071***	-0.0380*
	(0.0115)	(0.0148)	(0.0219)	(0.0138)	(0.0126)	(0.0209)	(0.0268)	(0.0162)	(0.0156)	(0.0149)	(0.0289)	(0.0229)
Access to transport	-0.0157*	-0.0207*	0.0298*	0.0066	-0.0134	-0.0327*	0.0355	0.0106	-0.0179	-0.0070	0.0309	-0.0059
	(0.0089)	(0.0124)	(0.0170)	(0.0115)	(0.0111)	(0.0182)	(0.0237)	(0.0127)	(0.0120)	(0.0129)	(0.0208)	(0.0177)
Close to a primary school	-0.0971***	0.0551***	0.1846***	-0.1426***	-0.0939***	0.0532***	0.1594***	-0.1187***	-0.0934***	0.0555***	0.2128***	-0.1749***
	(0.0130)	(0.0116)	(0.0180)	(0.0148)	(0.0157)	(0.0185)	(0.0242)	(0.0178)	(0.0204)	(0.0136)	(0.0251)	(0.0246)
Close to a secondary school	-0.0365***	0.0026	0.0718***	-0.0378**	-0.0260*	0.0076	0.0471	-0.0287*	-0.0455***	-0.0004	0.0925***	-0.0466*
	(0.0106)	(0.0187)	(0.0215)	(0.0153)	(0.0146)	(0.0304)	(0.0356)	(0.0171)	(0.0156)	(0.0190)	(0.0295)	(0.0248)
Close to a water source	0.0320**	0.0290	-0.0648*	0.0038	0.0384**	0.0283	-0.0885**	0.0218	0.0244	0.0327	-0.0259	-0.0313
	(0.0158)	(0.0231)	(0.0345)	(0.0244)	(0.0167)	(0.0327)	(0.0427)	(0.0252)	(0.0246)	(0.0248)	(0.0456)	(0.0405)
Close to a market	0.0117	-0.0060	-0.0224	0.0168	0.0109	-0.0062	-0.0185	0.0139	0.0152	-0.0056	-0.0331	0.0235
	(0.0120)	(0.0162)	(0.0238)	(0.0147)	(0.0140)	(0.0227)	(0.0311)	(0.0145)	(0.0180)	(0.0179)	(0.0334)	(0.0238)

*Significant at 10%, **Significant at 5%, ***Significant at 1%. Boostrapped robust standard errors in parentheses (200 replications), clustered at the household level. Marginal effects are the partial derivatives of the characteristics, evaluated to in relation to the average of the other characteristics. Dependante variables are "School and Domestic works". Estimations include regional fixed effects. The reference category of ethnic group and religion are Akan group and other religion respectively.

7 CONCLUSION

The existing literature on child labor and schooling is abundant and is constantly rising. Very often, the research concentrates on how personal, family and school characteristics affect children work. However, little attention has been given to the effect of the violence or armed conflict may have on allocation of the children's time between school attendance and work. This study attempts to contribute to fill this knowledge gap by looking at the impact of the Ivorian civil conflict on the household decision-making process in school attendance and work. We used a dataset from Ivorian that contains information on education, child labor and conflict experience. This study uses a sample of 6,238 children aged between 10-14 years, living 4,161 households. The results based on bivariate probit model show that civil conflict has a significant positive effect on the incidence of the child labor and negative effect on the school attendance. Overall, it is found that the probability of working for children living in a more conflict-affected household increases by about 14%. This decreases probability by 1.15% for school attendance. Particularly, this analysis revealed that children are 4.98% more likely to be exclusively engaged in work, 8.78% more likely to work and go to school, and 9.33% less likey to be exclusively in school. This findings are broadly consistent with the literature which illustrate increases in child labor in response to exposure to shocks (Beegle et al., 2006; Rodríguez and sánchez, 2012; Di Maio and Nandi, 2013). In line with the literature, we explored the heterogeneity in the baseline results. This analysis revealed that boys' participation in work is more sensitive to the conflict-related victim status than girls'. In addition, we found that children are less likely to be exclusively enrolled in school and that there is strong a demand for children combining work and school in urban areas than rural areas.

Further, we analyzed whether outcomes differed by the type of work performed. This analysis revealed that if work is mostly domestic, girls are less likely to be exclusively in school, more likely to work exclusively, and more likely to work and go to school than boys. The fact that conflict-affected families assign a greater share of domestic responsibilities to girls (while boys tend to specialize in market-oriented work) is likely to have an effect on women's future outcomes, like their decision to participate in the labor market, career selection, or occupational choice. Our analysis is limited, since it not allow us to take into account child labor intensity i.e the amount of time a child dedicated to each type of activity. Despite this shortcoming, our analysis indicates that civil conflict increases significantly child labor and reduces school attendance in Côte d'Ivoire.

Chapitre 2

Civil Conflict and Education Attainment : Evidence from Côte-d'Ivoire

1 INTRODUCTION

The adverse effects of civil conflicts on many factor that influence social well-being have become a major concern for development actors. Almost one third of developing countries have experienced civil warfare during 2000-2008 (Minoiu and Shemyakina, 2014). Most of these conflicts have negative consequences for human development, with profound repercussions on the economy and political systems and destroying the social cohesion. Recent studies have examined the impact of civil wars on the health of the population (Alderman et al., 2006; Minoiu and Shemyakina, 2014), mortality rates (Guha-Sapir and Willem Van, 2002; Jaclyn and Clayton, 2017), labor market (Kondylis, 2010; Di Maio and Nandi, 2013; El-Mallakh et al., 2018), physical capital (Abdi, 1998), and economic growth (Murdoch and Sandler, 2002; Kang and Meernik, 2005). This study aims to extend these works by analyzing the effects of civil war on another important indicator of social well-being : education. There is no controversy on the importance of education on the social and economic welfare of individuals and nations (Barro, 1991; Mankiw et al., 1992; Glewwe, 2002). Not only does education yield higher individual-level incomes (Psacharopoulos, 2004) and plays an importante role in state-level growth (Barro, 2001; **?**; Hanushek and Woessmann, 2010), it also provides a way for individuals to recover from the physical and mental trauma (Elbedour et al., 1993; Aguilar and Retamal, 1998).

The research on the effects of civil conflicts on education is well documented in the literature and it might seem straightforward to think that there is a negative relationship between civil conflict and education. However, there are reasons to think that this relationship is not as straightforward as it seems. The existing literature regarding the relationship between education and civil conflict has shown mixed results. Earlier studies by Miguel and Roland (2011) and (Chen et al., 2008) based on macro-level data found negligible impacts of armed conflicts on outcomes of interest including education attainment or literacy rates. In contrast, works from applied micro-econometric literature are in general agreement on the negative impacts of full-scale conflict on education (Akresh and de Walque, 2008; Minoiu and Shemyakina, 2014; Rodríguez and sánchez, 2012; Dabalen and Paul, 2012; Diwakar, 2015; Shemyakina, 2015; Singh and Shemyakina, 2016). Although this wide range of studies point out the negative impact of conflict, there are a handful of empirical studies which find counter results. For these studies, civil conflicts can have educational benefits (de Groot and Göksel, 2011; Valente, 2011; Ferris and Winthrop, 2010). The lack of consistency in the existing literature regarding relationship between conflict and education motivates further research on this topic in order to explore the relationship in more detail.

This study contributes to the literature by addressing the issue of how households and individuals are affected by the civil conflicts. The overall objective of this study is to inform policy makers and the international community about the impact of civil conflicts on the future well-being of African households. Specifically, our analysis explores the effects of the Côte d'Ivoire civil conflict on educational attainment of children who were between ages 5 and 14 years at the time conflict. To address this empirical issue we use a cross-sectional data drawn from the Côte d'Ivoire Household Living Standards Survey (HLSS) data collected in 2008 known as « ENV 2008 ». Our analysis focus on educational attainment of individuals who were between ages 5 and 14 years at the time of the civil conflict. Using a double-difference method we find that the average years of education for children aged 5-14 at the moment of conflict is lower compared with an older cohort in war-affected households. In contrast, we find that the average years of education for female children is higher than male children if they are live in a war-affected household. Finally, our results show that the decline in the average level of education is more significant for children in rural areas and for those whose household heads are literate. We find that our main effects are robust to the use of various controls in the estimates, an alternative baseline cohort and, an alternative measure of education.

Côte d'Ivoire is an appropriate case of study. The civil war in this country broke out in September 2002 as a result of discontent over land ownership and nationality laws followed by an attempted military coup. It divided the country into two : the rebel-held North and the government-controlled South and caused more than 3,000 deaths (Dabalen and Paul, 2012). The war internally displaced more than 700,000 people and as many as 500,000 children were out of school between 2002 and 2004 (UNICEF, 2004). According to the Ministry of Education in Côte d'Ivoire (2004), education in the North was affected more severely than education in the South. As per this report, almost 50 percent of the school-going aged children were out of school and only 20 percent of government-paid teachers stayed in their posts in the North since 2002. Moreover, the start of the 2005 school year was delayed in the North, and approximately 72,000 children were unable to write their examinations in the North (UNICEF, 2005). In the government-held zone schools are burdened with the large numbers of IDP children who have fled the violence in the rebel-held zones to continue their education in the southern schools.

The remainder of the paper is organized as follows. In next section, we undertake a survey of related literature. Section 2 provides a brief account of the situation in Côte d'Ivoire. In section 3, we highlight the data sources and descriptive statistics. Our empirical framework, results and robustness checks are presented in sections 4, 5 and 6 respectively. We then provide conclusion in section 7.

2 RELATED LITERATURE

Several authors have previously looked at the influence of conflict on educational outcomes. An interesting contribution comes from the works of (Collier et al., 2003) who characterized civil conflict as « development in reverse ». Past research on the impact of war on education examines cross-country or macroeconomic statistics and lead to mixed results. Some authors such as Davis and Weinstein (2002) and Miguel and Roland (2011) show that affected countries and populations adjust relatively fast and often return to their pre-conflict growth trajectories [1]. Other authors such as Chen et al. (2008) using cross-national information and an event data methodology observed that, countries experience a substantial drop in secondary school enrollment but no significant effect

1. Davis and Weinstein (2002) find no indistinguishable effect between cities that experienced heavy bombing during World War II from those that were not bombed 20 to 25 years after the war in Japan. This finding is supported by the works of Miguel and Roland (2011) in the case of Vietnam War. They find that that physical infrastructure, education, and poverty levels all converged across regions within 25 years. Moreover, they found no impact of US bombings on Vietnam's literacy rates through 2002.

for primary education. Using fixed-effects models, Gates et al. (2012) explore the conflict impacts on developing countries' progress on the Millennium Development Goals (MDGs) from 1991–2008. They find no significant impact of conflicts on primary or secondary enrollment in conflict-affected countries. However, they find that countries in conflict-affected areas are experiencing declining educational success. But whatever, these macroeconomic and cross-country data approaches have some limitations. Firstly, it is possible that the speed of economic recovery could be driven by the type of damage caused by the war. For instance, the destruction of physical capital could have different consequences than human capital destruction. Secondly, the nature of the parties at war may also play a significant role. Indeed, whether it is an international conflict (between two States) often relying on professional armies, or within a State between fractions of society (some of them are non-army forces), each of them remains unobserved in cross country data even if either of these parties play a role in the war (Serneels and Verpoorten, 2015). Finally, analyzing macro-level information could erroneously lead to the conclusion that there are no medium-term negative educational impacts due to armed conflicts (Rodríguez and sánchez, 2012).

The recent availability of data from war regions has resulted in an emerging empirical literature that investigates the microeconomic effects of war on human capital outcomes. These studies establish a robust negative association between armed conflict and human capital outcomes (Chamarbagwala and Morán, 2011; Shemyakina, 2011; Di Maio and Nandi, 2013; Dabalen and Paul, 2014; Shemyakina, 2015; Singh and Shemyakina, 2016). Regarding the long-term health effects of war, Alderman et al. (2006) consider the impact of pre-school malnutrition on subsequent human capital formation in rural Zimbabwe. They find that young children who suffered from war-related malnutrition are significantly shorter as adults and that this may affect their lifetime labor productivity. Similarly, using micro-level information from Côte d'Ivoire, Minoiu and Shemyakina (2014) examine the impact of conflict on children's health status. They find that children from regions more affected by the conflict suffered significant health setbacks compared with children from less affected regions.

As for the labor market effects of war, Kondylis (2010) considers the impact of the 1992-1995 Bosnia and Herzegovina war on labor market outcomes using longitudinal data. She finds that displaced Bosnians are less likely to be working relative to the people who stayed and men experience higher unemployment levels while displaced women are more likely to drop out of the labor force. Similarly, El-Mallakh et al. (2018) analyze the effects of the 2011 Egyptian protests on the relative labor market conditions of women using panel data. Using the difference-in-differences approach, they find that the 2011 protests have reduced intra-household differences in labor force participation by

increasing women's employment and unemployment relative to men. They also find that women's employment relative to men increased in both the private and informal sectors.

Regarding the relationship between conflict and education, Akresh and de Walque (2008) examine the impact of Rwandan civil war on the educational outcomes of different cohorts of children. The authors find that children exposed to the Rwandan conflict lost nearly a half year of schooling compared to their peers who were not exposed. They were also 15% less likely to complete grades three and four. For the case of Guatemala, Chamarbagwala and Morán (2011) combine data from the 2002 National Population Census and the distribution of the number of human rights violations and victims across 22 departments to examine the impact of civil war on education outcomes for the rural Mayan population. They find a strong negative impact of conflict on education outcome in this disavantaged group. For the three periods of the civil war identified, rural Mayan males showed a 0.27, 0.71, and 1.09 year decline in education attainment, while females showed a 0.12, 0.47, and 1.17 year decline. With very low education attainment overall, this amounts to a 23% and 30% decline in years of schooling during the third period of the war for males and females, respectively. Similarly, using a combination of household and violence data sets Rodríguez and sánchez (2012) estimate the effect that exposure to armed conflict has on school drop-out decisions of Colombian children. They find that armed conflict reduces the average years of schooling in 8.78% for all Colombian children. For Côte d'Ivoire, one paper examines the possible effects of violence on education outcomes. Dabalen and Paul (2012) explore the impact of civil war on education in the context of a school-going age cohort. Using the Household Living Standards Survey (HLSS) data collected in 2008 and the data on local incidences of conflict taken from the Armed Conflict Location and Event Database (ACLED), they results suggest a drop in average years of education by a range of 0.2 to 0.9 fewer years.

Beside of the impact of the conflict education, several studies also note that civil conflicts reinforce gender inequalities. This could happen by reducing the educational opportunities of girls, who are more vulnerable, or boys, who are more likely to be forcibly recruited as child soldiers (Justino, 2010a). Thus, Shemyakina (2011) dealing with the impact of Tajikistan conflict finds that exposure to the conflict, as measured by past damage to household dwellings, had a large significant negative effect on enrollment rates for girls, and no effect on the enrollment of boys. She also finds that girls who were of school age during the conflict and lived in conflict-affected regions were less likely to complete mandatory schooling. Diwakar (2015) uses the 2007 Iraq Household Socio-Economic Survey data in conjuction with data on civilian deaths to examines the effect of armed conflict on

education accumulation and enrolment rates, and whether this effect differs by gender. His findings suggest that an increase in conflict events is associated with a decrease in education accumulation and enrollment rates for both sexes, although more pronounced for boys. In a similar paper, Singh and Shemyakina (2016) in the case of the 1981-1993 Punjab insurgency, find a substantial and statistically significant negative effect of conflict on female educational attainment. Swee (2015) finds that negative effects on schooling may be stronger for males in the case of Bosnia and Herzegovina civil conflict.

There are a handful of empirical studies which contrast previous findings in which conflict has been shown to have a negative impact on human capital accumulation. According to this literature, this negative relationship is indeed true but fully due to supply-side effects, whereas demand-side effects actually increase human capital accumulation. For example, de Groot and Göksel (2011) consider the conflict-affected Basque region. They find that educational levels for those from conflict-affected regions increase more than those in other regions of Spain. The authors explain their results by the fact that very low levels of conflict–conflict in which the supply of education is uninterrupted–create an incentive for individuals to improve educational qualifications so they can migrate and work in other Spanish regions. Similarly, Valente (2011) in the case of Nepal conflict notes improved education for women in conflict-affected regions and explains that this may be because reductions in inequality for women and other disadvantaged groups was a rebel goal.

Our objective is to examine the effect of civil war on educational attainments. We focus on years of education of children who were primary school-age during civil war. These school-aged children are generally less likely to progress in grade during the conflict periods. As result, they have fewer years of schooling than individuals of school going age directly preceding or following the period of conflict (Akbulut-Yuksel, 2014).

3 HISTORICAL BACKGROUND

For almost two decades after its independence, Côte d'Ivoire experienced unprecedented economic prosperity due to sound economic management, improved trade relationships with the developed countries (particularly Western Europe), effective development of the cocoa and coffee industries and an ethnically inclusive political system, until the 1980s. Indeed, between 1960 and 1980, the country maintained strong and sustained economic growth of more than 7 percent per annum and over the same period, average GDP per capita was about $1,330 (in 2005 US dollars), nearly 6.3

percent of that of the United States. Strongly dependent on primary commodities such as cocoa and coffee (more than 50 percent of total export in 2000), Ivorian economy faces to his first difficulties with the deterioration of the terms of trade which lead an abrupt and lengthy decline in the 1980s (Bogetic et al., 2007). The fall in the price of cocoa and coffee in the 1980s exacerbated poverty in the country leading to an increase in poverty in the poorest regions of the north rising from 25.6 percent to 56.9 percent during this period. By the time the country devalued its currency in 1994, its ten year average GDP growth had fallen to 0.50 percent.

The configuration changes after the death of long-standing President Felix Houphouet-Boigny in 1993 with the advent of the first coups d'états during the 1990s including the first military coup in December 1999 which caused a deep sociopolitical crisis. In September 2002, another attempt of military coup whose roots can be traced back to widespread discontent over land ownership and nationality laws since in the 1990s emerges [2]. Indeed, the scarcity of employment opportunities due to the decline of the economy has led landowners in the South to demand the return of their land. Thus, multiple attacks in several cities, including Abidjan in the south, Bouaké in the centre and Korhogo in the north, have been carried out by rebel forces mainly representing the Muslim regions in the north of the country. But this action having failed did split the country in two, each controlled by rivals. The central, northern and western parts of the country were under the control of rebel forces [3] and government control was restricted to the southern part. The first years of the conflict were marked by more violence than the latter period. It caused some 600 battle fatalities per year in its initial phase compared to ten times as much in the average civil war in the Battle Deaths Dataset (Minoiu and Shemyakina, 2014; UCDP/PRIO, 2009).

The consequences for the population's welfare have been tragic. The access to basic public services such as school [4], electricity and water, health clinics were severely disrupted in the part under the control of rebel forces. Likewise, accessible basic services in government zone have knew an overheated due to the massive displacements caused by the civil war [5].

2. in particular the new Electoral Code restricted the right to vote, affecting the large population of foreign origin living on the territory of Côte d'Ivoire and presidential candidacy nominations to only Ivorian nationals with complete Ivoirian parenthood

3. called Forces Armeées des Forces Nouvelles consisted of a coalition of four former rebel groups

4. 50 percent of school-age children were deprived of education by 2004 (Sany, 2010)

5. This displacement concerned globally about 7 percent of the population (National Institute of Statistics report, 2008)

It was estimated in 2004 that as many as 700,000 children had been out of school since the beginning of the crisis. According to the Ministry of Education, 50 per cent of children in the North and West of the country have been deprived of education, 20 percent of the government-paid teachers remained in their posts in the North or have returned since the fighting has subsided (Sany, 2010; UNOCHA, 2004). With regard to exams, in the rebel-held zone they were postponed during the conflict. In the government-held zone schools are burdened with the large numbers of IDP children who have fled the violence in the rebel-held zones to continue their education in the southern schools. Per capita GDP growth during 2002–2007 was on average –1.5%, the second lowest in the region, and poverty rose steeply (Minoiu and Shemyakina, 2014). The peace process negotiated and signed in 2007 in Ouagadougou resulted in a power sharing agreement between the government and the rebel forces, thus officially ending the conflict. These peace agreements implies the redeployment of the administration in the North, the economic and schooling activities recovery in affected regions thank to implementation of the Disarmament, Demobilization and Reintegration (DDR) program.

It is worth noting that prior to the outbreak of the rebellion in 2002, Ivorian Government had initiated a National Plan for the Development of the Education/Training Sector (PNDEF, 1997) with the aims to ensure universal primary education in 2010. This objective was consistent with the achievement of the Education for All (EFA). The net enrollment rate (number of children enrolled as a percentage of the total school-age population) in primary education moved from 58.3 in 1997 to 64.19 percent in 2001 (UNESCO, 2001). The same trend also observed in secondary education. It must be emphasised that even though the rates are still below the target set by the government and compared to other countries nearby, they has been nonetheless climbing. The Ivorian civil conflict is the only major shock recorded between 2002 and 2007 that could be one of the main causes of the decline in education levels during this period.

