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## Redistributive impacts of civil war: The case of Côte d'Ivoire

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# LIS

## Working Paper Series

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### Redistributive Impacts of Civil War: The Case of Côte d'Ivoire

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# **Redistributive impacts of civil war: The case of Côte d'Ivoire**

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## **Abstract**

Many of the world's LDCs are plagued by recurring conflict. Conflict impedes sustainable development through various channels, creating conditions conducive to further conflict. Conflict has redistributive impacts, particularly when it erupts in resource-rich countries. Between 2002 and 2011, Côte d'Ivoire faced off two spells of civil war (2002–2007 and 2010–2011) along geographic, religious, ethno-linguistic and economic lines. Poverty and inequality rose throughout the decade. We investigate how the civil war and the associated changes in the political balance impinged on the economic performance of the affected geographic/ religious/ ethnic groups at various income deciles. Growth incidence curves before–after conflict illustrate the income changes experienced by the respective socioeconomic groups. Accounting for distortions due to individual selection and general-equilibrium spillovers, unconditional quantile regressions fitted by the means of a recentered influence function are used to isolate between-group gaps in household incomes attributable to conflict. The results on microdata from three Household Living Standards Surveys (2002, 2008 and 2015) confirm that as the political tide shifted, the economic fortunes of the affected groups turned. Previously marginalized communities – the northern, Gour and Mandé ethnic, and non-Christian groups – have bridged some of their disadvantage in terms of their endowments and the market returns on them. These changes are clearest in the upper half of the income spectrum, leading to profound changes in social order.

*Keywords:* Conflict and inequality; civil war; income gap decomposition; growth incidence curve; recentered influence function, unconditional quantile regression; Côte d'Ivoire; Luxembourg Income Study.

*LIS keywords:* Income distribution; redistribution; ethnicity; politics.

*JEL Classification:* D74, D31, D63, N37, O55.

## I. Introduction

Many of the world's LDCs, not least in the Sahel, are plagued by prolonged or recurring conflict. Conflict impedes their sustainable development through various channels, and creates conditions potentially conducive to further conflict. Resource-rich countries are not immune to conflict; on the contrary, access to and control of natural resources often forms a distinct dimension of conflict. Conflict has a redistributive impact, as the brunt of violence and the social changes it brings typically fall differently on different social and economic groups, and as the control over countries' resources changes hands. The incidence of losses and gains can change across subsequent spells of conflict, as different groups intermittently prevail and gain control, and as the facets and directions of conflict evolve.

Understanding the incidence of the burden of conflict across the society is crucial for any war-recovery, poverty-alleviation, and long-term developmental strategies, not least because appropriate scaling and targeting of the associated mitigation programs can avert further outbreaks of conflict. This is crucial in resource-rich countries, where effective, equitable and sustainable management of resources must take into account conflict prevention, mitigation and relief.

A case in point is Côte d'Ivoire, a country endowed with ample mineral and biological resources, and at the same time beset with similar socioeconomic challenges and deprivations as the world's LDCs. Between 2002 and 2011 the country fought two civil wars along what can be labeled as geographic, religious, ethnic/racial and even economic lines. Civil conflict arose from alleged economic mistreatment of one group by another and an inequitable regime of access to public resources. The conflict then fed on itself. It resulted in severe losses on both opposing sides, even when one party intermittently prevailed over the other to rule the country. The conflict also resulted in a lost decade for the national economy, as the country's resources were destroyed or lay bare, and investors, traders and qualified workers stayed away. GDP per capita fell during the two spells of civil war. Various macroeconomic indicators show a contraction or stagnation around the years 2002–2007 and 2010–2011. Figure 1 (and Figure A1 in the appendix) shows that domestic output per capita, exports and foreign direct investment declined in much of the decade, and labor force participation stagnated or slightly lost ground. Unemployment rate rose. Figure 2 also shows that inequality as measured by the Gini index rose throughout the decade, and poverty rate and depth according to various definitions also picked up, suggesting that material harms may have been concentrated at the bottom of the economic distribution, while recovery may have favored those higher up the distribution (Cogneau et al. 2017).

This study investigates how the two spells of civil war and the associated changes in the political balance affected the economic performance of various socioeconomic groups. The study's significance derives from its use of up-to-date high-quality survey microdata to study the incidence of burdens of conflict in Sahel, and by extension in Sub-Saharan Africa. The study's empirical contribution is to isolate numerically the income effects due to conflict from those due to individual selection and to general-equilibrium spillovers, and to estimate them across different income quantiles. This investigation is crucial to understanding the historical development in many conflict-affected LDCs, and to designing well-targeted welfare programs that can help alleviate suffering and, just maybe, prevent the relapse of conflict in war-torn countries.

The rest of the study is organized as follows. The next section outlines the recent history of Côte d'Ivoire and the country's current economic outlook. Section III introduces our conceptualization and empirical strategy in relation to the available data. Section IV presents the main results, and Section V discusses their implications for policymakers and international donors, and concludes.

## II. Background

Côte d'Ivoire encompasses over two-thirds of the mineral-rich Birimian Greenstone Belt stretching from Senegal to Ghana, and is rich in the deposits of gold, diamonds, iron, zinc, cobalt, nickel, manganese, and clay. Significant oil and natural gas reserves also lie off its coast. Nevertheless, these mineral resources are presently largely untapped, in part due to lack of foreign direct investment amid political uncertainties. Instead, Côte d'Ivoire continues to rely on its biological resources, namely the production of cocoa beans, coffee, palm oil, silica and other commodities for its national income and exports. Farming has historically been the main source of rural households' livelihood subject to the associated precariousness and usurpation by authorities and dominant groups (Deaton 1992; Merrill and DiCampo 2012).

Population of Côte d'Ivoire covers 60 ethnicities and 78 languages (Lewis 2009) that can be divided into 4 major groups: Akan, Krou, Gour and Mandé. Mandé peoples are the most prevalent in the northwest and north-center, Gour in the northeast, Krou in the southwest and south-center, and Akan in the southeast. The north is also notably the home to ethnic groups common with the neighboring Burkina Faso and Mali, such as the Mandinka and Burkinabé groups. These northern ethnic groups often face discrimination from southern, capital-area dominant groups, which sometimes boils over into violent conflict.

### *History of violence*

The civil war spanning the years 2002–2011 pitted a predominantly Christian, Krou and Akan-ethnicity population in the privileged southern coastal region, against a coalition of largely Muslim, Mandé and Gour-ethnicity rural farmers, and to some degree migrant/nomadic population in the north that has historically been politically and economically disenfranchised (Sackey and Dexia 2021). The southern group held on to political power during 2000–2002, pursuing ultra-nationalist politics dubbed *ivoirité* (Kone 2020). Meanwhile, deprivation, lack of opportunities and discrimination among the northern groups compelled them to tout their grievances publicly and to rebel. Civil war followed. The first spell of the war, during 2002–2007, was fought between the incumbent president Laurent Gbagbo (in power since 2000), representing the largely Christian south, and the rebel Forces Nouvelles de Côte d'Ivoire (FNCI) from the Muslim north. The FNCI held grievances over discrimination and disenfranchisement by the group in power. By 2004 the country became effectively divided between the rebel-held north and the government-held south, and tensions persisted until the incumbent president agreed in 2007 to hold a new presidential election. This marked a limited victory for the northern coalition, although the election would not take place until 2010. The Mandé-ethnic *dozo* warriors paraded around the country to boast of their prowess, even though gradually they became socially marginalized by civic society and had to cede territory and access to strategic areas (Heitz-Tokpa 2019).

In the meantime, Gbagbo held on to restricted power. In 2010, a heated election was fought between Gbagbo, and Alassane Ouattara representing a coalition of ethnic and regional interests (Bassett 2011). The Independent Electoral Commission (CEI) of Côte d'Ivoire declared Ouattara to be the new president, but the Ivorian Constitutional Council declared the results to be invalid, and ruled for Gbagbo. In December, both candidates assumed presidency, as the incumbent Gbagbo refused to cede power, triggering a political crisis and the second spell of civil strife. Over the following months, army forces and militias loyal to Gbagbo clashed with Ouattara's supporters including United Nations and French peacekeeping forces in what has been dubbed Gbagbo's *war of second independence* (Piccolino 2012). The civil war led to substantial damages to towns, outflow of refugees, and around 3,000 casualties, including infamous massacres in Bloléquin and Duekoue towns. Human rights violations were reported on both sides. The war ended with the arrest of Gbagbo and the installation of Ouattara to presidency in April 2011. This marked the ascendance of the northern coalition in the country's political and economic power structure.

### *Economic distribution in Côte d'Ivoire today*

Following the two civil wars and a timid, uneven recovery from them, Ivory Coast remains a lower middle-income country, with high poverty rate and an elevated degree of inequality (Cogneau et al. 2017; Czajka 2020). Throughout the 2010s, moderate poverty afflicted over one-half of the population, and extreme poverty afflicted one-third.<sup>1</sup> The Gini coefficient of inequality has been moderately high at 39–43%.

The government's fiscal system features a limited public redistribution program, and appears to be unequalizing and even anti-poor. Fiscal incidence studies estimated that, in 2015, 50.6% of the population fell under the \$3.20 (2011 USD PPP) poverty line in terms of the pre-fiscal interventions income, and the share rose to 52.7% in terms of post-fiscal incomes when distortionary taxes were accounted for. Under the \$1.9 severe poverty line, the comparable rates were 21.2% pre-fiscal and 22.9% post-fiscal. The public support rates are below even the low levels in Sub-Saharan Africa (Lustig et al. 2019). Government operates essentially no transfer programs except energy subsidies, which tend to accrue to the richest 10% of the population (Tassot and Jellema 2019).

These trends suggest that, even in the post-conflict years, economic conditions in Côte d'Ivoire have not exhibited prosperity and inclusiveness of all social groups. Understanding how the country got to this state, and how this agrees with theoretical predictions, is the aim of the following empirical analysis.

### **III. Research design**

This study evaluates the distributional impacts of civil war in the Ivoirian context, by tracking the trends in economic fortunes of various socioeconomic groups in Côte d'Ivoire between 2002, 2008 and 2015. Political science postulates that the spoils of war – benefits from a victory in conflict or in the political process – may accrue most to the winning coalition of the politically connected and economic elites, while the losses from a defeat are harder to allocate, and may accrue to the poorest

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<sup>1</sup> Refer to Figure 2 based on the World Bank (2023) data. Year 2018 shows remarkable improvement over preceding years, which is difficult to explain, except by sampling or measurement differences.

and the marginalized, or across the entire socioeconomic spectrum. Damages may be meted out either 1) by the victors as retribution and a blow to the most vocal empowered opponents representing a future threat; or 2) by both sides of the conflict, as collateral damage inflicted on the most marginalized groups. These alternative views of redistributive impacts have implications for our predictions of the incidence of burdens, and inequality, on all sides of the conflict. They lead to two sets of alternative testable hypotheses:

*H1: Following a spell of civil war, (horizontal) welfare gaps become most prominent at the top of the economic distribution between the winning and the losing sides, while at lower quantiles the between-group welfare gaps are not affected by civil war.*

*H1a: Civil war may reduce the (vertical) interquantile welfare gaps between those economically privileged and those disadvantaged, as the most serious harms are inflicted between the warring elites. The losses of the losing elites exceed the gains to the winning elites.*

Alternatively,

*H2: The collateral damages inflicted by civil war at lower quantiles – particularly of the losing side – may increase the between-group welfare gaps between the winning and the losing groups.*

*H2a: The collateral damages increase the interquantile welfare gaps between those more-versus-less advantaged.*

In relation to the Ivorian case, these hypotheses lead to specific predictions about the changes in interquantile income gaps, and changes in between-group income gaps at lower versus higher quantiles, over the spells of years 2002–2008 and 2008–2015. Hypotheses 1 and 1a predict that between 2002 and 2008, the interquantile income gaps may have decreased, while the between-group gaps between the winning (i.e., northern, Mandé/Gour, non-Christian) and losing (southern, Krou/Akan, Christian) coalitions increased particularly at higher income quantiles. Alternatively, Hypotheses 2 and 2a predict that between 2002 and 2008, the interquantile income gaps increased, and the between-group gaps between the winning and losing groups increased particularly at lower income quantiles.

Between 2008 and 2015, when election-related violence failed to overturn the pro-north outcome and led to cementing of the northerners' rule, hypotheses 1 and 1a make the same predictions as before: the interquantile income gaps may have decreased, while the between-group gaps between the winning and losing groups increased, particularly so at higher income quantiles. Alternatively, Hypotheses 2 and 2a posit that the interquantile income gaps increased, and the between-group gaps between the winning and losing groups increased particularly at lower income quantiles.

These hypotheses can be evaluated quasi-experimentally in an event study using suitable microdata and appropriate multivariate estimation techniques. The survey instruments and estimators used are described next.

*Data*

The analysis relies primarily on microdata from three waves of a household income survey for years 2002, 2008 and 2015, a single source of data harmonized and distributed by Luxembourg Income Study.<sup>2</sup> The three waves of the Survey on Households' Living Standards (SHLS, *Enquête sur le Niveau de Vie des Ménages*; INS 2015) cover years when the political situation in Côte d'Ivoire was tense but relatively stable – before the outburst of violence in September 2002, following the peace agreement of March 2007, and following the eventual power transition in April 2011.

Between the times of the three surveys, interestingly, the power structure in Côte d'Ivoire turned from favoring one major population bloc in terms of region, ethnicity and religion in 2002, to quasi-parity between population groups by 2008, to even favoring the opposing group by 2015. The two respective groups transitioned from being clearly privileged to becoming nearly on par with the other group, or from being disadvantaged to catching up. We investigate the changing fortunes of the two groups between subsequent spells of conflict, and the distributive impacts across socioeconomic lines.

The 2002–2015 waves of the SHLS have only recently been harmonized and made available publicly, and have not, to our knowledge, been used in development research. These primary survey waves are supplemented with non-harmonized data from the 2018 wave of the SHLS provided by the World Bank and the National Institute of Statistics (INS 2021). The joint use of microdata from the three survey waves (supplemented with the newest year-2018 data) is an important contribution of this study.

The SHLSs are large-sample, nationally representative surveys of high quality, and are informative of the demographic composition of Ivorian society (Ainsworth and Munoz 2003). SHLSs contain key variables for the study of distributional impacts of economic shocks such as an episode of civil war. Income effects in SHLS data can be disaggregated by preexisting income quantile, geography (north/south)<sup>3</sup>, character of residence (rural/urban, farm/non-farm), household composition and family status (female/male headed, non-married/married).

The household characteristics available in the SHLSs are valuable as criteria for delineating population groups subject to differential impacts of a spell of civil war between 2002 and 2008/2011. For illustration, the 2015 wave covers 47,635 individuals in 12,128 households, of which 12,100 households have full non-missing information and can be used in analysis. Refer to Table 1, left panel. Across all survey waves, 66-68% of Ivorian households reside in the southern region, 44-52% reside in urban areas, and 35-53% engage in farming. The share of households engaged in farming declined markedly between 2008 and 2015, on account of trends such as land deterioration, and conglomeration in the cocoa and coffee supply chains (Merckaert 2021). 81-83% are headed by a male, and 56-63% have a household head who is married. In relation to our analysis, the Akan and Krou (traditionally privileged) ethnic groups made up 37% of population during 2008–2015 (down from 43% in 2002), and Christian believers made up 36% (down from 38% in 2002).

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<sup>2</sup> Data are available from LIS's LISSY remote-execution system: [www.lisdatacenter.org/data-access/lissy/](http://www.lisdatacenter.org/data-access/lissy/).

<sup>3</sup> SHLSs allow disaggregation into 14 regions (but this is not undertaken here): Abidjan Autonomous District, Haut-Sassandra, Poro, Gbeke, Indenie-Djuablin, Tonkpi, Yamoussoukro Autonomous District, Gontougo, San-Pedro, Kabadougou, N'zi, Worodougou, Loh-Djiboua and Agneby-Tiassa.



These social groups are not represented equally across national income strata, and the representation has evolved over time. Northern, Muslim, rural, farming and non-employed households have been significantly more prevalent among lower income groups, and households that identify as non-married, female-headed, and Mandé/Gour have also been somewhat more prevalent among the poor. (Refer to Tables A1–A3 and Figures A2–A3 in the appendix.) Workers in the south earned on average 59% more than those in the north in 2002, and the gap remained at 38% in 2015. Akan/Krou workers earned 33% more on average than the Mandé/Gour, but the gap vanished by 2015. Similarly, Christian workers out-earned non-Christians by 49% in 2002, but this shrank to 13% by 2015 (Table 1, right panel). In general, across most social splits, the between-group income gaps, and broadly inequalities, stagnated between 2002 and 2008, and then diminished by 2015, most notably for the North–South, Muslim–Christian and farm–non-farm divides. Income gaps in 2015 only increased between households with female versus male, and non-employed versus employed heads, and essentially stagnated between Mandé/Gour versus Akan/Krou groups.

In relation to the central hypotheses in this study, evidence in Table 1 (and Tables A1–A2) shows that the regional, ethnic and religious gaps (north vs. south, Mandé/Gour vs Akan/ Krou, and Muslim/Christian) diminished across the entire period 2002–2015, offering preliminary confirmation that, as the economically disadvantaged groups prevailed in the political arena, they managed to partially close the income gaps against the previously privileged groups.

Regarding income gaps within social groups (refer to Tables A1–A2 in the appendix), inequality increased among the northern and the non-Christian groups during the entire time window 2002–2015, while for the Mandé/Gour group it abated. The previously privileged communities – southern, Akan/Krou, Christian groups – saw a decrease in inequality during the overall period 2002–2015, with some variations between the trends during 2002–2008 and 2008–2015.<sup>4</sup> These observations broadly suggest that the economic fortune became less widely dispersed on the losing side of the conflict, and more widely dispersed on the winning side, touching on the prediction in hypothesis H1a.<sup>5</sup>

Hence, the descriptive statistics reported in this section are valuable for validating the hypothesized treatment and comparator groups. In light of these stylized facts regarding the turning economic wave among selected social and income groups across 2002, 2008 and 2015, the following subsections delineate our strategy for identifying the redistributive impacts of the two spells of civil war (2002–2007 and 2010–2011).

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<sup>4</sup> While the Akan/Krou experienced an increase in inequality during 2002–2008, the southern and Christian groups saw a decline in inequality among the lower eight deciles during the same time, and an increase only among the top two deciles. The top deciles among the various social groups witnessed mixed trends.

<sup>5</sup> It also incidentally shows some convergence in the within-group inequalities between the privileged and disadvantaged groups, for an overall stagnation in the national Gini coefficient for income (mirroring the evidence in Figure 2).

Additional evidence comes from the quantile incomes estimated in the regressions. The top rows in Tables A4–A6 partially confirm the trends in incomes of the groups on the winning versus losing side of the conflict, at higher versus lower income quantiles. Between 2002 and 2015, the (vertical) income dispersion among northern residents increased, while it fell among southern residents. The (vertical) income dispersion among the Mandé and Gour, and among the Akan and Krou (as well as among Muslims and Christians) essentially stagnated.