4 DATA

4.1 Data overview

Data used in this study are from Côte d'Ivoire households living standard survey, also known as Enquête sur le Niveau de Vie des Ménages (ENV). This survey was administered jointly by the National Institute of Statistics and the World Bank between June and Agust 2008. The ENV 2008 is a nationally representative survey that covers all the socio-economic aspects of the lives of each person in a household living in Côte d'ivoire. A total of 12,600 randomly selected households and 59,699 individuals in 58 departments nested into 19 regions were interviewed. This household survey contains a rich set of information on demographics, education, employment, health, conflict victimization and other characteristics.

4.2 Civil conflict measure

The ENV 2008 presents two attractive features which make it convenient for measuring the exposure to the civil conflict. First, this is the sole survey conducted one year after the end of the 2002-2007 civil war (after the Ouagadougou agreements). Secondly, the ENV 2008 was specifically designed to document the consequences of the civil war. To this end, a new section on the « impact of the war » was added, which included a range of questions that are commonly used to evaluate the welfare impact of war on individuals and households. Most questions refer to a wide variety of war-related experiences. For example, head of households were interviewed about : *How did your income change over the years of crisis* ? ; *Has the current crisis affected your life* ?. In addition, the survey includes a set of questions on the physical impact and casualties of the war, such as : *Have you registered a death or illness linked to the crisis* ? ; *Have you been displaced during the war* ? ; *Have you suffered from any violence linked to the crisis* ?. In table 2.1, we provide a summary of the war victim status based on household responses. We note that the Ivorian civil conflict had a major impact on the household income as 68.4% of households have seen their income dropped. We also note that more than half of the households were directly affected by the civil war (62%) [6]. One in five households report having been forced to flee ; 34.2% report suffering from health impaired related to the war (psychological problems, sleep disorders, anxiety and stress) and 16.1% of household report have recorded deaths. Regarding the household property, we note that about 11% of households report

6. This indicator refers to those who met problems related to food, health, housing and loss of economic activity due to the civil war.

properties totally or partially destroyed due to the conflict. Similarly, 11% report the lost of their ownership. We also note that 10% of households are displaced and 12.8% have hosted displaced persons. In addition, more than 15% of head of households claim to have been victims of conflict-related violence. These violences include thefts, rape victims, victims of assault, sexual violence and other abuses.

TABLE 2.1 – War-related experiences at the household level

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Forced to flee	0.205	0.404	0	1
Income dropped	0.684	0.465	0	1
Property destroyed	0.115	0.319	0	1
Lost ownership	0.113	0.316	0	1
Displaced	0.100	0.300	0	1
Host displaced	0.128	0.334	0	1
health impaired	0.342	0.474	0	1
Death recorded	0.161	0.368	0	1
Victim of crisis	0.626	0.484	0	1
Victim of violence	0.159	0.366	0	1

Source : Computed from ENV 2008

We use these indicators to define the civil conflict measure. As we have shown in the chapter 2 of this thesis, we resort to multiple component analysis (MCA) method to create our conflict-related victimization index, which is finally a combination of the indicators listed above [7]. The conflict-related victimization index is rescaled so that it ranges between 0 and 1, with higher values corresponding to high levels of victimization. More details regarding the results of the MCA are available in Appendix B.

7. MCA can be seen as factor analysis with multiple qualitative data based on a Burt matrix

4.3 Descriptive statistics

The empirical analysis in this study is based on a sample of 23,948 individuals aged 11-30 in 2008 and for whom we have informations about the education completed. We exlude those enrolled in Koranic schools that represent only 0.95% of the sample. Reagrding the Ivorian education system, we note that it consists of six years of primary school awarded by the *Certificat détude primaries elementaires (CEPE)*, which is followed by seven years of secondary schooling. In the final year of secondary school students earn a baccalaureate degree. Universities, technical and vocational trainings are part of the higher education system in Côte d'Ivoire. The official compulsory primary school age is 6 but more and more, registrations are made early at the age of 5, especially in private schools. To take into account the repetitions that are very important (the average repetition rate in primary school has oscillated between 20 and 24 percent for two decades (World Bank, 2005)), the maximum age for mandatory school has been set at 14 years. We therefore consider two cohorts of individuals : those born between 1988–1997 (young cohort) and those born between 1978–1987 (old cohort). The level of education attained by individuals in the younger cohort is of particular interest for this study. This cohort includes those that should have begun or completed the last year of primary schooling during or after the conflict, that is, between 2002–2007. The old cohort includes individuals who are over the age of primary school during the conflict.

The basic statistics of main variables are presented in Table 2.2. On average individuals in young age-cohort (born between 1988 and 1997) complete 4.16 years of educations ; there are as many females as there are males. Regarding the household's head characteristics, we note that one out of five households is conflict-related victim ; they are essentially married (about 80%) ; are on average about 47 years old and are essentially females. As for education level of household heads, we note that most of them are without education (52%). In addition, we note that 35.1% of households are considered well-off and 49% are landowners. When it comes to household itself characteristics, we note that the average household size is about 8 and less than half of households are rural dwellers (47.2%). Regarding the ethnic and religious affiliations, we note that households are largely members of the Akan ethnic group (29%) and more Muslim (40.4%) than Christian (38.6%). We also note that less than 20% are non-ivorians. As for access to school infrastructures, Table 3.2 also reveals that most households have access to primary schools (about 70%) and less than half have access to secondary and university schools.

TABLE 2.2 – Summary statistics of main variables for young cohort (born 1988-1997)

Variable	Mean	Std. Dev.	Min.	Max.
Individual characteristics				
Years of education	4.164	3.834	0	13
Child's gender (1=female)	0.5096	0.4999	0	1
Household's head characteristics				
Conflict-victim	0.204	0.232	0	1
Age of head	46.919	13.578	0	99
Head gender (1=male)	0.809	0.393	0	1
Marital status	0.795	0.404	0	1
No education	0.524	0.499	0	1
Primary education	0.188	0.39	0	1
Lower secondary education	0.146	0.353	0	1
Upper secondary education	0.096	0.295	0	1
Higher education	0.046	0.208	0	1
Household itself characteristics				
Household size	7.923	4.361	1	37
Rural household	0.472	0.499	0	1
Krou	0.119	0.324	0	1
Mandé du nord	0.171	0.376	0	1
Mandé du sud	0.077	0.266	0	1
Voltaïque	0.158	0.365	0	1
Akan	0.291	0.454	0	1
Non ivorian	0.184	0.387	0	1
Christian	0.386	0.487	0	1
Muslim	0.404	0.491	0	1
Other religion	0.211	0.408	0	1
School Infrastructures				
Close to secondary school	0.334	0.472	0	1
Close to primary proche	0.692	0.462	0	1
Close to university	0.334	0.472	0	1

Source : Computed from ENV 2008.

Table 2.3 reports average years of education completed by the age-cohorts, disaggregated by gender and residence. We note that children in young age-cohort complete an average 4.163 years of education while those in old age-cohort complete about 4 years of schooling. This suggests that the majority of students in mandatory school are lagging behind in the progression of their grade. Gender analysis reveals that females are disadvantaged in terms of years of schooling compared to men. Females in the young age-cohort complete on average about 3.55 years of education (compared to 4.773 years of schooling for males) and those in the older age-cohort complete about 3.09 years of education (compared to about 4.779 years of education for males). Table 2.3 also reveals that the rural individuals are disadvantaged in terms of education. Compared to the old age-cohort, those in the young age-cohort in rural area complete on average about more years of educations.

Table 2.3 – Year of education completed by cohort and gender

	Full Sample	Female	Male	Rural	Urban
Born 1988-1997 (young cohort)	4.163	3.552	4.773	3.058	5.149
Born 1978-1987 (old cohort)	3.870	3.039	4.779	2.342	5.003
Total	23,948	11,744	12,204	10,800	13,148

Source : Computed from ENV 2008

Table 2.4 reports average years of education for both age-cohorts and an individual war victim status, which takes the value of one if an individual household was reported as a victim of the violent conflict and zero otherwise. As it can be seen, the average years of education for the young age-cohort living in conflict-victimized household is lower compared to the rest. This result is statistically significant and represents a decrease of 46.20%. Regarding the old age-cohort, the gap in average years of education between victim an non-victim is positive but not statistically significant. The cross-cohort difference shows that the average years of education for both victimization statuses is negative and statistically significant. In particular, the education gap between old and young cohorts decrease by 23.8% and 72.6% for conflict-victims and non-conflict-victims respectively. Overall, the difference-in-difference outcome suggests that an individual born between 1988 and 1997 (young age-cohort) experienced an average drop of 0.222 year of education if resided in a conflict-victim household.

TABLE 2.4 – Means of years of education by cohort and victim status

	[1]	[2]	[3]
	Conflict-victim	Non-conflict-victim	Within-cohort Difference
1. Old cohort (born 1978-1987)	3.873	3.848	0.025
	(0.047)	(0.127)	(0.135)
2. Young cohort (born 1998-1997)	4.112	4.574	-0.462***
	(0.035)	(0.105)	(0.106)
3. Cross-cohort difference	-0.238***	-0.726***	
	(0.058)	(0.164)	
4. Difference in Differences	**-0.222*** **		
	(0.084)		

Standard errors are in parenthesis

5 EMPIRICAL FRAMEWORK

5.1 Identification and econometric specification

Using the cross-sectional data of the ENV 2008, we compare schooling completion outcomes of children who should have completed their mandatory schooling before the civil conflict to the completion outcomes of those who were of school age during the war (age 5–14 years). The identification strategy uses the characteristics of the Ivorian education system which regulated 6 years of mandatory or primary level schooling between the ages 6-14, and 7 years of non-mandatory schooling between the ages 15-24. We define an unaffected or control group as those who completed their mandatory school before the conflict, i.e. before September 2002. While the affected cohort (treatment group) includes those who should have completed the last year of primary schooling during the conflict, ie between 2002-2007. The unaffected cohort contains children born between 1978–1987 (old age-cohort), which ensures that the child is at least 15 years old before the start of the civil conflict and has already completed primary school. In contrast, the affected cohort contains children born between 1988–1997 (young age-cohort), which ensures that the child is younger than 15 years old in 2002. This implies that his primary education was interrupted or disrupted by the war. We follow Singh and Shemyakina (2016), Diwakar (2015) and Dabalen and Paul (2012) in estimating the following baseline specification with department and birth-cohort fixed effects :

$$Educ_{ijkt} = \alpha_k + \beta_t + \delta_1 Affected_i + \delta_2 Victim_j + \gamma(Affected_i * Victim_j) + \lambda X_{ij} + \varepsilon_{ijkt} \quad (2.1)$$

where the independent variable $Educ_{ijkt}$ denotes the years of education for child i from household j residing in department k and born in year t. α_k is a fixed effect for the child's department of residence while β_t denotes the year of birth fixed effect. The first serves to control for unobserved correlations of observations within department and the second control for the underlying trends in education attainment due to birth in a later year versus an earlier year. $Victim_j$ is a variable reflecting the level of consequences of the civil conflict experienced by the household (victim status), $Affected_i$ is a dummy variable indicating whether an individual i was between 5 and 14 years old during the conflict (born between 1988–1997) and is zero for individuals who were born in 1978–1987.

X_{ij} is set of control variables. The individual level control includes gender and the relationship with the head of the household. Household level controls includes controls for both the household itself and the characteristics of the household's head. Controls at the household level include the size of the household, dummies for place of residence, close to primary, secondary and higher school. For the head of the household, we include his age and dummies for gender and marital status. In addition, we include his education level. The parameter of interest which estimates the effect of conflict-related victimization on education outcomes is γ. Indeed, this parameter indicates how children who were of school-going age at the time of conflict and who live in a household victim of civil war changed their attainment compared to those who were not school going-age in the same household. Intuitively, we expect the coefficient of the double difference variable (γ) to have a negative sign. Indeed, civil wars affect negatively educational attainment because, during violent conflict, children are either removed from school by their parents, are prevented from attending school or the conditions under which they attend school do not provide them with education of sufficient quality.

All regressions are estimated with robust standard errors to control for the effect of unobserved heterogeneity. In line with the literature, we also examine the effect of conflict for different sub-samples. We explore heterogeneity in the baseline results by separating children from different types of households (rural vs. urban, literate vs. non-literate). In addition, we explore the gender-differential impact of conflict by estimating Equation 6.4 with interaction terms between the variables of interest and a female dummy, and the triple interaction term between the last two variables and the household victim status.

$$\begin{aligned} Educ_{ijkt} &= \alpha_k + \beta_t + \delta_1 Affected_i + \delta_2 Victim_j + \phi Female_i + \phi_1(Female_i * Affected_i) \\ &+\phi_2(female_i * Victim_j) + \phi_3(Female_i * Affected_i * Victim_j) \\ &+\lambda X_{ij} + \varepsilon_{ijkt} \end{aligned} \tag{2.2}$$

The coefficient ϕ_3 is an estimate for the gender-differential impact of conflict-related victimization on educational attainment for affected cohorts after accounting for cohort, gender, and conflict effects individually and their interactions.

As in the previous chapter (the chapter 1), a limitation related to our measure of conflict is the selection into victimization. Selection into violence is often a concern in the conflict affected economies (Minoiu and Shemyakina, 2014). Indeed, those who self-report being victims might inadvertently be targets for violence due to their characteristics. In this setting, the conflict-related victimization index may not be a reliable measure if some household heads attribute their experiences of post-conflict hardship to the conflict itself which could correspond to an over-report. In addition, memory loss or denial could lead some people to underestimate their war-related traumas. Individuals from such households could experience worse economic and education outcomes. Moreover, in the case of victim compensation, some households are more likely to report economic forms of victimization. There are other types of victimization that may be underestimated by the household. These include forms of victimization that are not necessarily visible or difficult to report, such as depression or sexual violences.

The potential bias that might arise due to these factors is a measurement error of the conflict-related victimization index. This could lead to an underestimation of its actual impact on education. The existing literature provides little guidance on the biases associated with self-reported victimization data and the extent to which these may systematically be associated with observables (Minoiu and Shemyakina, 2014). To check the extent to which conflict-related victimization status is correlated with observables, we regress the conflict-related victimization index on a set of observable household characteristics and socio-demographic characteristics of the household head, including age, gender, marital status, higest level of education completed, ownership of durable goods, ethnic and religious affiliation, and household size (Dillon, 2012; Dabalen and Paul, 2014; Minoiu and Shemyakina, 2014). Formally, we estimate the following specification :

$$Victim_j = \beta_0 + \beta_j Z_j' + \varepsilon_j \tag{2.3}$$

where Z_j denotes the controls for both the household itself and the characteristics of the household's head. If the determinants of the conflict-related victimization are not statistically significant, this implies that there is no correlation between being a victim of conflict and observable household characteristics. Regression analysis is performed for the entire sample, then separately for residence and literate status subsamples.

6 RESULTS

6.1 Selection into victimization

Table 2.5 reports the results of the specification that examines the relationship between household covariates and the selection into victimization for the entire sample, residence and then for literate status subsample. As we can see, we find a systematic selection into victimization based on certain characteristics, as suggested by the F-tests. Educated heads of households are more likely to systematically report being victims of conflict than no educated (reference category), as the coefficients associated with educational level are positives and statistically significant at the 1% level in all specifications. This result suggests that the degree of victimization increases with education level. This is also the case for the married. This effect is statistically significant at least at the 5% level in most specifications. Our results also report that large households are more likely to systematically report being victims of conflict. This effect is positive and statistically significant at least at the 5% in all specifications. In contrast, male-headed households are less likely being direct victims of violence than female-headed households (statistically significant at least at the 5% level in all specifications). This results confirms that women are more vulnerable than men in civil conflict situation.

Regarding the ethnic and religious affiliations, we find that *Krou* and *Mandé du sud* groups systematically report more likely being direct victims of violence than the Akan ethnic group (reference category). It should be noted that these two ethnic groups live primarily in the western and southwest regions. These parts of the country was strongly affected by the conflict. These effects are statistically significant at least at the 1% level. In contrast, our results also show that *Mandé du nord and Voltaïque* groups are less likely to report being victims of conflict. Similarly, we find that non-ivorians are less likely to be victimized. This results appear counterintuitive as we have expected the opposite effect because of the roots of the conflict [8]. We also find that Christians and muslims are less likely to report being direct victims of violence. With regard to access to a number of educative infrastructures, we find that households close to primary school are more likely to be victimized (column 2, statistically significant at 1% level).

8. The root causes of the Ivorian conflict can be traced back to widespread discontent over land ownership and nationality laws (in particular, eligibility rules for individuals running for office), and voting rights affecting the large population of foreign origin living in Côte d'Ivoire (Minoiu and Shemyakina, 2014)

In the light of the above, it is concluded that observable household characteristics are correlated with the reporting of conflict-induced victimization. Including controls such as head's age, education, ethnicity, religion, the household composition, and other households caracteristics in most of our specifications, we could mitigate the effects of self-reporting bias [9].

9. Similar strategy was implemented by Bellows and Miguel (2009), Minoiu and Shemyakina (2014) and Dabalen and Paul (2014).

TABLE 2.5 – Determinants of the selection into victimization

	[1]	[2]	[3]	[4]	[5]
VARIABLES	All	Rural	Urban	Literate head	Non-literate head
Age of the head	-0.0000	-0.0005***	0.0005***	0.0002	-0.0002**
	(0.0001)	(0.0001)	(0.0001)	(0.0002)	(0.0001)
Head is a male	-0.0126***	-0.0123*	-0.0157***	-0.0117*	-0.0095*
	(0.0036)	(0.0063)	(0.0051)	(0.0066)	(0.0049)
Head is married	0.0128***	0.0126**	0.0139***	0.0077	0.0156***
	(0.0033)	(0.0054)	(0.0045)	(0.0052)	(0.0046)
Primary educ	0.0275***	0.0321***	0.0220***		
	(0.0036)	(0.0047)	(0.0046)		
Lower secondary educ	0.0268***	0.0409***	0.0221***		
	(0.0042)	(0.0078)	(0.0051)		
Uper secondary educ	0.0483***	0.0665***	0.0399***		
	(0.0056)	(0.0106)	(0.0059)		
Higher educ	0.0357***	0.0205	0.0362***		
	(0.0062)	(0.0127)	(0.0072)		
Rural household	-0.0053			-0.0054	-0.0072*
	(0.0034)			(0.0060)	(0.0042)
Size of household	0.0019***	0.0022***	0.0014***	0.0033***	0.0008**
	(0.0003)	(0.0004)	(0.0005)	(0.0006)	(0.0003)
krou	0.0148***	0.0120	0.0162**	0.0199***	0.0214**
	(0.0052)	(0.0083)	(0.0069)	(0.0061)	(0.0094)
Mandé du nord	-0.0441***	-0.0472***	-0.0336***	-0.0301***	-0.0582***
	(0.0056)	(0.0090)	(0.0066)	(0.0090)	(0.0070)
Mandé du sud	0.0354***	0.0582***	0.0208**	0.0355***	0.0354***
	(0.0069)	(0.0122)	(0.0101)	(0.0097)	(0.0110)
Voltaïque	-0.0274***	-0.0407***	-0.0150**	-0.0394***	-0.0227***
	(0.0051)	(0.0076)	(0.0062)	(0.0074)	(0.0066)
Non-Ivorian	-0.0273***	-0.0135**	-0.0336***	-0.0306***	-0.0352***
	(0.0042)	(0.0061)	(0.0056)	(0.0067)	(0.0057)
Christian	-0.0181***	-0.0193***	-0.0118*	-0.0177***	-0.0118**
	(0.0040)	(0.0052)	(0.0070)	(0.0062)	(0.0052)
Muslim	-0.0142***	-0.0089	-0.0134*	-0.0209***	-0.0063
	(0.0042)	(0.0056)	(0.0070)	(0.0077)	(0.0051)
Close to secondary school	0.0033	-0.0018	0.0050	-0.0002	0.0069
	(0.0033)	(0.0080)	(0.0037)	(0.0046)	(0.0047)
Close to primary school	0.0028	0.0120***	-0.0034	-0.0013	0.0043
	(0.0028)	(0.0040)	(0.0041)	(0.0044)	(0.0031)
Constant	0.0976***	0.0935***	0.0842***	0.1240***	0.1077***
	(0.0083)	(0.0113)	(0.0111)	(0.0123)	(0.0095)
Department FE.	Yes	Yes	Yes	Yes	Yes
Observations	23,930	10,783	13,147	10,936	12,994
R-squared	0.3286	0.4492	0.2485	0.3009	0.3773
F-test	127.82	93.38	80.32	61.72	88.70
Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000

Note : Robust standard errors in parentheses, boostrapped with 200 replications. * Significant at 10% ; **significant at 5% ; *** significant at 1%. The dependent variable is conflict-victim index. Regressions are at the household level and include department fixed effects. Data source : Côte d'Ivoire ENV2008.

6.2 Baseline results

Table 2.6 presents the regression results for Equation (6.4) where the dependent variable is the years of education completed. The coefficient of interest is the interaction term between the dummy for « being of school age » at the time of the civil conflict (Affected cohort) and living in a victimized household. The baseline model incorporates the interaction term and individual controls including gender and relation to the head of household (column 1). In the second model, we add characteristics of the household's head including age, gender, marital status and education level (column 2). The third model includes controls for the household itself such the place of residence, the size of the household, ethnic and religious affiliations and the access to school infrastructures (column 3). Finally, the last model includes department and year of birth fixed effects (column 4).

The estimated coefficients on the interaction terms between conflict measure and the affected cohort dummy are negatives (in all columns) and statistically significant at least at the 5% (columns 2-4). More specifically, the baseline regression model with characteristics of the household's head yields a coefficient of -0.384 (column 2). This suggests average years of education for children born between 1988–1997 and living in a highly victimized household is 0.384 years fewer compared to the individuals born between 1978–1987 living in a similar household. The coefficient drops to -0.413 when we include household level control variables as well as department and year of birth fixed effects (as shown in column 4). Though our finding is consistent with the literature that find that there is a negative relationship between the conflict and educational accumulation (Rodríguez and sánchez, 2012; Dabalen and Paul, 2012; Akresh and de Walque, 2008), our results are quite different in term of magnitude. The differences in result can be explained by the fact that our result is comparing affected and unaffected cohort of children living in a highly victimized household which is different from comparing high conflict with no conflict at all as, it is the case in these studies. Whatever it might be, two main explanations can be provided to justitfy our findings. The first is related to household labour allocation decisions. The existing development economics literature widely reports that households in conflict-affected countries tend to use children as a form of economic security mechanism (Justino, 2010a; Duryea et al., 2007; Basu and Van, 1998). This, in order to compensate for the unexpected reduction in the financial resources available to households during wartime. Akresh and de Walque (2008), (Rodríguez and sánchez, 2012), Shemyakina (2015) and Swee (2015) point to this mechanism as an explanation for the reduction in educational attainment and enrolment observed in contexts of civil war. The second potential explanation relies on changes in returns to education. Indeed, violent conflicts may considerably affect both the average level and

the distribution of returns to education. The destruction of industries and infrastructures could result in a general scarcity of job opportunities for skilled workforce especially in most affected areas. In this context, return to education play a large role in households' decisions. Due to the lower returns to education, households can redistribute their resources toward more profitable sectors. In wartime contexts, this may mean remove the school-age children from school to put them in paid jobs.

Other coefficients have expected signs. Regarding the child characteristics, we find that female children have between 1.332 and 1.479 (statistically significant at 1% level) fewer years of education than male children. In contrast, children of the head of household are more likely to have more years of education than other children in the household. When it comes to the characteristics of the household's head, we find that older household's heads have a significant and positive effect on the years of education. In contrast, our results reveal that married and those male-headed household have a significant and negative effect on the education outcome completion. We also find that an increase in education level of head of household has a significant and positive effect on the years of schooling. Similarly, as we have expected we find that the large households affect significantly and positively the years of schooling. In contrast, we find an opposite result when we consider the place of residence of the household. Indeed, we find that rural household significantly and negatively impacts the educational attainment level (columns 3 and 4).

Regarding the ethnic and religious affiliation, we find that the « mandé du nord and voltaïque » variables significantly and negatively affect the educational attainment level. Similarly, our results also reveal that non-Ivorian households significantly and negatively affect the level of education attained. This results could be explained by the fact that overall, most children of non-Ivorian household are more likely to be involved in agricultural and economic activities. We also find that Christian households affect significantly and positively the level of education while we find the opposite effect for Muslim households (columns 3 and 4). Finally, with regard to access to school infrastructures, we find that households close to a secondary school has a significant and positive impact on the level of education. However, we find that households close to a primary school significantly affect the level of education. This effect is not statistically significant (column 4).

Table 2.6 – Baseline estimates, full sample, effect of civil conflict on education.

VARIABLES	[1]	[2]	[3]	[4]
Conflict-victim	0.6104***	0.0446	-0.1332	0.2169
	(0.1798)	(0.1641)	(0.1487)	(0.1787)
Affected	-0.0169	-0.2156***	-0.2084***	-1.1627***
	(0.0678)	(0.0632)	(0.0650)	(0.1310)
Conflict-victim ∗ Affected	**-0.3584**	**-0.3838***	**-0.5464*****	**-0.4127****
	(0.2292)	**(0.2001)**	**(0.1875)**	**(0.1990)**
Female	-1.3320***	-1.4269***	-1.4262***	-1.4778***
	(0.0559)	(0.0496)	(0.0479)	(0.0452)
Child of the head	1.0257***	1.2247***	1.2526***	1.3570***
	(0.0528)	(0.0570)	(0.0573)	(0.0490)
Age of the head		0.0246***	0.0143***	0.0130***
		(0.0018)	(0.0017)	(0.0018)
Head is a male		-1.1736***	-0.5910***	-0.6001***
		(0.0859)	(0.0797)	(0.0668)
Head is married		-0.4957***	-0.2932***	-0.2271***
		(0.0715)	(0.0692)	(0.0655)
Primary educ		2.2342***	1.5484***	1.3888***
		(0.0611)	(0.0622)	(0.0574)
Lower secondary educ		4.2753***	3.1024***	2.8937***
		(0.0717)	(0.0777)	(0.0773)
Uper secondary educ		5.2265***	3.6983***	3.4562***
		(0.0951)	(0.0978)	(0.1035)
Higher educ		5.1791***	3.8747***	3.5877***
		(0.1395)	(0.1347)	(0.1415)
Rural household			-1.3212***	-1.0673***
			(0.0517)	(0.0589)
Size of household			0.0221***	0.0185***
			(0.0058)	(0.0059)
krou			0.1345	0.1126
			(0.0864)	(0.0972)
Mandé du nord			-1.1095***	-0.7898***
			(0.0915)	(0.0921)
Mandé du sud			-0.2517***	-0.1479
			(0.0943)	(0.1037)
Voltaïque			-1.0082***	-0.6373***
			(0.0805)	(0.0883)
Non-Ivorian			-0.9553***	-1.0876***
			(0.0788)	(0.0803)
Christian			0.6101***	0.4685***
			(0.0602)	(0.0671)
Muslim			-0.2965***	-0.2727***
			(0.0742)	(0.0691)
Close to secondary school			0.8665***	0.8686***
			(0.0598)	(0.0668)
Close to primary school			-0.0901*	0.0033
			(0.0489)	(0.0509)
Constant	4.1983***	2.8575***	3.8940***	3.7192***
	(0.0688)	(0.1095)	(0.1226)	(0.1726)
Department FE.	No	No	No	Yes
Year-birth FE	No	No	No	Yes
Observations	23,948	23,948	23,930	23,930
R-squared	0.0440	0.2806	0.3417	0.3704

Note : Robust standard errors in parentheses, boostrapped with 200 replications. * Significant at 10% ; **significant at 5% ; *** significant at 1%. The dependent variable is the years of education completed. « Affected » stands for the cohort born in 1988–1997, control group is born in 1978–1987. Reference category of ethnic group is Akan and for religion is other. Reference of head's education is « No education »

6.3 Results across sub-samples

Table 2.7 presents the regression results for equation 2.2. Estimates in this table suggest that conflict related-victimization has a postive and statistically significant impact on the educational attainment of female children who were age 5–14 during the Ivorian civil conflict (the triple interaction term) after controlling for other variables. More specifically, the estimated coefficient on the triple interaction term, between « affected », « female » dummy and « conflict-victim » measure is positive and statistically significant at the 1% level in all specifications (as shown columns 1 to 4). The first regression model without household controls and fixed effects yields a coefficient of 1.473 (column 1). The coefficient drops to 1.125 when we include household level control variables as well as the fixed effects (as shown in column 4). This suggests average years of education for female children aged 5-14 is 1.125 years higher than males if they live in a household who has experienced a high degree of victimization. This result is consistent with assumption that in some settings, armed conflict is found to reduce boys' educational attainment more than that of girls. One reason is that boys may be enlisted in the military as soldier (Swee, 2015). Another is that they may be sent out to work mainly in paid jobs to help the household cope with the conflict-induced shock. Finally, our finding could be explained by a catch-up effect of the level of education of boys by that of girls. Indeed, in most developing countries girls have traditionally low schooling including during the pre-conflict periods. Boys' schooling attainment may decline more relative to girls' in settings where boys may become combatants, joining the military or rebel groups by choice, or coercion. In addition, they may also drop-out school to be involved in remunerated activities including after the war.

Table 2.7 – Gender-differential impact of conflict on education accumulation

VARIABLES	[1]	[2]	[3]	[4]
Conflict-victim	1.5660***	0.8675***	0.6644***	0.9965***
	(0.2993)	(0.2414)	(0.2290)	(0.2386)
Affected	-0.1558	-0.3906***	-0.3523***	-1.2737***
	(0.1185)	(0.1003)	(0.0941)	(0.1378)
Conflict-victim * Affected	-1.1847***	-1.0912***	-1.2557***	-1.0468***
	(0.3775)	(0.3124)	(0.2911)	(0.2942)
Female	-1.3100***	-1.4700***	-1.4433***	-1.4562***
	(0.1183)	(0.0957)	(0.0907)	(0.0889)
Female * Conflict-victim	-1.7397***	-1.4995***	-1.4548***	-1.4236***
	(0.3721)	(0.3048)	(0.3034)	(0.2767)
Affected * Female	0.2905*	0.3532***	0.2889**	0.2393**
	(0.1571)	(0.1291)	(0.1178)	(0.1092)
Affected * Female * Conflict-victim	**1.4729*** **	**1.2606*** **	**1.2739*** **	**1.1250*** **
	(0.4686)	**(0.4302)**	**(0.3926)**	**(0.3800)**
Child of the head	1.0322***	1.2207***	1.2483***	1.3518***
	(0.0560)	(0.0543)	(0.0572)	(0.0578)
Age of the head		0.0250***	0.0146***	0.0133***
		(0.0017)	(0.0019)	(0.0018)
Head is a male		-1.2086***	-0.6231***	-0.6264***
		(0.0826)	(0.0780)	(0.0755)
Head is married		-0.4563***	-0.2612***	-0.2007***
		(0.0704)	(0.0640)	(0.0658)
Primary educ		2.2341***	1.5491***	1.3902***
		(0.0583)	(0.0631)	(0.0616)
Lower secondary educ		4.2728***	3.1018***	2.8939***
		(0.0657)	(0.0769)	(0.0798)
Uper secondary educ		5.2268***	3.7014***	3.4599***
		(0.0956)	(0.1074)	(0.1023)
Higher educ		5.1832***	3.8818***	3.5951***
		(0.1410)	(0.1354)	(0.1324)
Rural household			-1.3136***	-1.0623***
			(0.0579)	(0.0523)
Size of household			0.0228***	0.0191***
			(0.0056)	(0.0065)
krou			0.1328	0.1111
			(0.0823)	(0.0909)
Mandé du nord			-1.1054***	-0.7862***
			(0.0898)	(0.0914)
Mandé du sud			-0.2503***	-0.1487
			(0.0953)	(0.1119)
Voltaique			-1.0009***	-0.6292***
			(0.0731)	(0.0993)
Non-Ivorian			-0.9513***	-1.0809***
			(0.0823)	(0.0799)
Christian			0.6115***	0.4704***
			(0.0579)	(0.0626)
Muslim			-0.2991***	-0.2767***
			(0.0721)	(0.0759)
Close to secondary school			0.8651***	0.8668***
			(0.0629)	(0.0584)
Close to primary school			-0.0829*	0.0085
			(0.0483)	(0.0537)
Constant	4.1784***	2.8568***	3.8747***	3.6750***
	(0.0914)	(0.1168)	(0.1453)	(0.1836)
Department FE.	No	No	No	Yes
Year-birth FE	No	No	No	Yes
Observations	23,948	23,948	23,930	23,930
R-squared	0.0461	0.2825	0.3433	0.3718

Note : Robust standard errors in parentheses, boostrapped with 200 replications. * Significant at 10% ; **significant at 5% ; *** significant at 1%. The dependent variable is the years of education completed. « Affected » stands for the cohort born in 1988–1997, control group is born in 1978–1987. Reference category of ethnic group is Akan and for religion is other. Reference of head's education is « No education »

The baseline regression results using rural and urban sub-samples are reported separately in Table 2.8. The coefficients on the interaction terms between conflict measure and « affected » cohort dummy are remarkably stable regardless of the set of controls–for the individual, head of household, household as well as fixed effects. Indeed, the estimated coefficient on the interaction terms are all negatives in all specifications suggesting that children who were age 5–14 during the Ivorian civil conflict have fewer years of education compared to individuals 15–24 living in households who experienced a higher victimization. However, the effect is only significant at the 1% level for the rural area. Particularly, Table 2.8 reveals average years of education for children aged 5-14 is between 0.689 and 0.757 years fewer if they are living in a rural household who has experienced a higher victimization (columns 1 to 4).

In Table 2.9 we present estimates for children from literate and illiterate households. Literate household is household where the head can read and/or write while illiterate household refers to a head who can not read and/or write in any language. We find that the estimated coefficient on the interaction terms between conflict exposition and « affected » cohort dummy are negatives in all specifications. This suggests that individuals who were age 5–14 during the Ivorian civil conflict have fewer years of education comapred to individuals 15–24. More specifically average years of education for individuals aged 5-14 is between 0.050 and 0.044 years fewer if they live in a literate household who has experienced a higher victimization. When it comes to illiterate household who has experienced a higher victimization, we find that average years of education for individuals aged 5-14 is between 0.211 and 0.249 years fewer. However all these findings are not statistically significant suggesting that there is no differential impact of household head's education on the effect of civil conflict on the years of schooling.

Table 2.8 – Residence sub-sample, effect of civil conflict on education accumulation

	Rural				Urban			
VARIABLES	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Conflict-victim	0.6726***	0.3195*	-0.0247	0.5621**	0.8329***	-0.0500	-0.3793	-0.1354
	(0.2055)	(0.1906)	(0.1956)	(0.2202)	(0.2966)	(0.2320)	(0.2359)	(0.2687)
Affected	0.4610***	0.2912***	0.2450***	-0.2730*	-0.1668	-0.4274***	-0.5119***	-1.8712***
	(0.0904)	(0.0854)	(0.0845)	(0.1582)	(0.1175)	(0.0880)	(0.0900)	(0.2065)
Conflict-victim ∗ Affected	**-0.6892****	**-0.7022*****	**-0.8062*****	**-0.7574*****	**-0.4528**	**-0.2872**	**-0.2610**	**-0.0352**
	(0.2710)	**(0.2508)**	**(0.2459)**	**(0.2537)**	**(0.3789)**	**(0.2680)**	**(0.2842)**	**(0.2991)**
Female	-1.2551***	-1.2296***	-1.2082***	-1.2448***	-1.5220***	-1.6674***	-1.6083***	-1.6647***
	(0.0726)	(0.0613)	(0.0559)	(0.0634)	(0.0802)	(0.0716)	(0.0690)	(0.0703)
Child of the head	0.8296***	0.8412***	0.8619***	0.8761***	1.3765***	1.5536***	1.5646***	1.6991***
	(0.0687)	(0.0755)	(0.0707)	(0.0740)	(0.0812)	(0.0778)	(0.0821)	(0.0798)
Age of the head		0.0213***	0.0116***	0.0095***		0.0269***	0.0165***	0.0146***
		(0.0022)	(0.0022)	(0.0024)		(0.0029)	(0.0032)	(0.0031)
Head is a male		-0.6212***	-0.2651***	-0.2465**		-1.1433***	-0.7760***	-0.8108***
		(0.1110)	(0.1007)	(0.1060)		(0.0981)	(0.1057)	(0.1000)
Head is married		-0.2185**	-0.0978	-0.0925		-0.4254***	-0.3394***	-0.2340**
		(0.0908)	(0.1067)	(0.0952)		(0.0904)	(0.0928)	(0.0967)
Primary educ		2.0174***	1.3010***	1.0865***		2.2361***	1.7050***	1.5427***
		(0.0806)	(0.0720)	(0.0704)		(0.0780)	(0.0949)	(0.0846)
Lower secondary educ		3.7921***	2.8059***	2.5239***		4.0809***	3.2612***	3.0378***
		(0.1189)	(0.1033)	(0.1237)		(0.0876)	(0.0994)	(0.1019)
Uper secondary educ		4.1675***	3.0302***	2.7200***		5.0029***	4.0071***	3.7534***
		(0.2121)	(0.1902)	(0.2157)		(0.1033)	(0.1315)	(0.1249)
Higher educ		2.7541***	2.3747***	2.0453***		5.1888***	4.3278***	4.0518***
		(0.3468)	(0.2921)	(0.2838)		(0.1545)	(0.1545)	(0.1571)
Size of household			0.0050	0.0107			0.0372***	0.0221**
			(0.0069)	(0.0077)			(0.0101)	(0.0098)
krou			0.3397***	0.4112***			-0.0264	-0.0977
			(0.1103)	(0.1258)			(0.1219)	(0.1223)
Mandé du nord			-1.3956***	-0.8791***			-0.9210***	-0.6960***
			(0.1000)	(0.1468)			(0.1281)	(0.1454)
Mandé du sud			-0.0916	-0.1138			-0.3941***	-0.3100**
			(0.1240)	(0.1601)			(0.1513)	(0.1452)
Voltaique			-1.3649***	-0.7650***			-0.6928***	-0.5068***
			(0.0792)	(0.1316)			(0.1119)	(0.1351)
Non-Ivorian			-0.8817***	-1.0620***			-1.0273***	-1.0796***
			(0.0840)	(0.1152)			(0.1201)	(0.1175)
Christian			0.6509***	0.4476***			0.5475***	0.4037***
			(0.0789)	(0.0811)			(0.1005)	(0.1018)
Muslim			-0.1341	-0.1098			-0.4335***	-0.4655***
			(0.0815)	(0.0872)			(0.1112)	(0.1176)
Close to secondary school			1.0638***	1.0220***			0.9483***	0.9393***
			(0.1362)	(0.1271)			(0.0748)	(0.0736)
Close to primary school			0.3748***	0.4093***			-0.5259***	-0.3021***
			(0.0609)	(0.0587)			(0.0819)	(0.0734)
Constant	2.6661***	1.5646***	1.9936***	2.2584***	5.3005***	3.4148***	4.1651***	3.9188***
	(0.0855)	(0.1471)	(0.1591)	(0.2330)	(0.1022)	(0.1433)	(0.1906)	(0.2579)
Department FE.	No	No	No	Yes	No	No	No	Yes
Year-birth FE	No	No	No	Yes	No	No	No	Yes
Observations	10,800	10,800	10,783	10,783	13,148	13,148	13,147	13,147
R-squared	0.0623	0.2290	0.2892	0.3271	0.0556	0.2657	0.3013	0.3384

Note : Robust standard errors in parentheses, boostrapped with 200 replications. * Significant at 10% ; **significant at 5% ; ***significant at 1%.

The dependent variable is the years of education completed. « Affected » stands for the cohort born in 1988–1997, control group is born in 1978–1987.