### *Estimation approach*

The availability of multiple survey waves, and the pooled cross-sectional data setup, allow us to perform a before–after analysis. To assess income growth incidence and the degree of ‘pro marginalized-groups’ and ‘pro poorness’ of development over time, our first approach is to estimate growth incidence curves (GIC) for the pairs of respective social groups. This may be interpreted as a quasi difference-in-difference (DID) analysis of the effects of the political-economy shock on the most affected social and income groups. GICs rely on pairs of surveys before, in the midst or after the span of conflict, documenting the annualized percentage income changes experienced by the respective social groups at respective income quantiles (Ravallion and Chen 2003).

One issue with the estimated income gaps is that sample selection between the respective groups distorts what can be attributed to the outcome of conflict: The groups experiencing the brunt of conflict and the control groups differ in their endowment of market-valued characteristics, affecting their counterfactual baseline incomes. The observed differences in income should thus be decomposed into such endowment (or ‘explained’) effects, and the market-returns (‘unexplained’) effects that could be attributed to the current balance in the conflict. Another issue with the observed income gaps is that they do not lend themselves to inference: if we switched individuals from a privileged to disadvantaged status, the nature of income gaps (and social grievances and indeed the outcome of conflict!) would change due to the general-equilibrium effects, and the individuals’ new incomes would not follow the naïve *ceteris-paribus* predictions.<sup>6</sup> Proper estimation should take these issues into account. Hence, as our second and main empirical approach, we use unconditional quantile regressions applied to an appropriately recentered influence function to isolate the systematic between-group differentials in individuals’ labor-market returns that can be attributed to the conflict, conditional on the individuals’ endowments.

While causal relationships cannot be drawn perfectly, our study describes the association between the contemporaneous political developments, and the earnings distributions of the winning and the losing sides of conflict, controlling for the groups’ social compositions. Because the gains of political victories are thought to accrue to political and economic elites, while losses may be borne by the opponent elites (hypothesis 1) or by the poorest groups (hypothesis 2), we estimate the differential exposure to the political risks by households in various parts of the income distribution. The following subsection elaborates on our application of the unconditional quantile regressions.

### *Unconditional quantile regressions*

Income inequality across pairs of social groups was traditionally gauged by analyzing between-group income differentials around the mean of an income distribution. More recently it has been recognized that the income gaps vary markedly between lower and upper ends of countries’ income distributions. Understanding the income differentials among the bottom and top income

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<sup>6</sup> For instance, changes in the distribution of treatment variables in the population – say, North–South displacement, urbanization rate, prevalence of farming in the population, or gender ratio – could induce general equilibrium effects on the *conditional* income distributions of the respective population groups.

households is important because of their implications for economic polarization, poverty depth, and growth incidence.

Income gaps are also known to be caused by different factors – by differentials in the respective groups’ endowments, and by differentials in the returns to those endowments and other unmeasured factors between the two groups (Blinder 1973; Oaxaca 1973). The endowment effect is the “explained” part of the income gaps associated with the typical differences in the market-valued endowments between the two groups, such as work experience, education, employment type, and residence near employers and markets. An “unexplained” part of the income gap is related to some latent circumstances (interacting with the groups’ stock of endowments, or not) of the privileged versus disadvantaged groups, here interpreted as the impact of the outcome of conflict.

Quantile regressions distinguishing the explained and unexplained income differentials have been the estimator of choice in labor-economic and development literature. Nevertheless, this estimator has at least two shortcomings when it comes to inference. In the exercise of counterfactually switching individuals’ treatment status, the projected income changes are based on the unreasonable assumptions that the individuals remain on the same rank in the (conditional) income distribution, and that the (conditional) income distributions remain unchanged. Hence, sectoral adjustments and general-equilibrium effects are assumed away.

A novel practical solution involves the estimation of a recentered influence function (RIF), on which the quantile regressions can be performed (unconditionally) (Firpo *et al.* 2009). The RIF technique is a regression-based procedure facilitating decomposition of different distributional statistics across the unconditional distribution of income. This technique requires estimating the conditional distributions of income on covariates only at one point of the overall distribution without imposing ex-ante whether a conjectured treatment effect is in favor of either group (Fournier and Koske 2012). The RIF approach is used in this paper to decompose the overall income distribution by individuals’ south/north residence, Mandé–Gour/Akan–Krou ethnicity, and non-Christian/Christian religion (rural/urban residence, engagement in farming activities or not, female/male and non-married/married headship, are also considered in the appendix as additional social partitions along which conflict showed itself).

The approach consists of two stages: estimating the unconditional quantile regressions (UQR) on the incomes of the two respective groups of interest, and then constructing a counterfactual distribution that would prevail if the treated group (i.e., the losing side in the conflict – namely the southern, Akan–Krou, Christian individuals – with their own characteristics and unobservables) received the returns prevalent among the winning group, that is, the hedonic wage structure among the northern, Mandé–Gour, and non-Christian workers. The comparison between the counterfactual and the empirical distribution allows us to decompose the income gaps into the part “explained” by the differentials in endowments, and the “unexplained” part due to the systematic differences in returns to individual endowments – attributable to some latent form of market segmentation between the two groups – and due to a residual constant that cannot be associated

with any particular observable market-valued difference between the groups. In this study, the “unexplained” part is attributed to the outcome of conflict.<sup>7</sup>

The first stage can be expressed as using the following RIF whose mean, by design, corresponds to the  $\theta^{\text{th}}$  quantile of earnings  $y$ , and is modeled as a linear function of relevant covariates as follows.

$$E[RIF(y, Q_\theta)|X] = X\beta + \varepsilon \quad (1)$$

where  $(y, Q_\theta|X) = q_\theta + IF(y, q_\theta)$ .  $RIF(y, Q_\theta)$  is the recentered influence function of the  $\theta^{\text{th}}$  quantile of  $y$  estimated by computing the sample quantile  $Q_\theta$  and deriving the density of  $y$  at that point by the kernel method.  $q_\theta$  is the population  $\theta^{\text{th}}$  quantile of the unconditional distribution of the dependent variable  $y$ , and  $IF(y, q_\theta)$  is the influence function.  $X$  is a matrix of regressors of five types: household-head characteristics including their work experience (proxied by age, age squared), gender and marital status; binary indicators for the head’s education level (4 levels + baseline); binary indicators for the head’s employment status (5 categories + baseline) and sector (6 categories + baseline); household characteristics including household size, and ratio of those below 14 or above 65 years of age in the household; geographic location (13 regions + baseline) and a rural-residence indicator. The coefficients  $\beta$  in equation 1 can be estimated using the ordinary least squares (OLS) regression.

After estimating the RIF equation, the predicted values for the  $\theta^{\text{th}}$  unconditional quantile will be used to decompose the income-quantile gaps between the two respective groups of interest into the “explained” and “unexplained” effects as follows (Ramadan et al. 2018):

$$\hat{Q}_\theta^i - \hat{Q}_\theta^j = \{\hat{Q}_\theta^i - \hat{Q}_\theta^*\} + \{\hat{Q}_\theta^* - \hat{Q}_\theta^j\} = (\bar{X}^i - \bar{X}^j)\hat{\beta}_\theta^i + \bar{X}^j(\hat{\beta}_\theta^i - \hat{\beta}_\theta^j) \quad (2)$$

for  $i/j$  pairs: *disadvantaged/privileged groups*.

Here  $\hat{Q}_\theta$  is the  $\theta^{\text{th}}$  unconditional quantile of log real annual income per adult equivalent,  $\bar{X}$  is the vector of the means of covariates, and  $\hat{\beta}_\theta^k$  is the estimate of the unconditional quantile partial effects of group  $k$ .  $\hat{Q}_\theta^* = X^j\hat{\beta}_\theta^i$  is the  $\theta^{\text{th}}$  quantile of the unconditional counterfactual distribution that would have prevailed for group  $j$  if they received group  $i$ ’s returns to their characteristics.

The first term in equation 2,  $(\bar{X}^i - \bar{X}^j)\hat{\beta}_\theta^i$ , gives the “explained” contribution to the income gap at the  $\theta^{\text{th}}$  unconditional quantile, as a function of the differences in distributions of endowments. The second term,  $\bar{X}^j(\hat{\beta}_\theta^i - \hat{\beta}_\theta^j)$ , is the “unexplained” part of the gap at the  $\theta^{\text{th}}$  unconditional quantile, due to differences in the returns to the endowments.

#### *Treatment vs. control groups, and welfare aggregate*

Next, we must identify specific pairs of non-overlapping groups for the analysis of income gaps between the losing (“newly disadvantaged”) versus winning (“newly privileged”) side of conflict in Côte d’Ivoire. Because the conflict spanning the years 2002–2011 was multidimensional, several alternative delineations are considered in turn. Workers’ residence (North vs. South), ethnicity (Akan and Krou vs. Mandé and Gour), and religion (Christian vs. non-Christian) are

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<sup>7</sup> This is analogous to the interpretations in prior studies: as discrimination against the disadvantaged group, or access to latent endowments excluded from the regression specification.

evaluated as demarcation lines of the conflict.<sup>8</sup> The impacts of the outcome of conflict on the respective groups are thought to be channeled through the groups' differential economic conditions amid shocks in access to resources, segmentation or paralysis of selected labor markets, or systematic discrimination.

Total disposable household income per adult-equivalent in real 2015 franc (CFA) is used as the key measure of individuals' welfare.<sup>9</sup> This post-fiscal 'consumable' concept is relevant here because the consequences of political changes in the country could manifest themselves through changes in workers' endowments or capabilities, through market compensation for those endowments (e.g., conflict-inflicted market segmentation, or discrimination), or through allocation of public assistance including contributory and non-contributory social assistance and fiscal redistribution.<sup>10</sup> In regressions, incomes are analyzed in logarithmic terms, facilitating clear interpretation of income gaps at each income decile as percentage gaps in the incomes of the disadvantaged groups relative to the incomes of the privileged groups.

### III. Results

#### *Growth incidence curves across spells of conflict*

Estimating the GICs across the pre- and post-conflict years and for the losing vs. winning social groups allows us to isolate the income changes experienced by the hypothesized winning and losing groups, in a quasi-DID setup. Figure 3 presents the results for the gaps in disposable income between households across the geography (north vs. south), ethnicity (Akan and Krou vs. Mandé and Gour) and religion (Christian vs. non-Christian) divides, for pairs of years across the spells of conflict (2002–2008 and 2008–2015).<sup>11</sup>

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<sup>8</sup> For reference, Figure A4 in the appendix shows the GIC for the 2002–2008 and 2008–2015 spells for the total population. Rural/urban residence and reliance on farming/not for sustenance are considered as additional demarcations of the brunt of conflict. Refer to Figures A5–A6 in the appendix. Because gender of household heads and household composition are associated with farming and rural statuses, and broadly with economic sectors that are less or more vulnerable to economic shocks in the formal markets, female/male headedness and marital status were considered as other delineations of newly privileged/disadvantaged groups.

<sup>9</sup> Conversion to adult equivalent scale is done using square root of household size, following LIS practices. Economic outcomes are deflated using GDP deflator from the World Development Indicators database (World Bank 2023). The exchange rates used for conversion are: \$1 = 628.89 CFA francs in year 2002; \$1 = 479.50 CFA francs in 2008; and \$1 = 625.14 CFA francs in 2015 (SSA 2003, 2009, 2017).

<sup>10</sup> For alternative aggregates of welfare and economic performance, we use household labor income and household capital income, again in real terms, standardized per adult equivalent. These alternative, pre-fiscal income concepts would reflect the direct market effects of conflict or market responses to it, assuming away any impacts through fiscal adjustments. Interestingly, Figures A7–A10 in the appendix show that the income gaps according to these alternative concepts, and their decomposition into explained and unexplained parts, is analogous, even quantitatively, to the results for disposable income. This means that the findings hold irrespective of the exact measure of welfare.

<sup>11</sup> These results are supplemented by detailed tables and figures for additional specifications in the appendix. Figure A5 in the appendix presents the gaps between households with rural or urban residence, households engaged in farming or not, and households with female or male head – as additional demarcations of conflict. Tables A4–A6 in the appendix report the full regression results. In particular, the gaps at various income deciles are decomposed using decile-specific regressions. These tables report the individual endowment and returns effects for each household characteristic, namely: demographics of household heads (work experience, experience squared, marriage status), education, employment status and sector, member-composition and size of households, and administrative region of residence. These characteristics may affect income directly if human-capital markets value them or offer allowances for them, or if they imply the presence of more working members contributing to income per adult equivalent.

Figure 3 panel (i) shows that the northern region saw a small distribution-neutral decline in incomes during 2002–2008. Substantial recovery followed during 2008–2015 that favored the top one-half of the income distribution, even as the poorest 5–10% of residents saw their incomes continuously declining. By contrast, the southern region saw positive, heavily pro-poor growth during 2002–2008 that was largely undone during 2008–2015. Overall, the north–south divide can be said to have been partially bridged during 2002–2015, on account of strong income growth of the upper one-half of northern residents during 2008–2015. The poorest 5–10% in the north and south alike saw little growth during that period.

Panel (ii) shows that the traditionally disadvantaged Mandé and Gour ethnic communities benefited from higher growth rates than the Akan and Krou groups in both time windows of 2002–2008 and 2008–2015, and particularly during 2002–2008. Across both pairs of ethnicities, growth during 2002–2008 was pro-poor, with the poorest 40% of residents (and especially the bottom 10%) witnessing distinctly higher growth rates, and the richest 15% seeing lower growth rates. During 2008–2015, the poorest 40% of residents (and especially the bottom 10%) saw a clear reduction in their incomes, while the upper 60% enjoyed positive growth.

Finally, panel (iii) shows similar results for the Muslim (or broadly non-Christian) versus Christian divide. Non-Christians in most income quantile groups benefited from higher growth rates than Christians during both 2002–2008 and 2008–2015 (except the bottom 25% group during 2002–2008). Growth was near distribution-neutral among non-Christians in both time windows, with only the poorest 15% (and richest 15%) seeing higher growth during 2002–2008 (lower growth, respectively), and seeing lower growth during 2008–2015 (higher growth among the richest 15%, respectively). Among Christians, growth was pro-poor during 2002–2008 and somewhat pro-rich during 2008–2015, with the upper 50% of residents experiencing lower growth rates in 2002–2008, and higher growth rates in 2008–2015. As a result of these trends, non-Christians (all but the poorest 25% of them) saw higher growth rates throughout the 2002–2015 time window than Christians.

These results jointly provide evidence that the traditionally disadvantaged groups who prevailed in the hostilities of 2002–2007 and 2010–2011 managed to partially close the traditional disadvantage, even though the rate of catching up was not equal across all income groups. Those at the bottom of the income spectrum were left behind in terms of income growth compared to higher income groups, as well as comparing the traditionally disadvantaged social groups to the privileged ones.

#### *Income gap decomposition by quantile across points in time*

Figure 3 focused on the dynamic gaps in income growth across the respective winning–losing groups and across income quantiles. Figure 4 delves deeper into estimating the income effects in each year consistently, by making two adjustments: 1) it distinguishes the part of income gaps that is explained by differentials in observed endowments, and the ‘unexplained’ part that is more readily attributable to structural factors and conflict; and 2) it infers individuals’ income changes across the national distribution more sensibly by relying on the unconditional RIF.

Across all panels (i)–(iii), Figure 4 suggests that demographic factors represented by the observed differentials in worker endowments are responsible for a large share of the between-group income gaps, and this ‘explained’ part changed markedly between 2002, 2008 and 2015. The endowment effects were for the most part larger in their magnitude than the ‘unexplained’ returns effects, and they typically operated in the same direction, both favoring the same group – the southern, Akan/Krou, Christian groups. Focusing on the ‘unexplained’ returns part, panel (i) shows that the north–south gaps in income returns favored the north group in 2002 (up to the 70<sup>th</sup> percentile of income), but turned to favoring the south group in 2008 and to a lesser degree in 2015. The southern group continued to outperform in terms of their endowments, but the endowment effect significantly diminished over time. The northern group received lower returns on their stock of endowments in 2008, but this returns effect shrank by 2015 for all but the highest three deciles.

Panel (ii) shows that, in 2002, the Mandé and Gour groups were less endowed with market-valued characteristics, and also received lower returns on their endowments (in all but the lowest and highest deciles). By 2008, their stock of endowments apparently fell, giving rise to an even higher pro-Akan/Krou total income gap, but the ‘unexplained’ returns effect started favoring the Mandé and Gour groups across all income quantiles. In 2015, both the endowment and returns effects greatly diminished in magnitude, with the returns effect only marginally favoring the Akan/Krou at the lowest deciles and the Mandé and Gour at the highest deciles.

Panel (iii) shows that the ‘unexplained’ returns effect was essentially zero in 2002, only weakly favoring the non-Christian group in the bottom and top two deciles, at the same time as the endowment effect clearly favored the Christian group. The ‘unexplained’ returns effect stayed at zero in 2008, even though it started favoring the Christian group at the bottom and top deciles. In 2015, the returns effect turned to favor non-Christian groups in deciles 2–6 and the top decile. Meanwhile, the endowment effect declined in magnitude from heavily favoring the Christian group in 2002 to less than one-half of its original size by 2015.

Figure 5 quantifies the percentage-point changes in the income gaps and their components between 2002 and 2015. The total gap (panel i) became more favorable toward the winning side of the conflict, regardless whether this is defined in terms of residence, ethnicity or religion (with a single exception of the gap in the bottom decile, which became more pro-south). The explained endowment effect (panel ii) also became more favorable to the northern, non-Christian and Mandé–Gour (above the third decile) groups. The returns effect became more favorable to the northern group (except the highest decile), and to the Mandé–Gour group across most income quantiles, but it is estimated to have become ever more favorable to the Christian group in all but the top income decile.

#### **IV. Discussion and conclusions**

Economic shocks do not befall equally all demographic groups or economic strata in society. The political-economy development in Côte d’Ivoire during 2002–2015 was not distribution-neutral, but affected vertical and horizontal equity in society, most obviously between the winning and losing sides of the country’s civil war. The events, including the violent conflict and its eventual outcome, also appear to have affected the demographic composition of society, and the

endowments possessed by the various affected groups, with implications for the relative wages that members of the respective groups could expect to earn.

This study has identified substantial differences in economic performance between privileged and disadvantaged social groups, and the changes in their relative performance after a spell of conflict. As the political tide shifted, the economic fortunes of the groups turned. Generally, the rate of catching up among the conflict-winning groups was thus not equal across all income quantiles, and appears to have been strongest in the upper half of the income spectrum, shedding light on the theorized distributional impacts of victories and defeats.