Reference category of ethnic group is Akan and for religion is other. Reference of head's education is « No education »

TABLE 2.9 – Effect of civil conflict on education accumulation by head literate status

	Literate head				Illiterate head			
VARIABLES	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Conflict-victim	-0.7962***	-0.6864**	-0.7287***	-0.2130	0.7427***	0.6727***	0.2798	0.8133***
	(0.2765)	(0.2702)	(0.2341)	(0.2414)	(0.2086)	(0.2147)	(0.1984)	(0.2196)
Affected	-0.9311***	-0.9354***	-0.9215***	-2.9619***	0.5079***	0.3825***	0.3722***	0.2990**
	(0.1254)	(0.1131)	(0.1159)	(0.2264)	(0.0835)	(0.0923)	(0.0775)	(0.1521)
Conflict-victim ∗ Affected	**-0.0501**	**-0.1072**	**-0.2526**	**-0.0443**	**-0.2112**	**-0.1496**	**-0.3791**	**-0.2487**
	(0.3513)	**(0.3360)**	**(0.3224)**	**(0.2822)**	**(0.2598)**	**(0.2709)**	**(0.2774)**	**(0.2239)**
Female	-1.9719***	-1.9675***	-2.0008***	-2.0503***	-0.7816***	-0.8970***	-0.8911***	-0.9276***
	(0.0738)	(0.0789)	(0.0724)	(0.0730)	(0.0640)	(0.0595)	(0.0544)	(0.0520)
Child of the head	1.2563***	1.2620***	1.3715***	1.6723***	1.4832***	1.1104***	1.1499***	1.1227***
	(0.0885)	(0.0991)	(0.0942)	(0.0890)	(0.0706)	(0.0749)	(0.0669)	(0.0701)
Age of the head		0.0094***	-0.0006	-0.0045		0.0290***	0.0174***	0.0178***
		(0.0036)	(0.0040)	(0.0045)		(0.0021)	(0.0023)	(0.0021)
Head is a male		-0.9642***	-0.3926***	-0.4491***		-1.1059***	-0.4122***	-0.4020***
		(0.1281)	(0.1117)	(0.1224)		(0.0931)	(0.0968)	(0.0891)
Head is married		-0.9228***	-0.5366***	-0.4501***		-0.0977	0.1475*	0.1978**
		(0.1137)	(0.1025)	(0.1218)		(0.0899)	(0.0873)	(0.0780)
Rural household			-1.8090***	-1.5258***			-1.2791***	-0.9449***
			(0.0824)	(0.0986)			(0.0680)	(0.0713)
Size of household			-0.0200*	-0.0244**			0.0398***	0.0353***
			(0.0112)	(0.0113)			(0.0072)	(0.0067)
krou			0.1460	0.1855*			0.5497***	0.4586***
			(0.1035)	(0.1107)			(0.1392)	(0.1698)
Mandé du nord			-0.8258***	-0.4389***			-1.6196***	-1.3161***
			(0.1653)	(0.1658)			(0.1132)	(0.1256)
Mandé du sud			-0.1722	0.0947			-0.5248***	-0.5201***
			(0.1245)	(0.1582)			(0.1352)	(0.1693)
Voltaïque			-0.6374***	-0.3100**			-1.5179***	-1.1805***
			(0.1453)	(0.1497)			(0.0898)	(0.1294)
Non-Ivorian			-0.8430***	-0.8943***			-1.3238***	-1.5299***
			(0.1230)	(0.1238)			(0.0999)	(0.1157)
Christian			0.4522***	0.3400***			0.9950***	0.7719***
			(0.0903)	(0.0976)			(0.0778)	(0.0816)
Muslim			-0.6528***	-0.6509***			-0.0036	0.0620
			(0.1433)	(0.1256)			(0.0860)	(0.0872)
Close to secondary school			0.9741***	0.9601***			1.0132***	1.0466***
			(0.0878)	(0.0928)			(0.0859)	(0.0937)
Close to primary school			-0.4617***	-0.3167***			0.3362***	0.3844***
			(0.0944)	(0.0877)			(0.0646)	(0.0603)
Constant	7.0817***	8.2195***	8.7009***	8.5602***	1.7997***	1.7191***	2.3385***	1.8684***
	(0.1058)	(0.1708)	(0.1772)	(0.2867)	(0.0665)	(0.1219)	(0.1536)	(0.1932)
Department FE.	No	No	No	Yes	No	No	No	Yes
Year-birth FE	No	No	No	Yes	No	No	No	Yes
Observations	10,945	10,945	10,936	10,936	13,003	13,003	12,994	12,994
R-squared	0.0866	0.1073	0.1998	0.2543	0.0767	0.1088	0.2296	0.2733

Note : Robust standard errors in parentheses, boostrapped with 200 replications. * Significant at 10% ; **significant at 5% ; ***significant at 1%.

The dependent variable is the years of education completed. « Affected » stands for the cohort born in 1988–1997, control group is born in 1978–1987.

Reference category of ethnic group is Akan and for religion is other. Reference of head's education is « No education »

7 ROBUSTNESS CHECK

7.1 Alternative baseline cohort

Our analysis may be vulnerable to criticism if certain pre-conflict events may have affected the education of our baseline cohort, possibly confounding our main results. One such event is a military coup characterized by several episodes of turbulence ranging from street protests to anti-government subversions. This finally led to a change in government in Côte d'Ivoire on December 26, 1999. The resulting consequences include a slowdown in the economic activity, a collapse in private investment, postponement of public investment projects and a cut back of social spending (Dore et al., 2003). In addition, according to the Ivorian National Statistics Institute (NSI), the poverty rate rose to 38.4% during the period 1998-2002 (characterized by the military coup), an increase of 1.8% per year. The implication of such a context is that the educational level of school-age children between 1999-2002 was probably affected. Thus, individuals born between 1978-1987 (old cohort) do not constitute a good comparison group to study the impact of the 2002-2007 civil war on the educational attainment. Indeed, those born between 1985-1987 and who are including in the comparison group were aged between 12 and 14 years old at the beginning of the 1999 military coup. As a result, their education probably had to be interrupted. Our robustness check consist of excluding from the sample individuals were born between 1985-1987. Therefore, our new control group includes only children born between 1975-1983, which ensures that the child is at least 15 years old before the 1999 military coup and has already finished primary school.

The results in tables 2.10, 2.11, 2.12 and 2.13 confirm our earlier results. Overall, the results in these tables confirm that children who were age 5–14 during the Ivorian civil conflict have fewer years of education comapred to individuals 15–24 living in households who experienced a higher victimization. Regarding the gender-differential impact, the results (Table 2.11) confirm that conflict related-victimization has a postive and statistically significant impact on the educational attainment of female children who were age 5–14 during the Ivorian civil conflict after controlling for other variables.

TABLE 2.10 – Effect of civil conflict on education. Alternative baseline cohort, full sample

	Full sample			
VARIABLES	[1]	[2]	[3]	[4]
Conflict-victim	0.5756***	-0.0813	-0.1994	0.1776
	(0.1956)	(0.1504)	(0.1467)	(0.1668)
Affected	0.1003	-0.1213*	-0.1168*	-1.5491***
	(0.0826)	(0.0678)	(0.0643)	(0.1472)
Conflict-victim * Affected	**-0.3227**	**-0.2904**	**-0.4874*** **	**-0.3756***
	(0.2313)	**(0.2076)**	**(0.1878)**	**(0.2021)**
Female	-1.3523***	-1.4694***	-1.4764***	-1.5186***
	(0.0489)	(0.0432)	(0.0461)	(0.0480)
Child of the head	0.8919***	1.1729***	1.1951***	1.3383***
	(0.0647)	(0.0560)	(0.0570)	(0.0545)
Age of the head		0.0231***	0.0148***	0.0136***
		(0.0019)	(0.0019)	(0.0020)
Head is a male		-1.1887***	-0.6511***	-0.6666***
		(0.0812)	(0.0775)	(0.0754)
Head is married		-0.5560***	-0.3675***	-0.2972***
		(0.0662)	(0.0652)	(0.0648)
Primary educ		2.3291***	1.7019***	1.5356***
		(0.0538)	(0.0588)	(0.0607)
Lower secondary educ		4.4113***	3.3437***	3.1357***
		(0.0694)	(0.0783)	(0.0665)
Uper secondary educ		5.4976***	4.1043***	3.8681***
		(0.0938)	(0.0915)	(0.1012)
Higher educ		5.6716***	4.4531***	4.1671***
		(0.1566)	(0.1431)	(0.1379)
Rural household			-1.2454***	-0.9695***
			(0.0520)	(0.0601)
Size of household			0.0121**	0.0097
			(0.0060)	(0.0063)
krou			0.1448*	0.1716**
			(0.0805)	(0.0821)
Mandé du nord			-1.0338***	-0.7237***
			(0.0876)	(0.0966)
Mandé du sud			-0.2554***	-0.1604
			(0.0953)	(0.0979)
Voltaïque			-0.9561***	-0.5939***
			(0.0770)	(0.0969)
Non-Ivorian			-0.8452***	-0.9679***
			(0.0702)	(0.0795)
Christian			0.5822***	0.4259***
			(0.0630)	(0.0684)
Muslim			-0.2650***	-0.2577***
			(0.0694)	(0.0747)
Close to secondary school			0.7142***	0.7249***
			(0.0631)	(0.0651)
Close to primary school			-0.0405	0.0480
			(0.0455)	(0.0508)
Constant	4.1688***	2.8656***	3.8331***	4.1781***
	(0.0642)	(0.1052)	(0.1200)	(0.2119)
Department FE.	No	No	No	Yes
Year-birth FE	No	No	No	Yes
Observations	22,797	22,797	22,779	22,779
R-squared	0.0419	0.3116	0.3635	0.3922

Note : Robust standard errors in parentheses, boostrapped with 200 replications. * Significant at 10% ; **significant at 5% ; *** significant at 1%. The dependent variable is the years of education completed. « Affected » stands for the cohort born in 1988–1997, control group is born in 1978–1987. Reference category of ethnic group is Akan and for religion is other. Reference of head's education is « No education »

Table 2.11 – Gender-differential impact. Alternative baseline cohort

VARIABLES	[1]	[2]	[3]	[4]
Conflict-victim	1.3330***	0.6271***	0.5738**	0.9250***
	(0.3073)	(0.2331)	(0.2490)	(0.2501)
Affected	-0.0991	-0.3746***	-0.3296***	-1.7089***
	(0.1152)	(0.0954)	(0.0940)	(0.1705)
Conflict-victim * Affected	-0.9506***	-0.8847***	-1.1719***	-0.9829***
	(0.3525)	(0.3007)	(0.3005)	(0.2866)
Female	-1.4413***	-1.6344***	-1.5868***	-1.5786***
	(0.1093)	(0.0944)	(0.0958)	(0.0946)
Female * Conflict-victim	-1.3698***	-1.2810***	-1.4079***	-1.3734***
	(0.3944)	(0.2982)	(0.3026)	(0.3251)
Affected * Female	0.4043***	0.5007***	0.4149***	0.3489***
	(0.1434)	(0.1248)	(0.1271)	(0.1206)
Affected * Female * Conflict-victim	**1.1024****	**1.0445****	**1.2228*****	**1.0692*****
	(0.4679)	**(0.4132)**	**(0.3720)**	**(0.4030)**
Child of the head	0.9089***	1.1753***	1.1964***	1.3370***
	(0.0640)	(0.0498)	(0.0571)	(0.0599)
Age of the head		0.0240***	0.0154***	0.0141***
		(0.0019)	(0.0021)	(0.0021)
Head is a male		-1.2404***	-0.6988***	-0.7065***
		(0.0688)	(0.0830)	(0.0723)
Head is married		-0.5094***	-0.3308***	-0.2668***
		(0.0701)	(0.0655)	(0.0641)
Primary educ		2.3283***	1.7006***	1.5364***
		(0.0567)	(0.0583)	(0.0602)
Lower secondary educ		4.4115***	3.3435***	3.1379***
		(0.0624)	(0.0839)	(0.0783)
Uper secondary educ		5.5056***	4.1129***	3.8789***
		(0.0994)	(0.1006)	(0.1018)
Higher educ		5.6774***	4.4609***	4.1771***
		(0.1401)	(0.1559)	(0.1460)
Rural household			-1.2354***	-0.9644***
			(0.0595)	(0.0559)
Size of household			0.0137**	0.0111*
			(0.0062)	(0.0057)
krou			0.1429*	0.1668**
			(0.0851)	(0.0838)
Mandé du nord			-1.0303***	-0.7233***
			(0.0898)	(0.1052)
Mandé du sud			-0.2495***	-0.1571
			(0.0949)	(0.1106)
Voltaïque			-0.9501***	-0.5891***
			(0.0726)	(0.0958)
Non-Ivorian			-0.8406***	-0.9619***
			(0.0812)	(0.0848)
Christian			0.5832***	0.4288***
			(0.0623)	(0.0702)
Muslim			-0.2698***	-0.2628***
			(0.0662)	(0.0791)
Close to secondary school			0.7162***	0.7255***
			(0.0677)	(0.0654)
Close to primary school			-0.0261	0.0593
			(0.0477)	(0.0458)
Constant	4.2018***	2.9099***	3.8432***	4.1487***
	(0.0869)	(0.1120)	(0.1394)	(0.2090)
Department FE.	No	No	No	Yes
Year-birth FE	No	No	No	Yes
Observations	22,797	22,797	22,779	22,779
R-squared	0.0438	0.3138	0.3656	0.3938

Note : Robust standard errors in parentheses, boostrapped with 200 replications. * Significant at 10% ; **significant at 5% ; *** significant at 1%. The dependent variable is the years of education completed. « Affected » stands for the cohort born in 1988–1997, control group is born in 1978–1987. Reference category of ethnic group is Akan and for religion is other. Reference of head's education is « No education »

TABLE 2.12 – Residence sub-sample, impact of civil conflict. Alternative baseline

	Rural				Urban			
VARIABLES	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Conflict-victim	0.4717**	0.0455	-0.2483	0.3131	1.1054***	0.0481	-0.2563	0.0453
	(0.1893)	(0.1771)	(0.1951)	(0.2092)	(0.3110)	(0.2432)	(0.2417)	(0.2700)
Affected	0.5084***	0.3584***	0.3078***	-0.3915**	0.0069	-0.2968***	-0.3856***	-2.4342***
	(0.1004)	(0.0805)	(0.0827)	(0.1970)	(0.1159)	(0.0906)	(0.0972)	(0.2082)
Conflict-victim ∗ Affected	**-0.4919***	**-0.4577***	**-0.5674****	**-0.5039****	**-0.7203***	**-0.4291**	**-0.4105**	**-0.2073**
	(0.2571)	**(0.2514)**	**(0.2450)**	**(0.2116)**	**(0.4082)**	**(0.3168)**	**(0.3038)**	**(0.3221)**
Female	-1.3147***	-1.2745***	-1.2641***	-1.2924***	-1.5123***	-1.6946***	-1.6552***	-1.7010***
	(0.0629)	(0.0575)	(0.0602)	(0.0553)	(0.0779)	(0.0692)	(0.0647)	(0.0622)
Child of the head	0.6851***	0.7609***	0.7855***	0.8198***	1.2417***	1.5079***	1.5101***	1.6993***
	(0.0778)	(0.0766)	(0.0742)	(0.0723)	(0.0861)	(0.0839)	(0.0803)	(0.0814)
Age of the head		0.0196***	0.0119***	0.0101***		0.0258***	0.0174***	0.0155***
		(0.0022)	(0.0023)	(0.0023)		(0.0031)	(0.0032)	(0.0031)
Head is a male		-0.6310***	-0.2982***	-0.2826***		-1.1816***	-0.8530***	-0.9017***
		(0.1134)	(0.1027)	(0.1027)		(0.1012)	(0.1022)	(0.1005)
Head is married		-0.3295***	-0.2078**	-0.1980*		-0.4873***	-0.3899***	-0.2801***
		(0.0969)	(0.0920)	(0.1030)		(0.0950)	(0.0936)	(0.0907)
Primary educ		2.1314***	1.4818***	1.2720***		2.3512***	1.8558***	1.6832***
		(0.0682)	(0.0724)	(0.0715)		(0.0814)	(0.0913)	(0.0944)
Lower secondary educ		3.8952***	3.0188***	2.7437***		4.2954***	3.5391***	3.3102***
		(0.1007)	(0.1156)	(0.1159)		(0.0883)	(0.1023)	(0.1020)
Upper secondary educ		4.4793***	3.4643***	3.1690***		5.3443***	4.4308***	4.1755***
		(0.1924)	(0.2101)	(0.2007)		(0.1121)	(0.1209)	(0.1249)
Higher educ		3.2660***	2.9021***	2.5677***		5.7191***	4.9130***	4.6312***
		(0.3229)	(0.3384)	(0.3056)		(0.1511)	(0.1477)	(0.1562)
Size of household			-0.0019	0.0056			0.0228**	0.0084
			(0.0067)	(0.0072)			(0.0096)	(0.0101)
krou			0.2614**	0.3259***			0.0515	0.0376
			(0.1071)	(0.1210)			(0.1158)	(0.1258)
Mandé du nord			-1.3026***	-0.8232***			-0.8483***	-0.6301***
			(0.1149)	(0.1475)			(0.1284)	(0.1338)
Mandé du sud			-0.0857	-0.1124			-0.3846***	-0.3262**
			(0.1226)	(0.1559)			(0.1442)	(0.1498)
Voltaique			-1.2445***	-0.6826***			-0.7023***	-0.5035***
			(0.0831)	(0.1312)			(0.1249)	(0.1320)
Non-Ivorian			-0.7969***	-0.9514***			-0.8910***	-0.9524***
			(0.0953)	(0.1119)			(0.1244)	(0.1243)
Christian			0.6135***	0.4289***			0.5385***	0.3591***
			(0.0713)	(0.0824)			(0.1158)	(0.1060)
Muslim			-0.1129	-0.0965			-0.3723***	-0.4285***
			(0.0787)	(0.0910)			(0.1266)	(0.1164)
Close to secondary school			0.8858***	0.8407***			0.7865***	0.7712***
			(0.1218)	(0.1392)			(0.0756)	(0.0751)
Close to primary school			0.3697***	0.3907***			-0.4191***	-0.1933**
			(0.0583)	(0.0561)			(0.0792)	(0.0770)
Constant	2.7381***	1.7033***	2.0642***	2.5191***	5.1932***	3.3142***	4.0263***	4.5494***
	(0.0821)	(0.1437)	(0.1441)	(0.2663)	(0.0947)	(0.1465)	(0.1958)	(0.2844)
Department FE.	No	No	No	Yes	No	No	No	Yes
Year-birth FE	No	No	No	Yes	No	No	No	Yes
Observations	10,352	10,352	10,336	10,336	12,445	12,445	12,443	12,443
R-squared	0.0619	0.2537	0.3044	0.3393	0.0515	0.2997	0.3288	0.3683

Note : Robust standard errors in parentheses, boostrapped with 200 replications. * Significant at 10% ; **significant at 5% ; ***significant at 1%.

The dependent variable is the years of education completed. « Affected » stands for the cohort born in 1988–1997, control group is born in 1978–1987.

Reference category of ethnic group is Akan and for religion is other. Reference of head's education is « No education »

Table 2.13 – Head literate status sub-sample, impact of civil conflict. Alternative baseline

	Literate head			Iliterate head				
VARIABLES	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Conflict-victim	-0.6422**	-0.5293**	-0.5952**	-0.0045	0.6054***	0.5318***	0.1915	0.7479***
	(0.2678)	(0.2529)	(0.2434)	(0.2564)	(0.1948)	(0.1920)	(0.2084)	(0.2223)
Affected	-0.9340***	-0.9492***	-0.9659***	-3.4704***	0.8074***	0.6569***	0.6460***	0.3263*
	(0.1078)	(0.1133)	(0.1023)	(0.2280)	(0.0826)	(0.0784)	(0.0795)	(0.1861)
Conflict-victim ∗ Affected	**-0.2012**	**-0.2577**	**-0.3636**	**-0.1500**	**-0.0718**	**-0.0057**	**-0.2706**	**-0.1888**
	(0.3422)	**(0.3202)**	**(0.3135)**	**(0.2858)**	**(0.2696)**	**(0.2628)**	**(0.2592)**	**(0.2695)**
Female	-2.0166***	-2.0358***	-2.1002***	-2.1337***	-0.7449***	-0.8680***	-0.8574***	-0.8839***
	(0.0794)	(0.0767)	(0.0749)	(0.0699)	(0.0606)	(0.0597)	(0.0538)	(0.0531)
Child of the head	1.1094***	1.1713***	1.2829***	1.6355***	1.4011***	1.0744***	1.1046***	1.0993***
	(0.0879)	(0.0873)	(0.0966)	(0.0832)	(0.0691)	(0.0713)	(0.0703)	(0.0719)
Age of the head		0.0041	-0.0035	-0.0087**		0.0280***	0.0172***	0.0183***
		(0.0036)	(0.0037)	(0.0042)		(0.0023)	(0.0022)	(0.0022)
Head is a male		-1.0348***	-0.4714***	-0.5022***		-1.0125***	-0.3499***	-0.3625***
		(0.1253)	(0.1219)	(0.1298)		(0.0908)	(0.0912)	(0.0915)
Head is married		-0.9182***	-0.5116***	-0.4378***		-0.2121**	-0.0078	0.0694
		(0.1211)	(0.1242)	(0.1060)		(0.0920)	(0.0868)	(0.0813)
Rural household			-1.8299***	-1.4837***			-1.2163***	-0.8741***
			(0.0864)	(0.0991)			(0.0672)	(0.0785)
Size of household			-0.0401***	-0.0425***			0.0378***	0.0340***
			(0.0111)	(0.0119)			(0.0072)	(0.0075)
krou			0.2050**	0.3038***			0.5495***	0.5061***
			(0.1030)	(0.1179)			(0.1481)	(0.1589)
Mandé du nord			-0.7462***	-0.3553**			-1.5932***	-1.2627***
			(0.1673)	(0.1528)			(0.1159)	(0.1277)
Mandé du sud			-0.1986	0.0795			-0.5048***	-0.5076***
			(0.1238)	(0.1535)			(0.1412)	(0.1708)
Voltaïque			-0.6112***	-0.2409*			-1.5197***	-1.1719***
			(0.1291)	(0.1439)			(0.0966)	(0.1180)
Non-Ivorian			-0.7481***	-0.7835***			-1.2419***	-1.4133***
			(0.1252)	(0.1333)			(0.1049)	(0.1066)
Christian			0.4973***	0.3609***			0.9589***	0.7190***
			(0.0959)	(0.0897)			(0.0857)	(0.0882)
Muslim			-0.6579***	-0.6846***			0.0362	0.0726
			(0.1336)	(0.1307)			(0.0831)	(0.0804)
Close to secondary school			0.8524***	0.8515***			0.9117***	0.9532***
			(0.0918)	(0.0992)			(0.0924)	(0.0859)
Close to primary school			-0.3534***	-0.2153**			0.3493***	0.3995***
			(0.0805)	(0.0909)			(0.0625)	(0.0567)
Constant	7.1853***	8.6075***	9.0937***	9.4611***	1.5329***	1.5155***	2.1130***	1.9024***
	(0.0945)	(0.1708)	(0.2057)	(0.3136)	(0.0596)	(0.1239)	(0.1394)	(0.2508)
Department FE.	No	No	No	Yes	No	No	No	Yes
Year-birth FE	No	No	No	Yes	No	No	No	Yes
Observations	10,549	10,549	10,539	10,539	12,248	12,248	12,240	12,240
R-squared	0.0853	0.1080	0.1997	0.2595	0.0914	0.1233	0.2402	0.2824

Note : Robust standard errors in parentheses, boostrapped with 200 replications. * Significant at 10% ; **significant at 5% ; ***significant at 1%.
The dependent variable is the years of education completed. « Affected » stands for the cohort born in 1988–1997, control group is born in 1978–1987.
Reference category of ethnic group is Akan and for religion is other. Reference of head's education is « No education »

7.2 Education alternative measure : School performance

Another possible limit of the previous results is that the years educations such as measured, does not allow to capture repetition and dropouts. In other words, this measure does not allow to verify whether the civil conflict has affected the school performances of individuals in the affected cohort. Following Psacharopoulos (1997), we define an age-adjusted measure of educational attainment (SAGE) as follows :

$$SAGE = \frac{Years\ of\ educations}{Age - 6} \times 100$$

where SAGE is a variable that allows to assess the progress of an individual in the school system. This variable is defined such as :

$$SAGE = \begin{cases} 0 & \text{if } illiterate \\ 0 < SAGE < 100 & \text{if } repeater\ or\ late\ entry\ into\ the\ school\ system \\ SAGE >= 100 & \text{if } above\ or\ normal\ progression \end{cases}$$

We are interested here in the effect of the Ivorian civil conflict on the probability of the grade repetition for children aged 5–14 during civil conflict. Therefore we define an outcome variable which takes 1 if $0 < SAGE < 100$ and 0 otherwise. This variable captures grade repetitions. Formaly, we estimate the following equation :

$$repeater_{ijk} = \alpha_k + \beta_t + \eta Victim_j + \lambda X_{ij} + \varepsilon_{ijk} \tag{2.4}$$

Where the outcome variable $repeater_{ijk}$ is a dummy variable (1 if the individual is repeater and 0 otherwise.) which measures the school performance of the individual i from household j and residing in department k. α_k is a fixed effect for the child's department of residence. The parameter of interest which estimates the effect of conflict-related victimization on grade repeatition is thus η. Repeater are individuals still in school and for which the SAGE score is below 100. Of course, this variable also captures those who entered late in the school system and are not necessarily repeaters. However, this variable does not include those who left school after repeating before the end of the period.

In Table 2.14 we present estimates for children aged 5–14 (full sample), and for children from rural vs. urban areas, literate and illiterate household as well as gender differential impact. Overall, these results confirm earlier results. Indeed, conflict related-victimization has a positive impact on the

children grade repetition, as reported in columns 1 to 6. This effect is statistically significant at least at the 5% level for the full sample, rural and illitereate sub-samples. Particularly, children age 5–14 living in household who experienced a higher degree of victimization are more at risk being grade repeaters. The magnitude of this effect varies between 5.55 and 13%. Regarding the gender differential imapact, our results show that the estimated coefficient on the interaction term between « conflict-victim » and « female » dummy is negative and statistically significant at the 5% level (column 6) suggesting that the female children aged 5–14 living in household who experienced a higher degree of victimization are 9.30% less likely to be grade repeaters.

TABLE 2.14 – Marginal effect of conflict exposition on the children (5-14 age) grade repetition

VARIABLES	Full sample	Rural	Urban	Literate	Illiterate	Gender
	[1]	[2]	[3]	[4]	[5]	[6]
Conflict-victim	**0.0555****	**0.130*****	**0.0124**	**-0.0351**	**0.124*****	**0.104*****
	(0.0278)	**(0.0450)**	**(0.0334)**	**(0.0310)**	**(0.0416)**	**(0.0324)**
Female	-0.131***	-0.141***	-0.123***	-0.0900***	-0.154***	-0.112***
	(0.0103)	(0.0167)	(0.0128)	(0.0142)	(0.0138)	(0.0130)
Conflict-victime * Female						**-0.0930****
						(0.0437)
Rural household	-0.0732***			0.0193	-0.121***	-0.0735***
	(0.0137)			(0.0198)	(0.0191)	(0.0143)
Child of the head	0.135***	0.157***	0.117***	0.108***	0.174***	0.135***
	(0.0104)	(0.0186)	(0.0154)	(0.0150)	(0.0156)	(0.0107)
Age of the head	0.00114***	0.00115**	0.000755	0.000159	0.00157***	0.00114***
	(0.000413)	(0.000575)	(0.000592)	(0.000697)	(0.000494)	(0.000394)
Head is a male	-0.0112	-0.00384	-0.0284	-0.00226	-0.0426*	-0.0105
	(0.0158)	(0.0274)	(0.0220)	(0.0244)	(0.0225)	(0.0167)
Head is married	-0.0386**	-0.0231	-0.0419**	-0.0712***	0.0157	-0.0391***
	(0.0155)	(0.0274)	(0.0205)	(0.0225)	(0.0227)	(0.0150)
Primary educ	0.181***	0.184***	0.162***			0.181***
	(0.0139)	(0.0221)	(0.0196)			(0.0136)
Lower secondary educ	0.168***	0.150***	0.163***			0.168***
	(0.0172)	(0.0311)	(0.0203)			(0.0156)
Upper secondary educ	0.0366*	0.129***	0.0273			0.0363*
	(0.0189)	(0.0410)	(0.0225)			(0.0188)
Higher educ	-0.0274	-0.0534	-0.00455			-0.0276
	(0.0234)	(0.0540)	(0.0315)			(0.0236)
Size of household	0.00155	0.00119	0.00365**	0.00590***	-0.000795	0.00156
	(0.00127)	(0.00156)	(0.00173)	(0.00215)	(0.00158)	(0.00124)
krou	0.0564***	0.0891***	0.0345	0.0647***	0.143***	0.0571***
	(0.0200)	(0.0322)	(0.0277)	(0.0225)	(0.0377)	(0.0189)
Mandé du nord	-0.00439	-0.117***	0.0483*	0.0383	-0.0753**	-0.00353
	(0.0205)	(0.0375)	(0.0271)	(0.0310)	(0.0306)	(0.0210)
Mandé du sud	0.0441*	0.0450	0.0421	0.0714**	0.0214	0.0450*
	(0.0245)	(0.0373)	(0.0327)	(0.0296)	(0.0399)	(0.0252)
Voltaïque	-0.0242	-0.103***	0.0483*	0.0866***	-0.123***	-0.0232
	(0.0199)	(0.0339)	(0.0279)	(0.0286)	(0.0277)	(0.0204)
Non-Ivorian	-0.0543***	-0.115***	0.0188	0.0164	-0.115***	-0.0536***
	(0.0168)	(0.0270)	(0.0258)	(0.0243)	(0.0271)	(0.0181)
Christian	0.0240	0.0607***	-0.0224	0.00109	0.0451**	0.0235
	(0.0150)	(0.0203)	(0.0234)	(0.0189)	(0.0221)	(0.0155)
Muslim	-0.0826***	-0.0834***	-0.111***	-0.0753***	-0.0938***	-0.0833***
	(0.0167)	(0.0255)	(0.0241)	(0.0240)	(0.0224)	(0.0181)
Close to secondary school	-0.00233	0.140***	-0.00533	-0.0215	0.0187	-0.00265
	(0.0134)	(0.0343)	(0.0158)	(0.0161)	(0.0198)	(0.0118)
Close to primary school	0.121***	0.163***	0.0953***	0.0588***	0.165***	0.121***
	(0.0110)	(0.0192)	(0.0172)	(0.0191)	(0.0162)	(0.0111)
Department FE.	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,146	6,192	6,943	5,978	7,168	13,146

Note : Columns represent marginal effect of logit model. Robust standard errors in parentheses, boostrapped with 200 replications.

* Significant at 10% ; **significant at 5% ; *** significant at 1%. Dependent variable is repeater(dummy).

Reference category of ethnic group is Akan and for religion is other. Reference of head's education is « No education »

8 CONCLUSION

This study contributes to the literature on the impact of armed conflict on education using a case of the 2002–2007 Ivorian civil conflict. To this end, we use the households living standards survey data collected in 2008 (ENV–2008) and perform a baseline difference in differences analysis for the full sample, residence and literate status sub-samples, and a triple differences regression to examine the gender differential impact of conflict on education. Our results indicate that children who were of mandatory school age and living in a highly victimized household attained less years of education than unaffected cohort (born between 1978–1987) living in a similar household, ceteris paribus. This loss amounts to about about half a year schooling (0.413) after controlling for individual, head of household, household itself characteristics as well as fixed effects of departments and year of birth. In contrast, we find that the average years of education for female children who were of mandatory school age is one year (1.125) higher than males if they are from a household who has experienced a high degree of victimization. In addition, our results also reveal that mandatory school age children (born between 1988–1997) from rural households who experienced a conflict related-victimization attained less years of education. Finally, all these effects are robust to the use of various controls in the estimates, an alternative baseline cohort, and an alternative measure of education. The potential mechanisms that can explain these results are child soldiering, household labour allocation decisions, changes in returns to education and catch-up effect of boys' education level by girls (Justino, 2010a). Indeed, the gender gap in the grade completion increases as a result of poor school attendance due to civil war. This is generally the case for many boys who are either solicited in the civil war as child soldiers or directly involved in the labour market to participate in family income. This situation has a negative and lasting impact on their educational level since they are no longer able to return to school even years after the conflict. In contrast, girls who traditionally had relatively low levels of education eventually catch up with boys. Our results could also be explained by targeting of schools, teachers and students, displacement as well as destruction of educational infrastructures during violent conflict.

Our analysis clearly indicate that households exposed to violence have a negative impact on the educational outcomes of individuals especially for children who were primary school-age in Côte d'Ivoire. This has several implications on the economic growth especially for countries that have lower levels of education to begin with. Indeed, educational outcomes is also one of the factors used by the United Nations to measure human development (Singh and Shemyakina, 2016).

Chapitre 3

School Feeding Programs and Child Labor in a Post-Conflict Country : Evidence from Liberia

1 INTRODUCTION

School feeding programs (SFPs), including meals served in school and take-home rations conditional on school attendance are a tool of transfer which has received renewed attention as a powerful policy instrument for achieving the Millennium Development Goals of universal primary education and hunger reduction in developing countries (UNESCO Institute for Statistics, 2007). These programs are supposed to shift parental preferences for children's educational participation by reducing the costs and increasing the benefits of time spent at school especially in areas of high food insecurity. Thus, for many poor households, SFPs are a response to the persistent hunger which is recognized as an obstacle to school enrollment and class attendance (Kazianga et al., 2014; UNESCO, 2008).

Furthermore, when the global economic crisis of the late 2000s emerged, the World Bank crisis response mechanisms has underlined the importance of SFPs both as a social safety net for children living in poverty and food insecurity, and as part of national educational policies and plans [1]. One of the advantages of SFP is that, in addition to allowing education, it has both positive

1. World Bank, 2011 in Scaling up School Feeding : Keeping Children in School While Improving Their Learning and Health

direct and indirect impacts on a number of other development goals namely for gender equity, poverty and hunger reduction, improvements in health and other social indicators. For instance, the 2011 World Food Program indicates that well-designed SFPs may have broad impacts on school attendance, school performance, student drop-out rates, cognitive development, the nutrition of preschool children and the gender parity at all levels of education. At the household level, the SFP is viewed as an economic incentive for households to send their children to school. Indeed, due to some constraints such the credit constraints or some schooling costs (for books, clothes, shoes or transportation), many poor households are unable to provide children with the opportunity to go to school and learn. There is a large body of empirical evidence which documents the effectiveness of SFPs (Adelman et al., 2008; Afridi, 2010; Kazianga et al., 2014). According to these studies, SFPs have indeed a positive impact on school participation as measured by school enrollment, class attendance, and student drop-out status (Meng et al., 2003; Ahmed, 2004; Vermeersch and Kremer, 2005). Though the merits of SFPs are well recognized in most literatures, some studies remain criticals. For instance, He (2009) in the case of Sri Lanka shows that SFPs do not have any effect on enrollment when comparing school that received the program and those that did not. Moreover, relatively few of the existing studies have shed light on the relationship between SFP and the reduction of child labor, especially in a post-conflict setting.

This relationship is worth investigating, mainly in the case of Liberia for several reasons. Firstly, Liberia is one of the poorest countries classified as both a least-developed country and a low-income food-deficit country, ranked 174 out of 187 according to the 2013 UNDP Human Development Index. The long lasting political conflicts that this country has experienced has shaped its economic environment. As a result, poverty and food insecurity are high across the country and particularly acute in Liberia's rural areas. As a result, households in these regions are struggling to feed their entire family including school-age children. Indeed, their own production of food falls short of the demand in the household. Hence, this constraint restricts households from sending children to school due to the fact that their day to day survival depends on the ability to raise more revenues through engaging their children in labor activities. Such households engage their children in some kind of activities to contribute to household income even if schooling fees are free. Those children are involved in various activities including fetching water, and light farm work, such as scaring birds away from newly planted seeds (Unicef Liberia, 2001) [2]. Second, regarding the performance in the education sector, Liberia is one of the countries off-track for achieving universal primary

2. http://www.unicef.org/liberia/children_7916.html

education by 2015 and is challenged with stagnating enrollment rates resulting in limited progress to decrease the number of out-of-school children (UNESCO, 2010). For instance, according to the 2007/2008 Liberia National School Census, only 33 percent of children in primary school age have been enrolled in school. In addition, girls, children in rural areas, and children from poor households are most affected. Development interventions in a post-conflict country like Liberia are often made difficult by the lack of physical infrastructure and the weakness of the productive capacities that have been completely destroyed by the war. This could reduce the ability of the SFP to reach the most vulnerable populations as well as the size of potential spillover effects. Likewise, the effect of the SFP on school attendance could be reduced or mitigated by the child labor, since it provides additional resources for the household. Besides, Liberia has experienced a decade of civil conflict that has had a major impact on food insecurity and child labor. It is therefore important to know whether the measures taken to fight food insecurity are also likely to reduce child labor. If this is the case, then the international community would save resources because, with one intervention, it would be possible to solve two problems.

The present study contributes to the literature on SFPs by addressing the issue of the impact of school feeding on child labor in Liberia, a post-conflict country with high prevalence of food insecurity. Theoretically SFP could affect child labor in two ways. First, through an income effect. Indeed, there is a wide shared idea among researchers that poverty is one of main causes of child labor (Zapata et al., 2011; Soares et al., 2012; Dillon, 2012). SFP acts an implicit transfer which increases the household consumption through the provision of meals served at school or take-home rations conditional on school attendance. Thus, households whose children benefit from the SFP should witness a decrease in the child labor compared to the households which are not part of the program.

Second, it is well establish that SFP is reported to improve the health status beneficiaries (Ahmed, 2004; Hall et al., 2007). Better health status may potentially improve the efficiency of the learning process (verbal fluency, visual processing, and concentration). Thus, students may need less time for learning and then use the spare time to increase their involvement in economic activities. This may particularly be the case in the absence of saving and borrowing and in the case where consumption is financed with both the income of child and that of the parent.

Therefore, if the school feeding which is an implicit transfer does not compensate the loss of child income due to the increase in school enrollment, we may not witness the drop in the child labor. This lack of effect is likely to occur especially if the household is labor constrained or/ child labor

is complementary to adult labor (Kazianga et al., 2012). In addtion, when girl's labor supply and boy's labor supply are perfectly substitutes SFP may not decrease the child labor.

In fact, since the take-home rations program is conditional to a high rate of school attendance and in most cases target girls, a household can choose to send to school only girls. Therefore, we may witness a drop in the girl's labor supply, but an increase in the boy's labor supply. Finally, as shown by Ravallion and Wodon (2000), a sufficient condition for a school feeding program incentives to reduce child labor is that schooling and leisure are complements. In fact, if schooling and leisure are substitutes, the extra time spent by children at school can come out of their leisure time.

Building on this background, the objective of this study is to assess the impact of the SFP on child labor in Liberia. Since the aim of the school feeding programs is to increase enrollment, school attendance and reduce school dropout, did they help reduce child labor too ? To answer this question, we use the newly available nationally representative CWIQ (Core Welfare Questionnaire Indicator) survey that was implemented in 2007 by the Liberia Institute of Statistics and Geo-information Services (LISGIS). The sample used in this paper is made up of 3,561 children aged between 5 to 15 years, living in 1,749 households across 15 counties of Liberia.

Using the propensity score matching technique, we find that the SFP leads to a statistically significant decrease of child labor estimated between 14 and 17 percent. This result is robust to the use of different matching techniques and the choice of covariates used in the estimation of the propensity score. In addition, the analysis reveals that the SFP is mainly effective in reducing child labor for male children, children living in war-displaced households and in households where the head is literate.

The paper's next section, presents a brief overview of SFPs, followed by the empirical framework. Sections 4 and 5 respectively present the results and the conclusion.

2 SCHOOL FEEDING PROGRAMS : Modalities and Impact

SFPs are transfer programs that are intended to curb the burdens of hunger, malnutrition and ill-health on school-age children. Early malnutrition can severely impact child health, school attendance and therefore acts as a major impediment to the achievement of Millennium Development Goals (MDGs) related to education, hunger and malnutrition. Providing school feeding is considered as a means to make significant steps toward universal primary education (MDG-Goal 2) and gender equality (MDG-Goal 3) (Gelli, 2010). The extensive literature on school feeding suggests

two types of food for education programs : school meals or snack and take-home rations (Kazianga et al., 2014). In-school feeding, where children are fed in school (breakfast, mid-morning snack, lunch) are implemented to support access to education and improve learning by reducing short-term hunger. Take-home rations are provided conditional of school attendance and are generally used as an incentive to boost the school attendance of a specific targeted group including girls. Unlike in-school feeding, take-home rations provide an implicit immediate income transfer which may represents a non-negligible part of the monthly household income (Gelli, 2010; Kazianga et al., 2014).