Jointly, the results from Figures 3 and 4 (combined with the numerical results in Tables A4-A6, descriptive statistics in Tables 1 and A1–A2, and various robustness exercises) point to the validity of hypotheses H1 and H1a. The traditionally disadvantaged groups who prevailed in the hostilities of 2002–2007 and 2010–2011 managed to partially close the earlier disadvantage. Careful decomposition of income gaps sheds light on some of the underlying trends. First, the ‘explained,’ endowment part of income gaps changed markedly between 2002, 2008 and 2015, and declined for several previously-privileged socioeconomic groups. Second, the ‘unexplained’ returns part also shifted and in some cases toward favoring the previously-disadvantaged. Southern residents continued to outperform northerners in terms of their endowments, but this endowment effect significantly diminished over time. The northern group also received lower returns on their stock of endowments, but this returns effect shrank by 2015. Across the ethnic divide, both the endowment and returns effects greatly diminished in magnitude by 2008 and 2015, with the returns effect only marginally favoring the Akan/Krou at the lowest deciles and the Mandé and Gour at the highest deciles. Comparing Christian and non-Christian groups, the endowment effect declined in magnitude from heavily favoring the Christian group in 2002 to less than one-half of its original size by 2015. The returns effect also turned to favoring Muslims across a large range of the income spectrum.

The implications of these findings for the post-conflict recovery years are that economic conditions in Côte d’Ivoire continue to exhibit fragmentation and lack of inclusivity of all social groups. Discontent among those lagging behind poses a risk of triggering civil unrest. To the extent that resentment over material wellbeing can fuel inter-group conflict, social tensions in Côte d’Ivoire may be far from resolved. Reducing the intensity of inequalities between ethnic and religious groups is seen as a major factor for deescalating conflict (Langer 2005; Basedau et al. 2013; Odusola et al. 2017).

Policymakers and international observers should thus push for enhancing vertical and horizontal equity in society, in economic outcomes and especially in opportunities. Advancing the capabilities of conflict impaired families should be prioritized, including expanding their access to human development including education and health (Sany 2010). Strengthening the democratic governance should also be pursued to mitigate social tensions and advance social inclusion and economic equality in the long term (Anyanwu et al. 2016).

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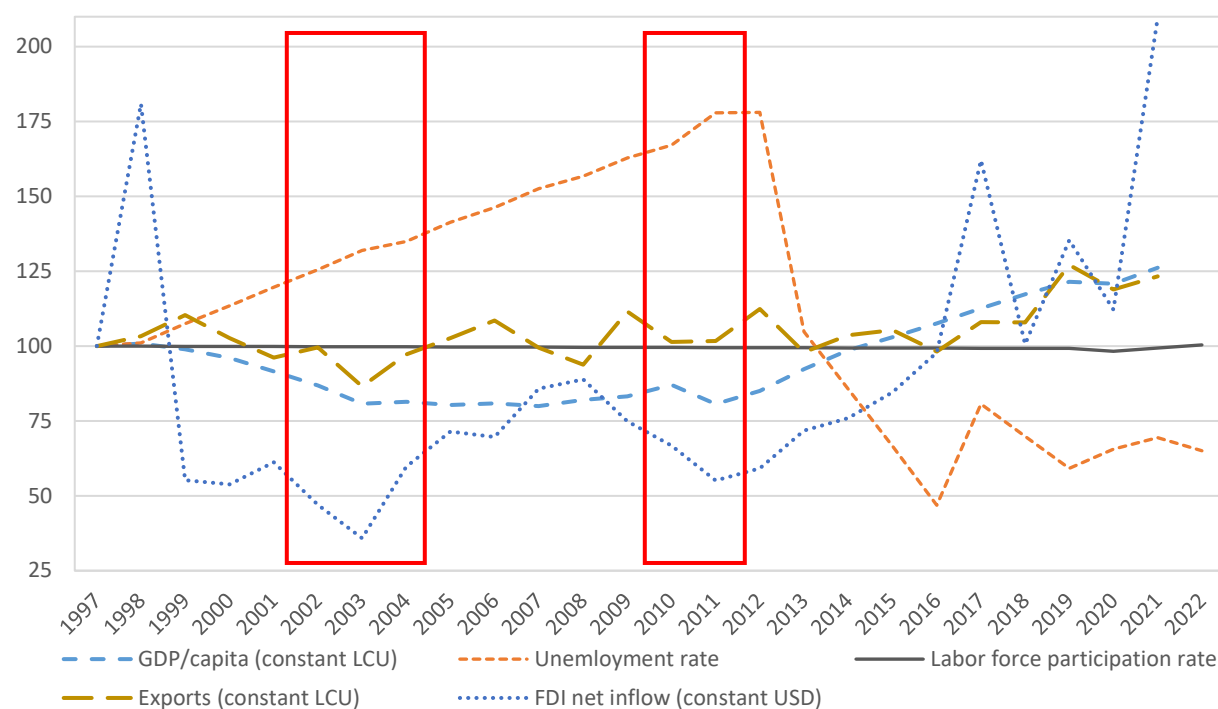
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Table 1. Demographic distribution and mean incomes, by SHLS wave

	Sample composition (households, %)			Mean disposable income in group (2015 CFA)			Mean disposable income of those not in group (2015 CFA)		
	2002	2008	2015	2002	2008	2015	2002	2008	2015
Raw sample	10,746	12,301	12,128						
Analysis sample	10,709	12,196	12,100	854.79	894.43	933.25			
South region	66.4%	67.8%	67.1%	972.27	1,033.58	1,029.71	610.43	550.72	746.87
Urban HH	46.1%	51.7%	44.2%	1,212.12	1,268.94	1,208.24	585.33	657.89	680.26
Non-farm HH	46.9%	47.4%	64.8%	1,213.20	1,270.53	1,017.31	627.78	713.80	772.28
Male HH Heads	83.0%	80.6%	80.7%	882.73	882.76	990.83	674.68	967.76	663.00
Married HH Heads	62.7%	58.6%	55.6%	876.25	871.33	967.17	782.19	989.78	854.92
Akan, Krou	43.0%	37.4%	37.4%	984.74	970.36	930.72	739.39	833.52	934.86
Christian	38.2%	36.8%	35.7%	1,068.73	1,056.09	1,004.68	719.61	800.33	888.94

Source: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples.

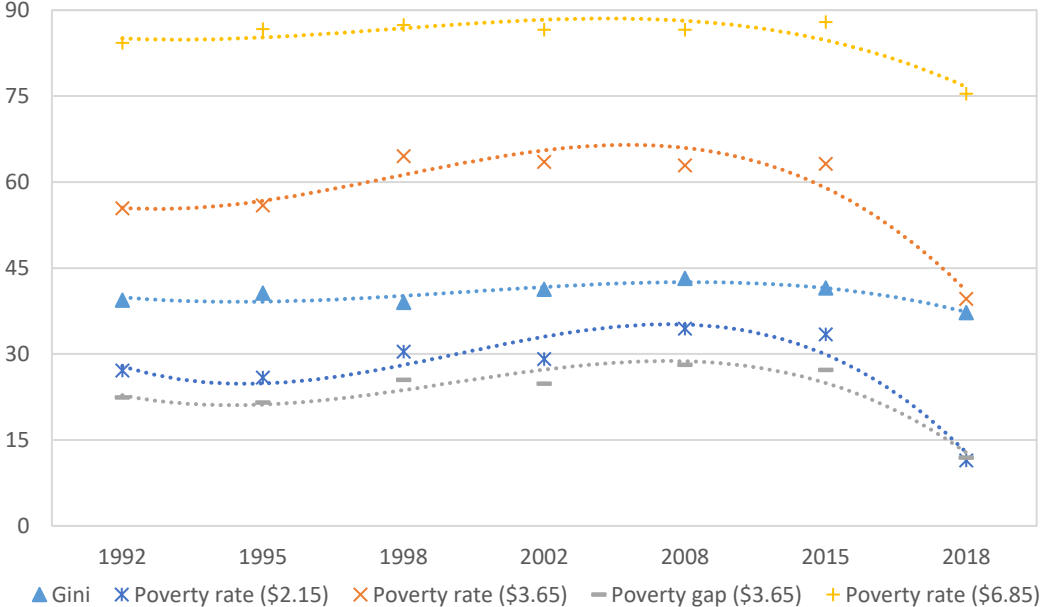
Figure 1. Selected macroeconomic indicators, 1997–2022 (Normalized levels, y1997=100)



Notes: Unemployment and labor-force participation rates are ILO estimates.

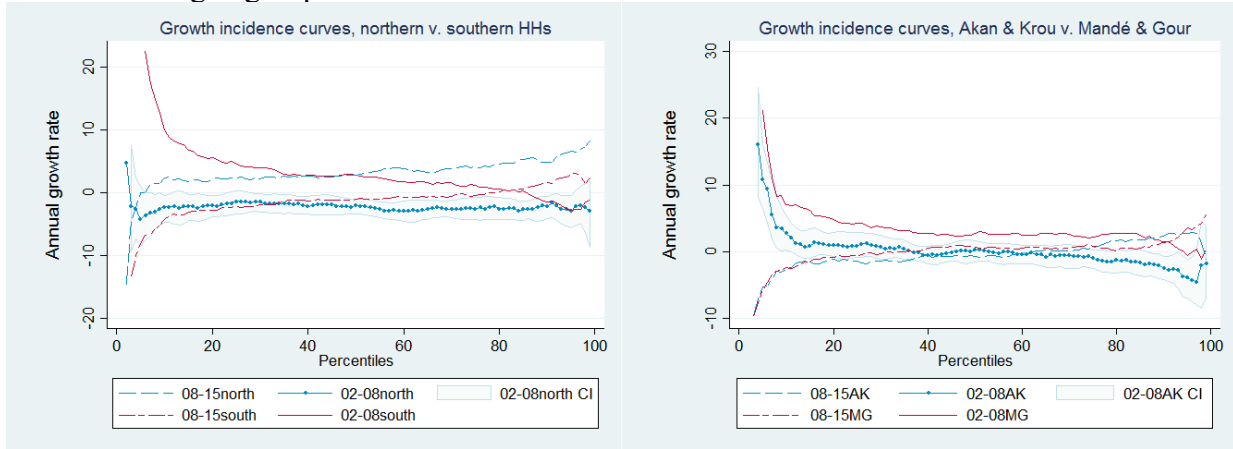
Source: World Bank (2023).

Figure 2. Inequality and poverty of household consumption per capita, 1992–2018 (%)



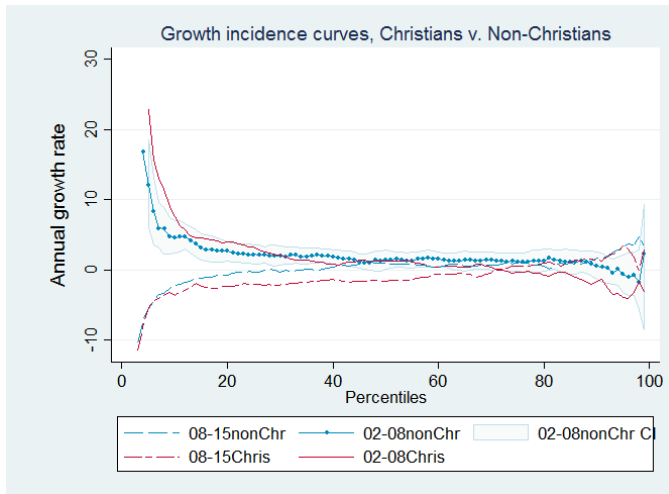
Notes: Cubic fitted line used to illustrate trends.  
 Source: World Bank (2023).

Figure 3. Growth incidence curves for disposable income per adult equivalent, privileged vs. disadvantaged groups



i. South vs. North region

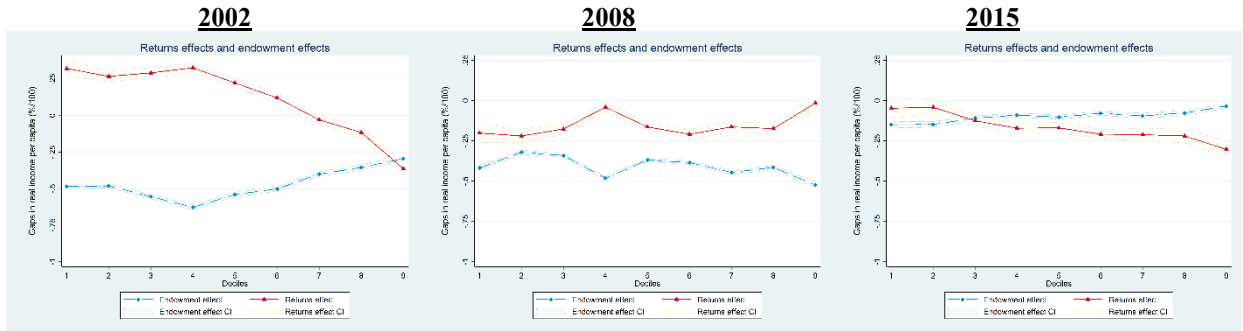
ii. Akan, Krou vs. Mandé, Gour HH head



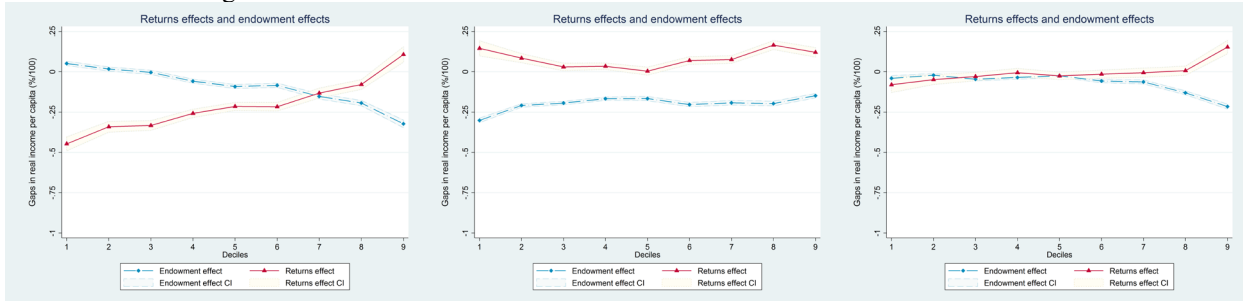
iii. Christian vs. Other HH head

Source: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. Confidence intervals computed by bootstrapping.

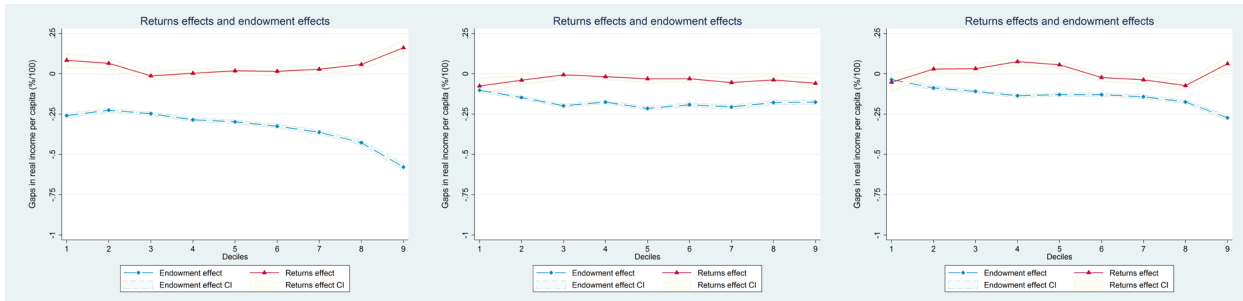
Figure 4. Unconditional disposable-income decile gaps, privileged vs. disadvantaged groups:  
Returns and endowment effects



i. South vs. North region



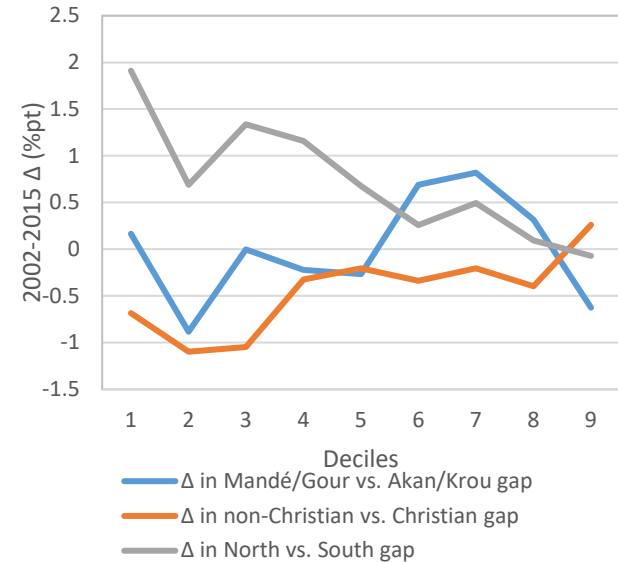
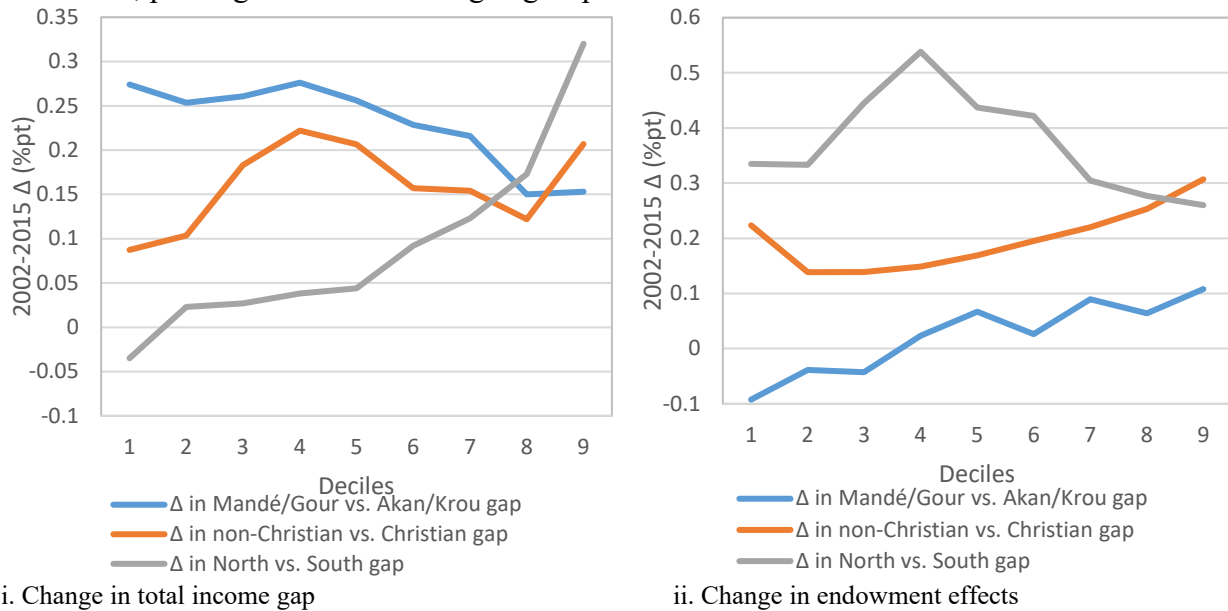
ii. Akan, Krou vs. Mandé, Gour HH head



iii. Christian vs. Other HH head

Source: Negative numbers indicate pro-south, pro-Akan/Krou or pro-Christian gaps. Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. Confidence intervals computed using the delta method.