In recent years, many empirical studies on the effectiveness of SFPs have been carried out by scholars, NGOs and the World Bank (Adelman et al., 2008; Afridi, 2010; Kazianga et al., 2012, 2014). These studies assess the effect of SFP on a wide range of health and education outcomes. Using data from the World Food Standardized school feeding surveys, covering 32 Sub-Saharan African countries, Gelli et al. (2007) investigate the effects of provision of food and additional take-home rations in schools on girls' enrollment. They find a positive correlation between SFP and school enrolment. According to this study, in the first year of the program, the absolute enrolment in World Food Program-assisted schools increased by 28 percent for girls and 22 percent for boys. However, after the first year of the implementation, this effect varies depending on the type of school feeding. When take-home rations are combined with in-school feeding, the girl's enrollment is kept above 28 percent and the dropout rate is significantly reduced. When in-school feeding is provided alone, the absolute enrolment rate reverts to the level of pre-intervention. A randomized control trial led by Vermeersch and Kremer (2005) in Kenya assesses the impact of school feeding on school attendance and learning. After controlling for school level and child characteristics, their findings point to a positive effect of the program on school attendance and test scores. But the latter effect holds only in schools where teachers were relatively experienced prior to the program. In the same line Kazianga et al. (2012) use a randomized trial to assess the effects of school feeding on health and education outcomes for children in rural Burkina Faso. After one year of program implementation, they find a 5 to 6 percent increase of girl's enrollment, regardless of the type of program (school meal or take-home rations). In addition, they find a small impact on the time adjusted scores of mathematics for girls. Surprisingly, the findings show an unexpected higher absenteeism for students who were exposed to the program. They interpret this finding as an indication that labor constraints matter, mainly when child labor is complementary to adult labor. Concerning health outcomes, the study documents a positive spillover effect on young sibling aged between 6 to 60

months. Specifically, take-home rations have increased their weight-for-height by 0.33 standard deviation and weight-for-age by 0.38 standard deviation. This finding is confirmed by Kazianga et al. (2014). Similar studies have been led by Grantham-McGregor et al. (1998) in Jamaica and Ahmed (2004) in Bangladesh. These studies highlight that the provision of school meals reduces the parents cost of sending children to school and positively impact school performance indicators such as enrollment, class attendance, drop-out rate, repetition of grades, school, cognitive function, and class-room behavior. Typically, these authors argue that the availability of subsidized in-school meals is a source of motivation to an increase of school enrollment. In fact, according to these authors, income effect is related to the provision of food that offsets the cost of educating children by making available additional income for households, and consequently raising the benefits of attending school on one hand. On the other hand, this income effect induces households to send their children to school at a relatively younger age thereby minimizing the possibility of late entry. According to Kazianga et al. (2012) and Kazianga et al. (2014), the nutritional function of SFP play an important role for school performance because of its effect on attendance and cognitive skills.

These studies however highlighted some drawbacks that should be addressed in order to improve the effectiveness of SFP. First, the program only target school-age children while the effect could be larger if children below the school age were targeted. Second, SFP may disrupt the hours of teaching and learning by withdrawing some school hours in order to share school meal to school-age children and hence potentially worsening school performance. Third, high level of school participation rate due to SFP could hide an accommodation problem which is not taken into account. In fact, if there is no investment in the hiring of new teachers, the increase of school enrollment may adversely impact the quality of education. Overall, despite differences in methodology, sample and region coverage, studies point on average a positive effect of school feeding on education and health outcomes of children. However, few of the studies on SFPs have explicitly addressed the question of their potential effects on child labor [3]. In fact, an extensive theoretical literature on child labor suggests that education and child labor may be substitutes. In fact, the increase of school attendance induced by SFP may reduce the labor supply of children.

3. Kazianga et al. (2012) partially address this issue and show that SFP shift labor supply from farm labor and off-farm productive labor to more domestic tasks

3 THE CONTEXT OF THE STUDY

3.1 Liberia as a post-conflict country

Liberia is the oldest African country as it was founded in 1847 by freed American slaves in the west region of the continent. It is a country of almost 5 millions of inhabitants, bounded by Guinea on the North, Côte d'Ivoire on the East, the Atlantic Ocean on the South and southwest and by Sierra Leone on the Northwest. Liberia underwent 14 years of devastating civil war between 1989 and 2003. The outbreak of the civil war is rooted in a longstanding identity debate that stemmed from the fact that the freed slaves that founded the country excluded the indigenous inhabitants from political, social and economic power. The conflict started in December 1989 when James Taylor a former government minister of the Liberia's first indigenous president Samuel Doe started an uprising meant to topple the Doe's government. After several ceasefires and unfruitful peace talks, the conflict ended in 2003 by the Accra comprehensive peace agreement that led to the election of Ellen Johnson Sirleaf in January 2006. In 14 years of civil war in Liberia, about 270, 000 Liberians were killed and over 500,000 were forced to flee their homes either as internally displaced peoples or refugees (Radelet, 2007). In the same time, the displacement of entire community and the collapse of economic and physical infrastructure leave children vulnerable to worst form of child labor. At the end of the conflict in August 2003, there were an estimated 15000 child soldiers to be demobilised and reintegrated (Galvanek, 2008) and in 2006, 32 percent of children between 5 to 14 years old were working (BILA, 2011). The conflict has also left the country with a destroyed infrastructure, a devastated economy and strong humanitarian distress that culminated with a severe food insecurity. The country's GDP per capita fell by 65 percent between the beginning of the conflict in 1989 and its end in 2003 (World Bank, 2012). In 2003, the GDP per capita was USD 131, that is only one-third of what it had been before the conflict. According to the Comprehensive Food Security and Nutrition Survey (CFSNS) which is the first comprehensive survey carried out since the end of the civil war, 68 percent of households had no access to improved water sources, 76 percent had no access to sanitary facilitation and no household had access to a steady source of electricity [4]. Likewise, the survey revealed that 86 percent of households across the country have been displaced due to the war though most of them returned between 2003 and 2004. Finally, the survey reported that 11 percent of households were considered to be food insecure, 40 percent highly vulnerable to food insecurity and 41 percent moderately vulnerable to food insecurity.

4. see WFP (2006)

3.2 School feeding in Liberia

Food aid interventions in Liberia date back to the beginning of the civil war in 1990. The largest provider of food aid in Liberia is the World Food Program (WFP) which between 2001 and 2006 distributed about 234,137 metrics ton of food comprising mainly bulgur wheat, vegetable oil corn-soya-blend (LISGIS, 2006) [5]. The World Food Program initially started its humanitarian assistance in Liberia to assist internally displaced peoples (IDPs) in more than 20 camps across the country. Since the resettlement of IDPs ended in 2006 and the last camp closed, the WFP shifted its intervention toward recovery activities such as school feeding (SF), food support for local initiative (FSLI) and nutrition intervention programs. According to the 2006's CFSNS, the SF was the most prevalent food program provided in rural area and the only one in urban area. In this paper, we are interested in the school feeding program that was provided by the World Food Program in 2006. This is clearly the first school feeding program provided by the institution in the aftermath of the civil war and after the resettlement of displaced peoples and refugees. The SFP was implemented by the World Food Program in partnership with the Liberian government with the objectives of : 1) preventing school children from feeling hungry during school, 2) providing school children with a balanced diet, 3) keeping school children in school for the entire day, 4) improving school attendance. The targeting approach of the WFP is based on food insecurity, low educational and nutrition indicators and gender-related problems (WFP, 2009) [6]. The geographic targeting is the starting point for selecting schools based on food security, poverty and education indicators. For instance, more schools will be chosen in counties where the state of food insecurity is reported as severe, the school enrolment/ attendance is very low and the gender gap is wider. Often all schools in very food insecurity area are targeted in order to prevent children from moving between schools (WFP, 2009). It is worth mentioning that often, though some schools are located in areas that meet the above mentioned targeting criteria, they do not benefit (or benefit less) from the SFP because they are not accessible by road. This was for instance the case of the counties of Gbarpolu and Grand Kru. In Liberia, the SFP focuses mainly on primary school age children. The SFP often takes two forms : the in-school feeding that benefit to all children who attend the targeted school and the take-home rations provided in counties where gender disparities are highest conditional on the girls' attendance rate. The food basket is made up of soy based fortified drink, high energy biscuit (in-school feeding), rice, pulse, fish and seasoning (Take-home rations), depending on infrastructure constraints. In terms of energy requirement, the program provides a minimum of 30 percent of

5. Liberia Institute of Statistics and Geo-Information Services
6. https://www.wfp.org/content/wfp-annual-report-2009-english

the Recommended Dietary Allowance (RDA) for the 6 to 12 years' children, that is around 628.4 kilocalories a day. The program is implemented throughout the school year and during on average 200 days, for a cost of USD 52 per child. Though the primary purpose of the school feeding program is to ensure food security among children and increase the school attendance, in this paper we examine its impact on child labor. This choice is motivated by two main factors. First, it is interesting to understand to what extent a food intervention program implemented in the wake of the post-conflict period can mitigate the negative impact of 14 years of war on child labor. As argued by Ravallion and Wodon (2000), child labor can displace schooling if the latter compete with labor-intensive jobs for children. This crowding-out effect can therefore explain the perpetuation of the poverty for children from poor families. Second, the theoretical literature indicates that school attendance and child labor are substitutes (Zapata et al., 2011; Dillon, 2012). Therefore, any policy that increases school attendance is likely to reduce child labour. However, empirical tests of this assumption are not widespread and often led to controversial results. For instance, Ravallion and Wodon (2000) theoretically show that if the substitution between schooling and leisure is strong enough, then schooling will not reduce child labor. However, in their empirical test, they find a moderate impact of food-for-aid program on child labor. In contrast, using Randomized experiment in Burkina Faso, Kazianga et al. (2014) find evidence that school meal intervention did not eliminate child labor.

4 DATA AND DESCRIPTION STATISTICS

The data used in this paper are from the Core Welfare Indicator Survey (CWIQ) carried out between August and September 2007 by the Liberian Government in partnership with international donors, including the World Bank and the United Nations Development Program (UNDP). The CWIQ is designed to collect the necessary information (households' socio-demographic characteristics, utilization, and satisfaction with social services) to provide welfare indicators for the monitoring of poverty alleviation programs. The CWIQ is a national representative survey carried out on a sample of 3,600 randomly selected households located in 300 randomly selected clusters (LISGIS, 2006) across 15 counties. In each county, the primary sampling unit is the enumeration area and the secondary sampling unit is the household. In each of the 300 enumeration areas, 12 households are sampled. Since the school feeding program is mainly implemented in primary education, we restrict the sample for this impact evaluation to children who are currently attending primary school. Therefore, we exclude all children below 5 and above 15 years respectively because, althought

the compulsory school starting age in Liberia is 6 years and comprise six grades, in our sample, 17.55 percent of children entered primary school at the age of 5, while 0.37 percent of them are still at primary school at the age of 15. Likewise, the International Labor Organisation's (ILO's) Convention No.138 specifies 15 years as the age above which a person may participate in economic activity. Futhermore, not only this choice is more conservative than the one of Ravallion and Wodon (2000), who use an age range of 5-16, and less restrictive than the range of 7-14 years used by Zapata et al. (2011) but this also allows us to maximize the sample of children eligible to receive the program. Though the percentage of children who are still at primary school at the age of 15 seems negligible, children of this age are more likely to be working than their younger siblings (Zapata et al., 2011). In addition, as it will be shown later, restricting the age range from 6 (the legal age to enter primary school in Liberia) to 14 does not alter the results qualitatively. Based on the above-mentioned restriction, the sample used in this paper consists of 3,561 children aged between 5 and 15 years, living in 1,749 households across 15 counties of Liberia.

4.1 School Feeding Program in the data

The treatment variable is the children's participation in the school feeding program. Specifically, our measure of school feeding is derived from the following question : « have any of the members of your household received food aid including school feeding in the last 12 months ? ». Therefore, the children are considered as treated if they are a member of a household that benefited from the school feeding program according to the question asked above. These are households for which children attended the targeted schools. It is worth mentioning that, among the households that received food aid, 72 percent benefited from the SFP. Since our study focuses only on school feeding, the initial variable of food aid is transformed into a dummy taking the value one if any member of the household received the SFP and zero otherwise. As such, our evaluation essentially assesses the differences in labor between children living in households that reported receiving the program and those that did not. The survey does not provide information on any household in which the children were offered the program but declined it. Thus, we are forced to assume a 100 percent take-up rate. This assumption does not seem to be implausible, because, in the targeted schools, in-school meals are automatically served and no child is left with the choice of taking one or not (LISGIS, 2006). However, it could be possible that those households where girls were offered a take-home ration actually declined it. Though the survey does not provide any information on the percentage of girls who were offered the take-home ration, the WFP's school feeding policy is to target poor and vulnerable people based on food insecurity and educational, nutritional, and gender-related

problems (WFP, 2009). Therefore, as highlighted by Ravallion and Wodon (2000), it is less likely that households living in poor and food insecure areas will decline food aid. In addition, as revealed by the 2006 Comprehensive Food Security and Nutrition Survey, in Liberia the in-school meal constitutes the major part of the SFP (LISGIS, 2006). In our sample, 20.25 percent of children benefited from the school feeding program (Table 3.1). This percentage appears to be very low considering the prevalence of food insecurity in Liberia. However, two factors can explain this low value. First, the poor quality of the road infrastructure prevents the program from reaching many highly food insecure areas. Second, the percentage of out-of-school children in Liberia is very high. According to the Education Data Policy Center and the 2007 Liberia Demographic and Health Survey, 65 percent of children of official primary school age are out of school. Table 3.1 also show that 20.66 percent of children receiving school feeding are male and 19.82 percent are female. Likewise, 20.38 percent of those children are living in a household that has been war-displaced at least once since the onset of the civil conflict in 1990 ; 23.28 percent are living in households in which the head is illiterate ; and 25 percent are living in an urban area.

4.2 Child labor in the data

We define child labor as any economic activity undertaken by an individual aged between 5 and 15 years old, i.e those reporting work either inside or outside the household as paid or an unpaid family member. We measure child labor according to the survey responses to the question : « Did you do any paid or unpaid work in the last seven days ? ». The child is deemed to be in the labor force if the answer to this question is « yes ». By this definition, 38.44 percent of children are working, 38.68 percent are boys and 38.20 percent are girls (Table 3.1). Likewise, 38.69 percent are living in households that have been war-displaced at least once, 42.86 percent are living in households in which the head is illiterate, and 46.49 percent are living in an urban area. Figure 3.1 provides the spatial distribution of child labor and school feeding across counties. In this figure, the county of Nimba stands out as the area that is the most affected by child labor while the least affected is the county of Sinoe. Similarly, the county that benefited more from the school feeding program is Grand Cape Mount. Figure 3.1 also suggests that it is unlikely that the program targeting was based on the prevalence of child labor in the counties. Table 3.1 reports the descriptive statistics of the main variables used in the analysis.

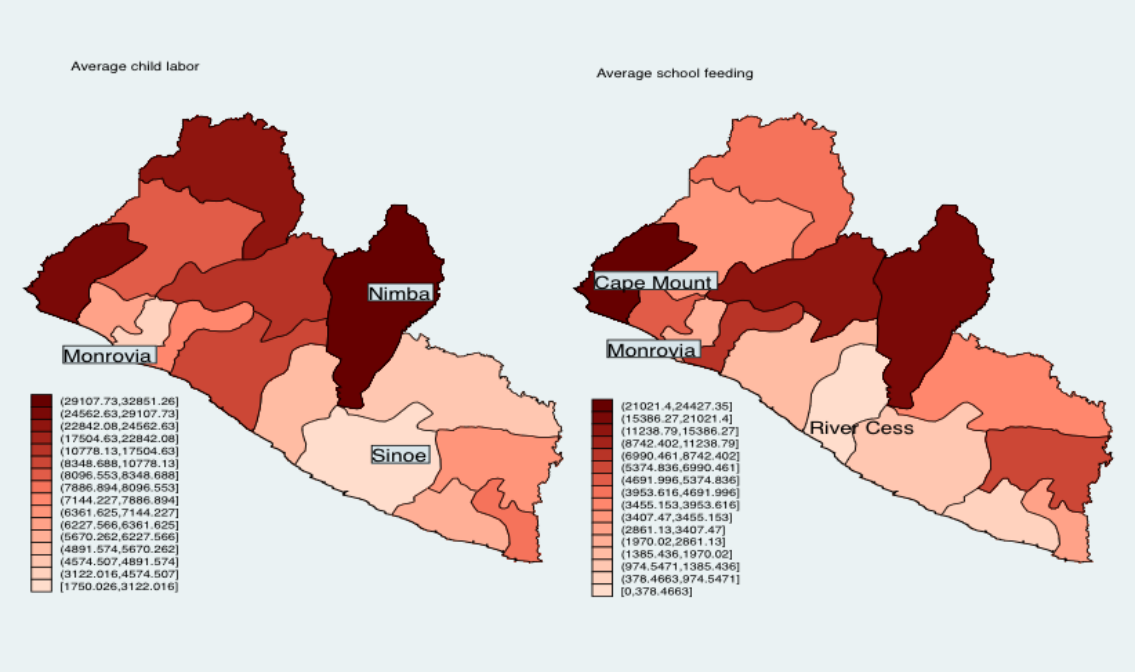

FIGURE 3.1 – Spatial distribution of child labor and school feeding

Table 3.1 – Descriptive statistics of the main variables (%)

	School feeding program	Child working (yes)
	20.25	38.44
Sex of child :		
Male	20.66	38.68
Female	19.82	38.20
Children living in :		
War-displaced households	20.38	38.69
Non-war-displaced households	19.61	37.28
Children living with a head of household who :		
Is literate	18.46	35.85
Is illiterate	23.28	42.86
Children living in :		
Urban area	25.01	46.49
Rural area	11.65	23.94

5 METHODOLOGY

The aim of the paper is to estimate the causal impact of the school feeding program on child labor. Ideally, the most convincing approach to identify a causal effect would have been to conduct a randomized experiment. In the absence of a randomized experiment, we use observational data and implement the propensity score-matching (PSM) technique to infer the causal effect of the school feeding program. The PSM technique is widely used in the impact evaluation literature, especially to evaluate the effectiveness of labor market policies (Dehejia and Wahba, 2002). The basic idea of the matching technique is to compare households that benefitted from the program with those with similar characteristics that did not participate in the program. To build this comparison group that shares similar characteristics with the treated group, Rosenbaum and Rubin (1983) propose the use of the propensity score, which is the probability of receiving the treatment conditional on a set of background covariates. Under the conditional independence assumption (CIA) and when the overlap condition holds, the average treatment effect on the treated can be estimated consistently (Rosenbaum and Rubin, 1983).

5.1 Estimating the average treatment effect on the treated

Using the Rubin causal model (RCM) framework, we assume a sample of N households indexed by $i : 1....., N$, viewed as a random sample of the population. The treatment indicator SFP_i equals one if household i receives the treatment and zero otherwise. It is worth noting that, in the specific

case of the school feeding program in Liberia, the household is considered as treated if any member of the household received school feeding. The potential outcome is then defined as Y_i (SFP_i) for each household i, and the propensity score is expressed as follows :

$$P(X) = Pr(SFP = 1/X) = E(SFP/X) \tag{3.1}$$

where X is the vector of observed covariates. Under the CIA and the overlap assumption, the PSM estimator of the average treatment effect on the treated (ATT) is written as :

$$ATT = E_{p(X)/SFP=1}\left\{E[Y(1)/SFP = 1, P(X)] - E[Y(0)/SFP = 0, P(X)]\right\} \tag{3.2}$$

In this paper, we employ three matching estimators : nearest-neighbor matching (NNM) with replacement, radius caliper matching (RCM), and kernel matching (KM). NNM consists of finding in the comparison group the individual for whom the propensity score is closest to the one of the treated individual. Matching with replacement implies the use of an untreated individual more than once as a match and therefore involves a trade-off between bias and variance (Caliendo and Kopeinig, 2008). Allowing for replacement increases the quality of the matching and decreases the bias. This feature is of particular interest in our case due to the fact that the distributions of the propensity score in the treated and the treatment group differ slightly. However, as suggested by Smith and Todd (2005), by reducing the number of distinct untreated individuals used to build the counterfactual, matching with replacement increases the variance of the estimator. The main idea of RCM is to use all the comparison members within a propensity score range as matching partners for a treated individual. This approach allows the use of extra comparison units when good matches are not available and in the same way avoids the increase in the variance of the estimator (Dehejia and Wahba, 2002; Caliendo and Kopeinig, 2008). Finally, the KM estimator uses the weighted averages of individuals in the control group to construct the counterfactual outcomes (Caliendo and Kopeinig, 2008). The major advantage of this approach is the lower variance of the matching estimator (Caliendo and Kopeinig, 2008; Smith and Todd, 2005). By using these three matching estimators, we find a proper balance between the bias and the variance and ensure the robustness of our results.

5.2 Implementation of propensity score-matching

The implementation of propensity score matching requires a choice of covariates that satisfies the CIA assumption, that is, those that simultaneously affect the decision to participate in the SFP and child labor. The conventional approach following Rosenbaum and Rubin (1983) is to include only pre-treatment variables in the propensity score model. However, as shown by Huber et al. (2013), under the condition that the influence of the treatment on covariates is not systematic, this requirement can be relaxed. To choose the relevant variables, we proceed in two steps. First, we rely on the work of Ravallion and Wodon (2000) to identify the set of variables that is likely to affect both participation in the SFP and child labor. Second, we use a recent algorithm proposed by Imbens (2015) to select the final covariates to be included in the propensity score model. Our set of covariates includes the household size, the share of boys aged 5 to 9, the share of girls aged 5 to 9, the share of boys aged 10 to 15, the share of girls aged 10 to 15, the household head's gender, marital status of household head, age of the child, the square of the age of the child, education of the head of the household, and land ownership. In addition to these variables, which are drawn from Ravallion and Wodon (2000), we rely on the available information about how the WFP targets schools to include in the propensity score model a dummy for the highly food insecure counties, the time to the nearest school, and household wealth index (Built from household assets in durable goods) that helps to assess the vulnerability of households to shocks. Following Imben's algorithm, we start by estimating the propensity score model using a set of basic covariates X_b (a subset of the set of covariates X mentioned above). Then we estimate one additional model for every covariate in X that is not included in X_b. For each of these estimations, the likelihood ratio test (LRT) of the null hypothesis that the coefficient of the additional covariate included in the model is not significant is performed. If the LRT is larger than or equal to a predefined threshold, then the associated coefficient is added to the model. This step is repeated until the LRT test is lower than the threshold or there are no more covariates to add.

The propensity score is estimated using a Logit model and is expressed as :

$$P(X) = \frac{e^{X'\beta}}{1 + e^{X'\beta}} \tag{3.3}$$

where X' includes a dummy for highly food insecure counties, a dummy taking the value of one if the head of the household is the family worker, the household size, the marital status, sex, and education of the head of the household, a dummy for land ownership, the time to the nearest

school, a wealth index, and the age, education (primary compared with preschool), and sex of the child.

6 RESULTS

Table 3.2 shows that most of the covariates used to explain the selection into the program are statistically significant at a conventional level. Besides, the significance of the food insecurity dummy clearly confirms that the targeting of the program at the county level is based on the state of food insecurity. Finally, the negative correlation between the time spent to reach the nearest school and the participation in the program suggests that households living in remote area are less likely to be selected into the program.

Table 3.2 – Logit estimates of school feeding participation

Variables	Propensity score logit	
	Coeff.	Std error
Household-level characteristics		
Highly food insecure county (1=yes)	2.003***	(0.269)
Employment status–Family worker (1=yes)	0.412***	(0.100)
Household size	-0.00301	(0.00405)
Head of the household is married (1=yes)	0.646***	(0.168)
Head of the household is literate (1=yes)	-0.0649	(0.104)
Head of the household is male (yes=1)	-0.239*	(0.125)
household is landowner (1=yes)	0.661***	(0.116)
Time to the nearest school	-0.661***	(0.116)
Wealth index	1.239**	(0.492)
Child-level characteristics		
Age	-0.184	(0.116)
Age squared	0.00956*	(0.00566)
Primary education level (1=yes)	-0.272**	(0.119)
Child is male (1=yes)	0.0946	(0.0927)
Rural area (1=yes)	0.0374	(0.155)
County fixed effect	Yes	
Intercept	-1.849***	(0.613)
Observations	3,561	
Wald	427.12	
P-value	0.000	
McFadden's Pseudo-R	0.15	

Note : Robust standard errors are presented. ***1%,**5%, *10%. The wealth index is built through multiple correspondence analysis, using the first component of the combination of responses related to the possession of durable goods, including a radio, phone, computer, generator, and stove, among others.

6.1 Assessing the quality of the matching

In this section, we assess whether the matching procedure used is able to balance the covariates between the treatment and the control group. For this purpose, we present in Table 3.3 the differences in the mean values of covariates between the participants in the school feeding program and the non-participants before and after the matching. Table 3.3 shows that the matching procedure is successful in balancing the covariates between the treatment and the control group. The difference in the mean values of all the variables used in the matching procedure is not statistically significant between the two groups. Therefore, there is no difference remaining after conditioning on the propensity score. Additionally, as suggested by Sianesi (2004) and Djimeu (2014), the propensity score is re-estimated on the matched sample and the before and after pseudo-R^2 are compared.

TABLE 3.3 – Logit estimates of school feeding participation

	Before matching				After matching				
Variables	SFP households (mean)	Non-SFP households (mean)	Diffs (1)-(2)	T-test	SFP households (mean)	Non-SFP households (mean)	Diffs (3)-(4)	T-test	% of reduction bias
Child labor	0.532	0.344							
Household characteristics									
Highly food insecure county (1=yes)	0.450	0.387	0.063	3.03	0.454	0.457	0.003	-0.11	95.5
Family worker (1=yes)	0.509	0.309	0.20	10.11	0.504	0.509	-0.005	-0.19	97.4
Household size	31.09	37.19	-6.1	-8.99	31.13	30.92	0.21	0.29	96.6
Married (1=yes)	0.906	0.824	0.082	5.34	0.905	0.901	0.004	0.25	95.2
Head of household is literate (1=yes)	0.575	0.646	-0.071	-3.52	0.580	0.577	0.003	0.14	94.8
Head of household is male (1=yes)	0.741	0.731	0.01	0.55	0.745	0.711	0.034	1.42	-232.8
Household is landowner (1=yes)	0.695	0.444	0.25	12.19	0.692	0.674	0.018	0.72	92.9
Time to the nearest school	17.20	23.26	-6.06	-3.87	17.3	16.68	0.62	0.41	89.8
Wealth index	0.050	0.060	-0.01	-2.35	0.050	0.054	-0.004	-0.87	56.5
Children's characteristics									
Age	9.63	9.76	-0.13	-1.08	9.65	9.84	-0.19	-1.18	-43.3
Age squared	101.85	103.66	-1.81	-0.74	102.18	106	-3.82	-1.19	-110.3
Primary education level (1=yes)	0.650	0.712	-0.062	-3.21	0.655	0.668	-0.013	-0.51	79.4
Male (1=yes)	0.521	0.502	0.019	0.93	0.521	0.517	0.004	0.16	78.3
Rural area (1=yes)	0.200	0.404	-0.204	-10.25	0.202	0.199	0.003	0.16	98.3
Counties									
Bong	0.046	0.032	0.014	1.74	0.046	0.041	0.005	0.47	62.3
Lofa	0.018	0.042	-0.024	-3.05	0.018	0.022	-0.004	-0.56	82.5
Nimba	0.078	0.058	0.02	1.96	0.079	0.070	0.009	0.61	57.4
Bomi	0.036	0.017	0.019	3.05	0.036	0.037	-.001	-0.03	98.5
Grand Cape Mount	0.098	0.003	0.095	15.64	0.089	0.089	0	0.00	100
Gbarpolu	0.151	0.106	0.045	3.31	0.152	0.148	0.004	0.24	89.8
Grand Bassa	0.011	0.021	-0.01	-1.82	0.011	0.015	-0.004	-0.61	65.3
Margibi	0.075	0.094	-0.019	-1.54	0.076	.072	0.004	0.28	78.6
Montserrado	0.023	0.037	-0.014	-1.81	0.0240	0.023	0.001	0.07	96
Grand Gedeh	0.098	0.046	0.052	5.26	0.099	0.094	0.005	0.29	91.2
Sinoe	0.030	0.080	-0.05	-4.65	0.031	0.023	0.008	0.85	85.2
Grand Kru	0.022	0.029	-0.007	-1.01	0.022	0 .024	-0.002	-0.18	79.9
Maryland	0.113	0.116	-0.003	-0.24	0 .114	0.125	-0.011	-0.62	-235.6
River Gee	0.110	0.029	0.081	9.26	0.111	0.119	-0.008	-0.45	90.6

Table 3.4 reports the results and shows that the after-matching pseudo-R^2 (0.005) is much lower than the before-matching one (0.15). Likewise, the likelihood ratio test of joint significance is not significant after the matching, suggesting good quality of the matching procedure.

Table 3.4 – Absolute pseudo bias

	Pseudo-R2	LR-chi2	p>chi2
Unmatched	0.154	541.19	0.000
Matched	0.005	9.36	0.999

6.2 The impact of the school feeding program on child labor

This section reports and discusses the key results of the estimation of the impact of the school feeding program on child labor in Liberia. We start by presenting the main finding obtained using different matching techniques. Then we perform some robustness checks to assess the consistency of the results with regard to the change in the measure of child labor or the variables used to compute the propensity score.

The main impact of the program

Table 3.5 reports the impact of the school feeding program on working children (ATT). The first column presents the results obtained using the full sample of the treated and shows that the SFP has a significant negative effect on child labor. Specifically, the school feeding intervention decreases the probability of working of the treated children by 14 percent compared with the matched control group members. Two main explanations can be provided to justify this finding. The first is related to the effect of school feeding on school enrollment and school attendance. The existing literature suggests that school feeding programs increase school enrollment and school attendance (Adelman et al., 2008; Kazianga et al., 2012). Since evidence abounds concerning the negative relationship between schooling and child labor (Ravallion and Wodon, 2000; Zapata et al., 2011), the school feeding program may reduce child labor through the increase in school enrollment. In other words, there is substitution between the time spent at school and the time spent working.

The second potential explanation relies on the fact that school feeding may act as a direct income transfer to households that reduces the need for extra revenues generated by child labor. For instance, if the 52 $ that corresponds to the annual cost of school feeding was given directly to households, it would have represented almost 24 percent of their annual income. On the same

line, this amount represents 84 percent of the annual income gap between the households in which children work and those in which children do not work in our sample. Finally, the WFP and the Government of Liberia attach great importance to the fact that the food used in the program is mainly provided by local farmers. Therefore, the SFP could be an additional source of income for households. This result is consistent with the assumption that the SFP serves as a safety net that helps to deal with the constraints that parents face to avoid resorting to coping mechanisms, which include making children contribute to the household income by taking them out of school to save school fees and related expenses (World Bank, 2009a).

TABLE 3.5 – Nearest-neighbor matching

	Full Sample	Male	Female	War displaced	Non-war displaced	Literate	Illiterate
	[2]	[3]	[4]	[5]	[6]	[7]	[8]
SFP	**-0.141****	**-0.239*****	**-0.114**	**-0.145****	**-0.144**	**-0.151***	**-0.181**
	(0.0649)	**(0.0848)**	**(0.0965)**	**(0.0581)**	**(0.165)**	**(0.0806)**	**(0.117)**
Observations	3.461	1.752	1.709	2.859	545	2.186	1.228
N_reps	100	100	100	100	100	100	100

Note : Standard errors are in parentheses. *** 1% ; ** 5% ; * 10%. Bootstrapped standard errors with 100 replications.

Heterogeneity in the program's impact

Because it is likely that the effect of the SFP varies by subgroups of the population, in columns (3) to (8) of Table 3.5, we assess the effect of the program according to gender, whether the household was displaced or not during the war, and the literacy of the head of the household.

Columns (3) and (4) show that the effect of the program is negative and significant for males and not significant for females. This finding reveals that boys' activities are likely to be remunerated and performed outside the household, unlike those of girls, who are more likely to be predominantly domestic and perform tasks inside the household. Therefore, the SFP as an income transfer tends to decrease male work probability. However, as we expected, we obtain a negative but not significant impact, probably because the availability of data does not help us to distinguish between domestic tasks that are generally allocated to girls and other forms of activities. In addition, the surprising lack of an effect of the program found for girls can be explained by the level of substitutability between girls' activities and boys' activities. In fact, most of the activities carried out by boys, such as selling, harvesting, sowing, and livestock holding, are also performed by girls. In contrast, activities such as cleaning, cooking, childcare, and collecting water and firewood are often exclusively handled by girls. Therefore, girls face a double burden and have to reduce their leisure time to

perform additional household tasks. As shown by Ravallion and Wodon (2000), if children have to use their leisure time to perform household tasks, the extra time spent at school will not be sufficient to reduce child labor.

Columns (5) and (6) distinguish the effect of the program between children living in war-displaced households and their counterparts living in non-displaced households. The results reveal a significant negative effect of the program for war-displaced households with a magnitude similar to the average effect. This result is more likely to reflect the high degree of vulnerability of households that have been displaced due to the war. On the same line, non-displaced households are more likely to have been affected less by the civil war and are therefore more resilient to economic shocks, for example a rise in food prices or natural disasters such as droughts. Therefore, the marginal impact of the school feeding program is very low, because, in these households, child labor is not a coping strategy.

Finally, in columns (7) and (8) of Table 3.5, the effect of the SFP differs depending on whether the head of the household is literate or not. Specifically, the probability of working reduces by 15 percent for children living in households in which the head is literate, while no effect is found for households in which the head is illiterate. In fact, literate heads of households value education and therefore are more responsive to the incentive provided by the SFP.

As highlighted by Caliendo and Kopeinig (2008), nearest-neighbor matching reduces the bias at the expense of increasing the variance of the estimator. To assess the robustness of the results discussed above, we resort to radius caliper (table 3.6) and kernel matching (table 3.7), which have the main advantage of reducing the risk of bad matches and the variance of the estimator. Overall, the results do not change significantly.

Table 3.6 – Radius caliper matching

	Full	Male	Female	War displaced	Non-war displaced	Literate	Illiterate
	[2]	[3]	[4]	[5]	[6]	[7]	[8]
SFP	**-0.170*** **	**-0.235*** **	**-0.140**	**-0.176*** **	**-0.219**	**-0.182** **	**-0.147**
	(0.0531)	**(0.0707)**	**(0.0863)**	**(0.0566)**	**(0.173)**	**(0.0736)**	**(0.102)**
Observations	3.461	1.752	1.709	2.859	545	2.186	1.228
N_reps	100	100	100	100	100	100	100

Note : Standard errors are in parentheses. *** 1% ; ** 5% ; * 10%. Bootstrapped standard errors with 100 replications.

TABLE 3.7 – Kernel matching

	Full	Male	Female	War displaced	Non-war displaced	Literate	Illiterate
SFP	**-0.176*** **	**-0.241*** **	**-0.0845**	**-0.157*** **	**-0.160**	**-0.176** **	**-0.146* **
	(0.0502)	**(0.0703)**	**(0.0687)**	**(0.0513)**	**(0.145)**	**(0.0692)**	**(0.0852)**
Observations	3.461	1.752	1.709	2.859	545	2.186	1.228
N_reps	100	100	100	100	100	100	100

Note : Standard errors are in parentheses. *** 1% ; ** 5% ; * 10%. Bootstrapped standard errors with 100 replications.

6.3 Robustness check

We perform three robustness checks. First, to address the concerns about the measure of child labor, we restrict the sample to children aged 6–14. In fact, the initial range of 5–15 might be too large if one considers that the legal age to enter primary education in Liberia is 6 and that, according to the definition of the International Labour Organization, people aged 15 are already part of the labor force (15–64). Second, to take into account the fact that some variables included in the propensity score model might be affected by the program or change over time, the propensity score model is re-estimated by excluding the education level of children and the wealth index. Third, we assess the impact of the SFP depending on whether the household is living in a county where the chronic food insecurity is high or low. The idea of this test is that, as food insecure areas are the areas where the largest number of households are treated, a larger program effect should be observed in these regions. On the contrary, in regions with low food insecurity, the effect of the program should be low or insignificant. To split the sample between counties with high and counties with low food insecurity, we resort to the Liberian 2006 Comprehensive Food Security and Nutrition Survey, in which z-scores and a cut-off of 40 percent are used. By this definition, nine counties out of sixteen, including Grand Monrovia, are classified as highly food insecure. These are Bong, Nimba, Bomi, Grand Bassa, River Cess, Sinoe, Grand Kru, Maryland, and River Gee. Table 3.8 shows that, when the age of the children is restricted to the interval 6–14, irrespective of the matching estimator, the impact of the SFP remains qualitatively unchanged. The treatment effect does not vary much across specifications, ranging between -0.15 and -0.17. Similarly, Table 3.9 shows that the results are robust to the changes made in the estimation of the propensity score model. Finally, Table 3.10 shows that, in counties where the level of food insecurity is high, the impact of the SFP is significantly greater. The treatment effect (-0.25) is also larger in absolute value than the main impact (-0.14) discussed earlier.

Table 3.8 – The SFP's effect on children aged between 6 and 14

	Nearest neighbor	Radius caliper	Kernel
SFP	**-0.161****	**-0.171*****	**-0.154*****
	(0.0818)	**(0.0635)**	**(0.0546)**
Observations	3.022	3.022	3.022
N_reps	100	100	100

Note : Standard errors are in parentheses.

*** 1% ; ** 5% ; * 10%. Bootstrapped standard errors with 100 replications.

Table 3.9 – The SFPs effect after a change in the specification of the propensity score model

	Nearest neighbor	Radius caliper	Kernel
SFP	**-0.216*****	**-0.161*****	**-0.175*****
	(0.0568)	**(0.0490)**	**(0.0430)**
Observations	3.464	3.464	3.464
N_reps	100	100	100

Note : Standard errors are in parentheses. *** 1% ; ** 5% ; * 10%.
Bootstrapped standard errors with 100 replications. Propensity score re-estimated by excluding the education level of children and the wealth index.

Table 3.10 – The SFP's effect according to food insecure areas

	Nearest neighbor		Radius caliper		Kernel	
	Food insecure=1	Food insecure=0	Food insecure=1	Food insecure=0	Food insecure=1	Food insecure=0
SFP	**-0.251*****	**-0.0452**	**-0.251*****	**-0.0506**	**-0.214*****	**-0.0378**
	(0.0879)	**(0.0882)**	**(0.0771)**	**(0.0633)**	**(0.0691)**	**(0.0587)**
Observations	1.387	2.074	1.387	2.074	1.387	2.074
N_reps	100	100	100	100	100	100

Note : Standard errors are in parentheses. *** 1% ; ** 5% ; * 10%. Bootstrapped standard errors with 100 replications.

6.4 Sensitivity analysis for the ATT

The conditional independent assumption (CIA) is not met if there are unobserved variables that affect assignment to the SFP and child labor simultaneously. In this sub-section, we assess the extent to which the inference about the program effects may be altered by the presence of an unobserved variable. To address this issue, we resort to the bounding approach proposed by Rosenbaum (2002) and use the Stata package *mhbounds* provided by Becker and Caliendo (2007). Specifically, let us assume that the probability of participating in the SFP is given by :

$$Psf_i = Psf(X_i, u_i) = Psf(SFP_i = 1|X_i, u_i) = F(\beta X_i + \gamma u_i)$$

where X_i are the observed characteristics for individual i, u_i is the unobserved variable, and γ is the effect of u_i on the participation decision. The study is free of hidden bias if the participation in the SFP is determined solely by the observables and $\gamma = 0$. In contrast, there is a hidden bias if two individuals with the same observable covariates have differing chances of receiving the school feeding program. If we denote the two individuals by subscripts i and j, and F is a logistic distribution, the odds ratio is given by :

$$\frac{Psf_i(1 - Psf_j)}{Psf_j(1 - Psf_i)} = \frac{exp(\beta X_i + \gamma u_i)}{exp(\beta X_j + \gamma u_j)} = exp[\gamma(u_i - u_j)]$$

There is no hidden bias if $\gamma = 0$ or $u_i = u_j$, implying a value of the odds ratio equal to one. To assess the effect of u on the ATT for different values of $exp[\gamma]$, Becker and Caliendo (2007) use the test by Mantel and Haenszel (1959). The test shows how strong the influence of the unobservables is before we can confidently not reject the null hypothesis that the effect of the SFP is actually zero. Table 3.11 presents the results of the Mantel and Haenszel (1959) bound test. According to these results, if we have underestimated the true treatment effect, the estimate of the program's impact remains credible even if an unobserved variable causes the odds of the treatment assignment to differ between the treatment and the control group by a scale of 2. Likewise, if we have overestimated the true treatment effect, Table 3.11 shows that the impact of the program remains significant even if the influence of unobserved factors increases by 1.3. Though the test does not provide evidence of the presence of a bias due to unobservables, a critical value of 1.4 clearly raises concerns about possible non-random selection on unobservables.

Table 3.11 – Sensitivity analysis

Gamma	Q_mh+	Q_mh-	p_mh+	p_mh-
1	4.62607	4.62607	1.9e-06	1.9e-06
1.1	3.5834	5.67454	.00017	7.0e-09
1.2	2.63303	6.63471	.004231	1.6e-11
1.3	1.76031	7.52195	.039178	2.7e-14
1.4	.953163	8.3473	.170254	0
1.5	.20214	9.11947	.419904	0
1.6	.408341	9.84545	.341512	0
1.7	1.0682	10.5309	.142715	0
1.8	1.69064	11.1806	.045453	0
1.9	2.27984	11.7984	.011309	0
2	2.83933	12.3877	.00226	0

Gamma	:	odds of differential assignment due to unobserved factors
Q_mh+	:	Mantel–Haenszel statistic (assumption : overestimation of the treatment effect)
Q_mh-	:	Mantel–Haenszel statistic (assumption : underestimation of the treatment effect)
p_mh+	:	significance level (assumption : overestimation of the treatment effect)
p_mh-	:	significance level (assumption : underestimation of the treatment effect)

7 CONCLUDING REMARKS

In the present study, attempts are made to assess the causal impact of an SFP on child labor in Liberia. Although SFPs play a significant role in school participation, little evidence is available concerning its impact on child labor. To fill this knowledge gap, this paper uses a sample of 3,561 children aged between 5 and 15 years, living in 1,749 households across 15 counties of Liberia. The results based on propensity score-matching techniques show that the SFP has a significant negative impact on the incidence of child labor. It is found that the school feeding intervention decreases the probability of working for the treated children by 14 percent compared with the matched control group members. This effect is robust to the use of various controls in the estimation of the propensity score model, an alternative measure of child labor, and different matching techniques. In addition, the analysis reveals that the SFP is mainly effective in reducing child labor for male children, children living in war-displaced households, and children living in households in which the head is literate. Overall, this study shows that the well-established effect of school feeding on school enrollment and learning is very likely to spill over to child labor in the case of Liberia. A potential explanation for this result is that the monetary value of school feeding is a sufficient incentive for households to give up the income that child labor may generate. Our test is limited in a number of ways. First, the available data do not allow us to distinguish clearly between the in-school feeding (school meal) and the take-home ration. The availability of this information would have helped to clarify the differentiated impacts of the program with respect to the children's gender. Likewise, we are not able to distinguish between the type of labor carried out by girls and that performed by boys. Despite these shortcomings, our analysis clearly indicates with reasonable confidence that the school feeding program may reduce child labor in Liberia. This effect is likely to reflect the fact that part of the income gap between the households in which children work and those in which children do not work is compensated for by the implicit transfer generated by the school feeding program. Therefore, a policy implication of our findings is that the monetary value of school feeding should be increased to compensate fully for the loss of income that the poorest households will face if they decide to give up child labor.