Figure 5. 2002–2015 changes in disposable-income decile gaps, and in returns and endowment effects, privileged vs. disadvantaged groups



Source: Positive numbers indicate pro-north, pro-Mandé/Gour or pro-Muslim changes in gaps. Negative numbers indicate pro-south, pro-Akan/Krou or pro-Christian changes. Author’s analysis of SHLS 2002, 2015 (LIS 2019). Population-weighted samples.

## Appendix

Table A1. Within-group Gini of per-capita disposable income inequality, by SHLS wave (%)

	Within-group Gini			Gini among those not in group		
	2002	2008	2015	2002	2008	2015
South region	58.625	56.911	57.306	50.758	56.525	57.296
Akan, Krou	57.353	60.104	55.169	58.147	57.563	55.617
Christian	60.385	58.909	56.476	54.161	55.869	58.603
Urban HH	57.289	57.186	59.150	53.312	53.755	53.610
Male HH Heads	56.985	56.788	56.916	56.217	60.983	57.166
Married HH Heads	56.045	55.963	55.551	58.865	59.836	59.581
Employed	56.304	57.499	54.567	63.865	59.013	66.820
Literate	57.153	56.194	57.583	51.562	56.737	55.085
Young ( $\leq 45$ )	55.580	54.995	56.546	58.914	61.047	58.502
All	57.113	57.663	57.403			

Source: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples.



Table A2. Descriptive statistics of demographic variables by year and income decile (%)

Decile	Non-married	Female headed	Youth HH	Non-employed	Rural	North	Non-Christian	non-Akan/Krou	Farming HH	Illiterate
<b>2002</b> 1	45.30	22.93	52.84	27.25	54.79	30.14	59.05	59.72	54.42	53.70
2	40.87	22.68	53.10	9.02	69.23	43.65	66.08	64.87	69.79	62.22
3	37.29	20.19	51.87	8.69	69.72	42.34	67.10	62.24	69.44	61.67
4	36.84	19.74	52.84	8.75	63.72	38.05	70.08	62.14	61.77	58.64
5	31.19	16.51	51.68	10.07	60.89	38.92	64.55	58.01	59.68	55.37
6	34.98	16.19	57.30	7.44	55.53	33.21	63.59	58.14	53.67	51.35
7	34.98	14.73	57.77	6.52	53.12	32.93	63.09	55.16	52.84	49.07
8	36.37	13.35	59.21	7.92	45.58	31.68	61.42	54.24	45.21	39.76
9	36.88	12.98	59.83	7.81	38.01	24.74	54.99	49.76	36.41	29.00
10	38.55	10.99	62.20	7.91	29.14	20.20	47.77	46.28	27.93	19.68
Total	37.33	17.03	55.86	10.13	53.98	33.59	61.78	57.06	53.13	48.04
<b>2008</b> 1	47.36	27.26	51.50	12.89	64.01	51.91	69.66	67.83	68.07	65.17
2	43.17	23.92	52.20	9.05	65.45	43.58	66.20	64.15	69.35	60.26
3	40.10	22.18	57.06	8.72	61.12	39.94	67.07	65.18	64.69	57.06
4	36.64	19.97	55.46	7.99	57.74	36.64	65.93	64.50	62.46	54.92
5	39.27	19.28	58.46	7.41	50.73	30.81	64.98	61.06	53.74	48.82
6	38.77	16.71	59.21	7.30	49.64	31.95	64.46	63.91	52.15	49.11
7	39.93	16.87	57.38	6.61	43.36	26.32	61.26	62.35	48.49	43.79
8	42.11	17.64	59.76	6.92	37.97	23.01	61.70	61.30	41.79	39.51
9	41.30	16.34	61.22	6.26	32.03	20.41	56.90	58.29	37.15	31.46
10	45.12	14.23	62.76	6.27	21.46	18.29	54.13	57.07	28.29	24.19
Total	41.38	19.44	57.50	7.94	48.35	32.29	63.23	62.56	52.62	47.41
<b>2015</b> 1	59.95	31.06	51.63	55.05	58.40	34.42	64.01	65.01	26.59	63.76
2	50.58	28.57	52.08	33.58	64.33	37.75	65.91	63.50	37.08	65.00
3	40.86	22.50	56.34	21.67	64.58	36.74	68.07	64.50	41.27	63.52
4	44.64	21.54	55.36	20.63	62.29	35.56	67.61	64.36	40.51	64.29
5	39.69	19.88	57.93	15.69	60.15	32.70	66.31	62.70	39.77	61.22
6	37.83	15.31	60.93	14.07	59.44	34.60	68.05	63.49	38.91	58.20
7	39.49	15.58	59.77	11.79	55.40	31.08	66.36	64.63	36.93	57.46
8	41.30	14.88	61.17	12.98	50.62	28.61	64.96	62.24	34.95	52.73
9	42.13	13.14	61.34	9.83	44.11	29.76	57.36	60.68	29.51	42.15
10	49.01	10.73	60.81	10.97	37.71	27.56	53.96	55.86	25.99	34.82
Total	44.56	19.31	57.73	20.63	55.70	32.87	64.26	62.70	35.14	56.31

Source: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples.

Table A3. Descriptive statistics of industry and occupational categories of main job by year and income decile (%)

Decile	Farming/Forest.	Fishing	Manufacturing	Utilities	Trade	Hotel/Rest.	Manager	Clerk/Sales/Service	Skilled agricultural	Manual
<b>2002</b> 1	70.39	4.12	4.65	1.20	15.54	4.12	2.77	26.38	69.39	1.45
2	75.81	3.55	3.65	1.36	12.83	2.82	1.65	21.46	73.48	3.41
3	72.27	4.41	3.36	1.89	13.03	5.04	2.30	22.76	70.56	4.38
4	64.75	5.84	6.05	3.44	13.45	6.47	3.62	27.54	64.18	4.66
5	62.34	8.33	6.22	3.80	13.08	6.22	3.89	29.41	61.24	5.46
6	53.75	9.04	7.71	5.04	18.19	6.27	3.98	38.43	52.09	5.50
7	49.90	10.98	9.04	6.50	17.48	6.10	7.40	38.13	50.10	4.36
8	41.36	13.11	9.76	12.30	16.36	7.11	14.59	41.03	40.63	3.75
9	29.61	15.54	7.92	22.11	16.06	8.76	25.60	40.31	30.78	3.32
10	20.35	16.34	8.94	31.86	17.06	5.45	43.65	33.30	21.32	1.73
Total	53.58	9.27	6.80	9.16	15.32	5.88	11.19	32.05	52.91	3.85
<b>2008</b> 1	75.88	3.15	4.86	1.72	10.10	4.29	2.58	20.42	74.52	2.48
2	71.93	3.18	5.81	2.09	13.35	3.63	2.55	23.91	70.45	3.09
3	67.93	3.70	6.23	2.35	14.45	5.33	3.16	26.81	64.89	5.14
4	62.98	5.84	6.29	3.68	15.45	5.75	3.86	29.56	61.01	5.57
5	52.70	8.06	8.50	4.87	16.92	8.95	5.59	36.97	50.62	6.83
6	50.66	9.37	10.43	5.04	19.36	5.13	5.38	40.13	48.85	5.64
7	45.50	10.67	10.32	8.82	17.37	7.32	8.08	42.45	43.25	6.22
8	36.86	11.90	10.76	10.32	22.40	7.76	12.27	46.78	36.28	4.68
9	29.90	13.55	7.60	17.83	24.65	6.47	18.88	48.95	27.80	4.37
10	19.60	15.82	9.49	23.46	26.27	5.36	30.13	48.99	18.68	2.20
Total	51.06	8.60	8.07	8.12	18.13	6.02	9.36	36.70	49.31	4.64
<b>2015</b> 1	62.16	4.75	8.78	2.74	16.82	4.75	4.99	29.02	58.23	7.76
2	66.92	4.03	8.30	4.15	12.20	4.40	4.03	26.07	62.97	6.93
3	67.90	4.54	9.19	3.38	10.67	4.33	3.49	25.26	62.79	8.46
4	65.87	5.22	6.68	5.01	12.94	4.28	3.77	25.96	61.57	8.69
5	62.09	7.99	8.19	3.90	13.35	4.48	3.91	30.11	58.55	7.43
6	60.71	8.20	8.40	5.31	12.74	4.63	5.79	29.34	54.83	10.04
7	57.48	10.47	6.26	8.04	13.55	4.21	7.39	30.87	53.60	8.14
8	49.38	9.97	10.35	8.64	17.00	4.65	9.22	38.02	46.77	5.99
9	41.28	11.93	9.54	16.51	14.86	5.87	21.54	35.84	36.30	6.32
10	32.47	13.17	8.81	26.16	14.75	4.64	32.25	35.88	29.17	2.70
Total	55.70	8.41	8.45	8.98	13.83	4.64	10.28	30.99	51.54	7.18

Source: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples.