Conclusion Générale de la thèse

Les conflits civils en Afrique sub-saharienne déciment le capital humain nécessaire à la croissance et au développement économique. Ils ont des effets à court et à long terme notamment, la perte de vies humaines, la destruction d'infrastructures de toutes sortes, la destruction du capital social, la perturbation du fonctionnement institutionnel et le recul des progrès réalisés par les pays dans leur processus de développement. Les conflits civils affectent également les capacités productives des jeunes adultes ainsi que de leur ménage en raison de l'expansion de maladies et traumatismes qu'ils engendrent. Ces facteurs de morbidité compromettent la main-d'œuvre et affectent l'allocation des ressources au sein des ménages.

Malgré une vaste littérature microéconomique sur les déterminants des conflits civils et sur l'accumulation du capital humain en Afrique, très peu d'études ont été consacrées à la relation entre conflits civils, éducation et travail des enfants en Afrique Sub-Saharienne notamment en Côte d'Ivoire et au Libéria.

Cette thèse avait pour objectif de mieux comprendre l'influence des conflits civils sur la formation du capital humain dans les pays en développement. Nous avons ainsi essayé de démontrer, à l'aide de techniques diverses, les effets néfastes des conflits civils sur le développement à long terme dans un contexte africain. Cette thèse poursuivait deux objectifs : (1) déterminer les conséquences des conflits civils sur la formation du capital humain, et (2) évaluer l'efficacité d'une politique de transfert public sur la formation du capital en situation post conflit. Les études de cas réalisées permettent de répondre aux objectifs en expliquant d'une part, comment les conséquences des conflits civils modifient les décisions en matière d'éducation et comment ils affectent les performances scolaires d'autre part. Nous avons montré également comment la mise en œuvre d'un

programme d'alimentation scolaire, considéré comme une stratégie de transfert public, atténue les effets néfastes des conflits chez les ménages.

Le premier chapitre examinait l'effet des conflits civils sur la répartition du temps des enfants d'âge scolaire (10-14 ans) dans le cas de la Côte d'Ivoire. Plus précisément, il s'agissait de comprendre comment des ménages touchés par des conflits civils font des choix en matière d'éducation et de travail des enfants. A l'aide de données provenant de l'enquête du niveau de vie des ménages de 2008, nous avons abouti aux conclusions suivantes : (i) le temps des enfants d'âge scolaire obligatoire est alloué au travail au détriment de la scolarisation si ces derniers sont issus d'un ménage victime du conflit civil. En particulier, cette analyse a montré que la probabilité de travailler des enfants issus des ménages victimes du conflit civil augmente d'environ 14%. (ii) Ces choix sont modulés selon le genre et le lieu de résidence. En effet, les enfants de sexe masculin ont plus de chance d'être impliqués dans du travail hors ménage que ceux de sexe féminin. Toutefois, ces dernières sont plus impliquées dans les tâches domestiques à l'intérieur du ménage. Enfin, les enfants vivant en milieu urbain contribuent plus au travail des enfants que leurs homologues en milieu rural.

Dans le second chapitre, nous avons étudié l'impact des conflits civils sur les performances scolaires en Côte d'Ivoire. Cette étude visait à évaluer le niveau d'éducation atteint par les individus d'âge scolaire obligatoire au moment du conflit. Les données utilisées dans le cadre de ce chapitre sont les mêmes que le chapitre précédent. A l'aide d'une méthodologie basée sur l'estimation en doubles différences, les résultats ont suggéré que le niveau d'éducation moyen atteint par les enfants d'âge scolaire obligatoire au moment du conflit est moindre par rapport à celui des enfants du même âge mais non affectés par le conflit civil. Cette baisse s'évalue à environ une demie année d'éducation. En outre, les résultats ont révélé que cette réduction est plus importante pour les enfants de sexe masculin (ceux-ci perdent 1,25 années d'éducation par rapport aux enfants de sexe féminin), les enfants vivant en milieu rural et ceux dont le chef de ménage est alphabète.

Dans le dernier chapitre, l'analyse s'est focalisée sur l'impact d'un programme de transfert social considéré comme une stratégie d'atténuation des effets néfastes des conflits civils. Il s'agissait d'évaluer l'efficacité d'un programme d'alimentation scolaire sur la réduction du travail des enfants au Libéria. A partir de données issues de l'enquête sur les indicateurs de base de bien-être de 2007 et de l'utilisation de techniques d'appariement des scores de propension, les résultats obtenus ont permis de constater que le programme d'alimentation scolaire a eu un impact négatif et significatif sur l'incidence du travail des enfants. En particulier, l'intervention de ce programme a réduit entre 14 et 17% la probabilité que les enfants travaillent. Cette réduction est plus importante pour les

enfants de sexe masculin, les enfants vivant dans des ménages déplacés par la guerre et pour les enfants vivant dans des ménages dont le chef est alphabète. Dans l'ensemble, ce chapitre a permis de mettre en évidence les externalités positives d'un programme d'alimentation scolaire. En effet, l'objectif premier d'un tel programme étant d'encourager la scolarisation et l'apprentissage, cette étude a montré qu'il pouvait aussi contribuer à la réduction du travail des enfants dans le cas du Libéria.

Ces trois chapitres aboutissent à des conclusions spécifiques propres à leur contexte particulier. Cependant, il est possible de les synthétiser pour en faire émerger des recommandations. Les personnes victimes de conflits civils en sortent avec l'espoir et l'ambition d'un avenir meilleur. Ils attendent par conséquent, des résultats rapides de la part des autorités et décideurs publics. Étant donné le compromis important entre éducation et travail des enfants induit par la situation de conflit, les décideurs publics devraient concevoir des mesures visant à réduire l'abandon scolaire précoce et faire la promotion de l'éducation. Cela passe par la suppression des frais de scolarité, l'apport de soutien aux initiatives communautaires, la mise en place de possibilité d'accès à un apprentissage accéléré. De plus, la mise en place de programmes de subventions conditionnelles pour la fréquentation scolaire et des possibilités d'emploi pour les ménages les plus affectés réduirait la participation des enfants au travail et le risque d'abandon scolaire des enfants. En raison de l'effet négatif des conflits civils sur les performances scolaires, les décideurs publics devraient identifier les personnes qui étaient d'âge scolaire obligatoire pendant la période de conflit et concevoir des programmes spéciaux leur permettant d'atteindre le niveau d'éducation qu'ils auraient eu en absence du conflit civil. Favoriser la construction de nouvelles infrastructures scolaires et encourager le retour du personnel enseignant et soignant (les médecins) dans les zones les plus affectés par le conflit afin d'alléger la pression sur les infrastructures sociales des zones non affectées.

Annexe A

Appendix

1 Descriptive statistic of child labor

Table A.1 – Children status in working

Status of the child at work	*Proportion in percentage*	*Observation*
Paid work	10.64	255
Unpaid family worker	89.36	2,142
Who makes the decision on child labour	*Proportion in percentage*	*Observation*
The parents and person other than the parent	84.34	1,605
The child himself	15.66	298

Source : Authors' calculation based on ENV-2008

Table A.2 – Children status in school

Type of education	*Proportion in percentage*	*Observation*
Classic education	96.92	3,928
Non-classic education	3.08	125
The type of school	*Proportion in percentage*	*Observation*
Public school	87.46	3,543
Private school	11.80	478
Other school	0.74	30

Source : Authors' calculation based on ENV-2008

Annexe B

Appendix

1 Multiple component analysis results

Using Multiples Analysis Components (MCA) method due to the binary form of responses (coded 0 or 1), analysis is made from a complete disjunctive table allowing to extract two dimensions and display output in compact form (the indicator matrix approach). We therefore performed a MCA with $Q = 10$ variables and the question is how many axes to retain in order to adequately describe conflict exposure. According to Abdi and Valentin (2007), MCA codes data by creating several binary columns for each variable with the constraint that one and only one of the columns gets the value 1. This approach allows creates artificial additional dimensions because one categorical variable is coded with several columns, causing artificially inflated variance. As a consequence, the percentage of inertia (i.e., variance) explained by the first dimension is severely underestimated. Usually, given the nature of the data, the inertia carried by the first axes are weak. In case such as this, it is suggested to resort to Benzécri's correction. Following Benzécri (1979) we discriminate keeping only the eigenvalues which are greater than the average eigenvalue $\gamma_m = 1/Q = 0.10$. This method leads us to retain only the first dimension. Using the first component, we obtain our conflict-victimisation index.

Table B.1 – *Eigen value and cumulative relative frequencies*

	Original values		Benzecri correction	
Axis	Principal inertia λ_h	Percent explained	Principal inertia λ'_h	Percent explained
1	0.3639695	36.40	0.7107471	99.71
2	0.1215098	12.15	0.00287781	0.29
3	0.1111263	11.11		
4	0.0851542	8.52		
5	0.0730025	7.30		
6	0.0724626	7.25		
7	0.0660608	6.61		
8	0.0603408	6.03		
9	0.0454722	4.55		
10	0.0009013	0.09		

Source : From ENV-2008. All variables take on a value of zero and one

Table B.2 – War-related experiences at the household level

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**
Forced to flee	0.205	0.404	0	1
Income dropped	0.684	0.465	0	1
Property destroyed	0.115	0.319	0	1
Lost ownership	0.113	0.316	0	1
Displaced	0.100	0.300	0	1
Host displaced	0.128	0.334	0	1
health impaired	0.342	0.474	0	1
Death recorded	0.161	0.368	0	1
Victim of crisis	0.626	0.484	0	1
Victim of violence	0.159	0.366	0	1

Source : Computed from ENV 2008

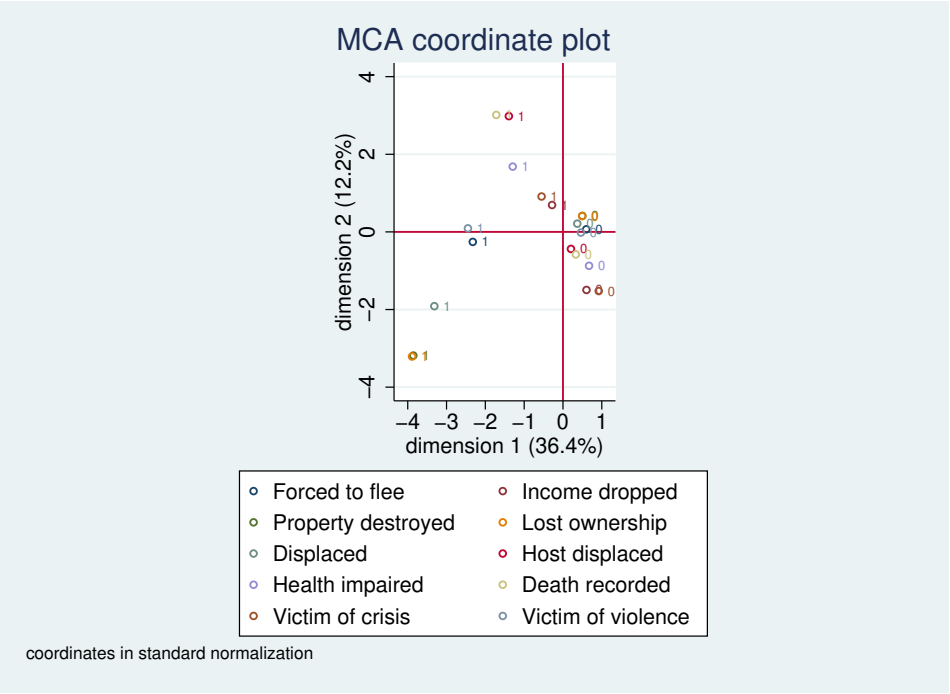

Figure B.1 – MCA dimensions projection plot

2 Administrative maps of the countries studied

Figure B.2 – The administrative regions of Côte d'Ivoire between 2002-2008. Source : United Nations map

Figure B.3 – The administrative regions of Liberia. Source : United Nations map

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Résumé de la Thèse

Au vu de l'importance de leurs effets néfastes sur la croissance économique, les guerres civiles sont qualifiées de processus de « développement à rebours » (Collier et al., 2003). Ce constat est particulièrement vrai pour les pays en voie de développement en raison de leur vulnérabilité économique. Les impacts des conflits sont particulièrement importants et prolongés lorsqu'ils affectent le processus d'accumulation du capital humain, facteur clé du développement économique à long terme. Selon les évaluations internationales, les pays touchés par un confli civil sont ceux qui se retrouvent régulièrement en fin de liste dans les progrès en matière d'éducation.

En dépit des progrès réalisés ces dernières années, l'Afrique fait face à d'énormes difficultés dans le domaine de l'éducation en raison de la prévalence élevée des conflits civils. Le deuxième objectif du Millénaire pour le développement (OMD), l'éducation primaire universelle, en termes de taux de scolarisation et de performances scolaires, est souvent mis à mal lorsque les pays sont touchés par des conflits armés internes. Ces derniers accentuent la pauvreté existante et réduisent les capacités d'adaptation de la population civile à faire face à la situation de conflit civil.

Cette thèse a pour objectif, d'une part, de déterminer les conséquences des conflits civils sur la formation du capital humain et, d'autre part, d'évaluer l'efficacité d'une politique de transfert public sur la formation du capital en situation post conflit. Elle s'articule autour de trois chapitres.

Le premier chapitre traite de l'effet des conflits civils sur la répartition du temps des enfants d'âge scolaire (10-14 ans) dans le cas de la Côte d'Ivoire. Spécifiquement, il s'agit de comprendre, comment les ménages victimes de conflit civil font leurs choix en matière de scolarisation et de travail des enfants. Les données utilisées proviennent de l'enquête du niveau de vie des ménages de 2008 réalisée par l'Institut National de la Statistique (INS) et la Banque Mondiale. A partir d'une approche économétrique tenant compte de l'interdépendance des deux formes d'allocation du temps (scolarisation et travail des enfants), nos résultats montrent que le temps des enfants d'âge scolaire est principalement alloué au travail au détriment de la scolarisation si ces derniers sont issus d'un ménage affecté par le conflit civil. Nos résultats montrent également que ce choix des ménages est fonction du genre et du milieu de résidence. En effet, les enfants de sexe masculin ont plus de chance d'être impliqués dans du travail hors ménage que ceux de sexe féminin. Ces dernières sont davantage impliquées dans les tâches domestiques à l'intérieur du ménage. Enfin, les

enfants des milieux urbains contribuent plus au travail des enfants que leurs homologues du milieu rural. La conclusion principale de ce chapitre est qu'en situation de conflit violent, l'allocation du temps des enfants est soumise à un compromis important entre l'école et le travail.

Le second chapitre est consacré à l'évaluation des conséquences du conflit civil sur les performances scolaires en Côte d'Ivoire. A partir des mêmes données et en considérant le statut de victime du ménage, l'objectif de ce chapitre est d'évaluer le niveau d'éducation atteint par les individus d'âge scolaire obligatoire au moment du conflit. A partir d'une spécification basée sur la méthode de la double différence, les résultats révèlent que le niveau d'éducation moyen atteint par les enfants d'âge scolaire obligatoire au moment du conflit est moindre que celui des enfants du même âge mais non affecté par le conflit civil. Cette baisse est plus importante pour les individus de sexe masculin, les individus vivant en milieu rural et ceux vivant dans dont le chef de ménage est alphabète.

Le dernier chapitre de cette thèse analyse dans le cas du Libéria, l'effet d'une politique de transfert social sur la formation du capital humain. Il s'agit de comprendre comment un programme d'alimentation scolaire assimilable à une politique de transfert public peut contribuer à réduire le recours au travail des enfants. Les données utilisées dans ce chapitre proviennent de l'enquête de 2007 sur les indicateurs de base du bien-être social au Libéria. A partir de techniques d'appariement, les résultats obtenus permettent de constater que le programme d'alimentation scolaire au Libéria réduit le recours au travail des enfants. Ce programme est particulièrement efficace pour réduire le travail des enfants de sexe masculin, des enfants vivant dans des ménages déplacés par la guerre et des enfants vivant dans des ménages dont le chef est alphabète. La principale conclusion de ce chapitre est que l'effet néfaste des conflits civils sur la formation du capital humain peut être atténué par des transferts sociaux.

Mots clés : Conflit civil, Guerre civile, Capital humain, Éducation, Travail des enfants, Côte d'Ivoire, Libéria, Afrique Sub-Saharienne.

Summary of the thesis

Given the importance of their negative effects on economic growth, civil wars are described as the "development in reverse" (Collier et al., 2003). This is especially true for developing countries because of their economic vulnerability. Conflict impacts are particularly significant and protracted when they affect the process of human capital accumulation, a key driver of long-run economic development. According to international assessments, countries affected by civil conflict are those that regularly rank at the bottom of the list in terms of educational progress. Despite the progress made in recent years, Africa faces enormous challenges in the field of education due to the high prevalence of civil conflict in this part of the world. The second Millennium Development Goal (MDG), universal primary education, in terms of both enrollment and school performances, is often derailed when countries are affected by internal armed conflicts. The latter worsen existing poverty and reduce the civilian populations' abilities to adapt to the civil conflict situation. The objective of this thesis is to determine the consequences of civil conflicts on human capital formation on the one hand and to evaluate the effectiveness of a public transfer policy on capital formation in post-conflict situation on the other. It is organized around three chapters. The first chapter deals with the effect of civil conflict on the children's time allocation of school-age children (aged 10-14) in the case of Côte d'Ivoire. Specifically, it is to understand how households affected by civil conflict make choices about schooling and child labor. The data used here come from the 2008 household standard of living survey conducted by the National Statistical Institute (NSI) and the World Bank. Using an econometric approach that considers the interdependence of the two forms of time allocation (schooling and child labor), results of this chapter reveal that school-age children's time is mainly allocated to work at the expense of schooling if they are living in a household affected by civil conflict. Our results also point out that these choices are linked to gender and place of residence. Indeed, male children are more likely to be involved in work outside the household than female children. The latter are more involved in domestic tasks within the household. Finally, children living in urban areas contribute more to child labor than their rural counterparts. The main conclusion of this chapter is that in situations of violent conflict, the allocation of children's time is subject to a high degree of a trade-off between school and work. The second chapter investigates the consequences of civils conflicts on school performances in the case of Côte d'Ivoire. Using the same data and considering the victim status of the household, the

objective of this chapter is to assess the level of education attained by individuals of compulsory school age. Using the same data and taking into account the victim status of the household, the objective of this chapter is to assess the level of education attained by children of compulsory school age. Through a difference-in-difference specification, we find that the average level of education attained by children of compulsory school age at the time of the conflict decreases compared to their counterparts of the same age but not affected by the civil conflict. In addition, this decline is more significant for male individuals, individuals living in rural areas and those living in poor households. The last chapter of this thesis analyzes in the case of Liberia, the impact of a social transfer policy on human capital formation. This is to understand how a school feeding program similar to a public transfer policy can help to reduce the use of child labor. The data used in this chapter come from the 2007 Liberia Core Welfare Indicators Survey. Using propensity score matching techniques, we find that the school feeding program in Liberia reduces the incentive for child labor. This program is particularly effective in reducing the work of male children, children living in war-displaced households, and children living in literate households. The main finding of this study is that, public social transfers can help to mitigate the adverse effect of civil conflicts on human capital formation.

Keywords: Civil conflict, Civil war, Human capital, Education, Child labor, Côte d'Ivoire, Liberia, Sub-Saharan Africa.