Table A4. Quantile decomposition of disposable-income gaps between northern/southern residence groups, selected deciles, by year

	2002			2008			2015			
	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	
Northern	4.828*** (0.029)	6.038*** (0.017)	7.159*** (0.025)	4.603*** (0.031)	5.894*** (0.013)	6.974*** (0.026)	4.813*** (0.033)	6.102*** (0.018)	7.338*** (0.027)	
Southern	4.989*** (0.027)	6.354*** (0.014)	7.816*** (0.025)	5.222*** (0.017)	6.425*** (0.012)	7.513*** (0.016)	5.010*** (0.027)	6.374*** (0.013)	7.675*** (0.021)	
Overall gap	-0.161*** (0.040)	-0.316*** (0.022)	-0.657*** (0.035)	-0.619*** (0.035)	-0.531*** (0.018)	-0.540*** (0.031)	-0.196*** (0.043)	-0.272*** (0.022)	-0.337*** (0.034)	
Endowments	-0.484*** (0.094)	-0.540*** (0.051)	-0.294*** (0.078)	-0.417*** (0.095)	-0.368*** (0.040)	-0.524*** (0.080)	-0.149*** (0.043)	-0.103*** (0.024)	-0.034 (0.035)	
Constant (Unexplained)	2.498*** (0.593)	0.751** (0.309)	-0.760 (0.498)	-3.108*** (0.817)	-0.507 (0.391)	-0.483 (0.699)	0.216 (0.521)	-0.318 (0.260)	-0.629 (0.408)	
Returns on endow.+Constant	0.324*** (0.101)	0.224*** (0.054)	-0.363*** (0.083)	-0.201** (0.100)	-0.163*** (0.043)	-0.015 (0.084)	-0.047 (0.058)	-0.169*** (0.030)	-0.303*** (0.047)	
Explained/Endowments Effects	Demographics of hhd. head	0.012 (0.008)	0.004 (0.004)	-0.012* (0.006)	-0.007 (0.014)	0.007 (0.006)	0.010 (0.012)	0.002 (0.007)	-0.009** (0.004)	-0.011 (0.007)
	Head ethnicity & religion	-0.087*** (0.022)	-0.103*** (0.013)	-0.043** (0.018)	0.077*** (0.029)	-0.006 (0.012)	-0.091*** (0.025)	-0.005 (0.004)	-0.003 (0.002)	-0.007** (0.003)
	Head education	0.001 (0.015)	-0.035*** (0.008)	-0.062*** (0.014)	-0.054** (0.025)	-0.042*** (0.010)	-0.167*** (0.021)	-0.038*** (0.011)	-0.034*** (0.007)	-0.048*** (0.010)
	Head employment	-0.032* (0.019)	-0.045*** (0.011)	-0.079*** (0.017)	-0.027 (0.022)	-0.058*** (0.010)	-0.096*** (0.020)	-0.025 (0.016)	-0.029*** (0.008)	-0.013 (0.011)
	Household composition	-0.009 (0.012)	-0.027*** (0.007)	-0.021** (0.010)	-0.068*** (0.019)	-0.051*** (0.008)	-0.010 (0.016)	-0.026** (0.011)	-0.020*** (0.006)	0.003 (0.009)
	Administr. region	-0.368*** (0.083)	-0.334*** (0.045)	-0.077 (0.068)	-0.339*** (0.080)	-0.218*** (0.033)	-0.171** (0.067)	-0.058 (0.040)	-0.008 (0.021)	0.042 (0.032)
	Unexplained>Returns Effects	Demographics of hhd. head	0.413 (0.466)	-0.383 (0.242)	-0.552 (0.391)	0.616 (0.424)	0.709*** (0.205)	0.867** (0.363)	-0.757 (0.474)	0.203 (0.237)
Head ethnicity & religion		-0.006 (0.059)	0.131*** (0.031)	0.159*** (0.050)	-0.126** (0.056)	0.045* (0.026)	0.194*** (0.048)	0.110** (0.046)	0.060*** (0.023)	0.167*** (0.036)
Head education		-0.117** (0.059)	-0.013 (0.031)	-0.048 (0.049)	1.800*** (0.366)	-0.291 (0.180)	-0.061 (0.314)	-0.013 (0.051)	-0.019 (0.026)	-0.112*** (0.040)
Head employment		-0.284 (0.276)	-0.109 (0.144)	0.418* (0.230)	-0.072 (0.253)	0.046 (0.119)	-0.226 (0.216)	0.003 (0.242)	-0.242** (0.121)	0.377** (0.190)
Household composition		0.022 (0.314)	0.242 (0.164)	0.372 (0.263)	0.559 (0.566)	-0.122 (0.268)	-0.189 (0.483)	0.455 (0.293)	0.128 (0.148)	0.352 (0.231)
Administr. region		-2.203*** (0.136)	-0.396*** (0.068)	0.047 (0.118)	0.131*** (0.028)	-0.043** (0.018)	-0.117*** (0.025)	-0.062 (0.078)	0.018 (0.037)	-0.135** (0.060)
Observations	10,709			12,196			12,100			

Notes: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. The 10<sup>th</sup>, 50<sup>th</sup> and 90<sup>th</sup> percentiles are selected for illustration – other deciles are available from the author on request. Standard errors computed using the delta method are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A5. Quantile decomposition of disposable-income gaps between Mandé & Gour vs. Akan & Krou ethnics, select deciles by year

	2002			2008			2015			
	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	
Mandé & Gour	4.765*** (0.023)	6.096*** (0.014)	7.500*** (0.027)	4.970*** (0.025)	6.190*** (0.014)	7.406*** (0.017)	4.869*** (0.026)	6.261*** (0.013)	7.550*** (0.023)	
Akan & Krou	5.160*** (0.031)	6.402*** (0.018)	7.715*** (0.026)	5.126*** (0.025)	6.352*** (0.018)	7.433*** (0.019)	4.989*** (0.036)	6.311*** (0.017)	7.612*** (0.023)	
Overall gap	-0.395*** (0.039)	-0.306*** (0.023)	-0.215*** (0.038)	-0.156*** (0.036)	-0.162*** (0.023)	-0.027 (0.025)	-0.121*** (0.045)	-0.050** (0.021)	-0.062* (0.032)	
Endowments	0.052 (0.040)	-0.091*** (0.024)	-0.323*** (0.047)	-0.301*** (0.040)	-0.166*** (0.023)	-0.148*** (0.027)	-0.041 (0.046)	-0.024 (0.023)	-0.215*** (0.041)	
Constant (Unexplained)	-0.153 (1.170)	-0.412 (0.644)	-0.152 (0.961)	-4.253*** (0.925)	-1.501*** (0.563)	-0.568 (0.643)	0.047 (0.543)	0.045 (0.249)	0.518 (0.387)	
Returns on endow.+Constant	-0.447*** (0.054)	-0.215*** (0.031)	0.108* (0.055)	0.146*** (0.052)	0.004 (0.029)	0.121*** (0.034)	-0.080 (0.061)	-0.026 (0.029)	0.154*** (0.049)	
Explained/Endowments Effects	Demographics of hhd. head	0.065*** (0.018)	0.033*** (0.010)	-0.006 (0.020)	0.011 (0.015)	0.004 (0.008)	-0.044*** (0.010)	-0.020 (0.022)	0.004 (0.010)	-0.004 (0.019)
	Head religion	0.014 (0.027)	-0.012 (0.016)	-0.013 (0.030)	-0.008 (0.027)	0.076*** (0.014)	-0.020 (0.017)	0.026 (0.034)	0.036** (0.016)	0.001 (0.030)
	Head education	-0.035** (0.016)	-0.068*** (0.010)	-0.115*** (0.020)	-0.051*** (0.019)	-0.084*** (0.010)	-0.077*** (0.013)	-0.124*** (0.023)	-0.096*** (0.011)	-0.187*** (0.022)
	Head employment	0.027** (0.013)	-0.022*** (0.008)	-0.114*** (0.015)	0.041*** (0.009)	0.020*** (0.006)	0.028*** (0.006)	0.065*** (0.016)	0.014** (0.006)	-0.024** (0.009)
	Household composition	-0.013 (0.019)	-0.028** (0.011)	0.012 (0.021)	-0.044*** (0.015)	-0.036*** (0.009)	0.019* (0.010)	0.013 (0.027)	0.005 (0.013)	-0.001 (0.023)
	Administr. region	-0.007 (0.024)	0.006 (0.014)	-0.088*** (0.028)	-0.250*** (0.025)	-0.146*** (0.014)	-0.056*** (0.017)	-0.001 (0.024)	0.012 (0.012)	-0.001 (0.021)
	Unexplained>Returns Effects	Demographics of hhd. head	-0.425 (0.444)	-0.629** (0.248)	0.921** (0.409)	2.068*** (0.434)	0.118 (0.258)	0.132 (0.297)	-0.675 (0.470)	-0.361* (0.216)
Head religion		0.070 (0.058)	0.017 (0.032)	0.002 (0.054)	-0.014 (0.050)	-0.149*** (0.029)	-0.044 (0.034)	-0.112 (0.074)	-0.003 (0.034)	-0.037 (0.053)
Head education		-0.009 (0.064)	0.081** (0.036)	0.095 (0.058)	1.191*** (0.418)	0.554** (0.256)	0.478 (0.292)	0.269*** (0.070)	0.091*** (0.032)	0.191*** (0.050)
Head employment		0.054 (0.244)	0.206 (0.136)	0.257 (0.223)	-0.108 (0.241)	0.125 (0.143)	-0.304* (0.165)	0.537** (0.243)	0.242** (0.112)	-0.185 (0.173)
Household composition		-0.472 (0.292)	0.084 (0.163)	0.003 (0.269)	0.497 (0.556)	-0.082 (0.333)	0.376 (0.382)	-0.007 (0.266)	0.079 (0.123)	0.377* (0.194)
Administr. region		0.489 (1.045)	0.440 (0.574)	-1.019 (0.831)	0.765* (0.390)	0.939*** (0.251)	0.051 (0.281)	-0.140 (0.133)	-0.120** (0.061)	-0.015 (0.095)
Observations	10,709			12,196			12,100			

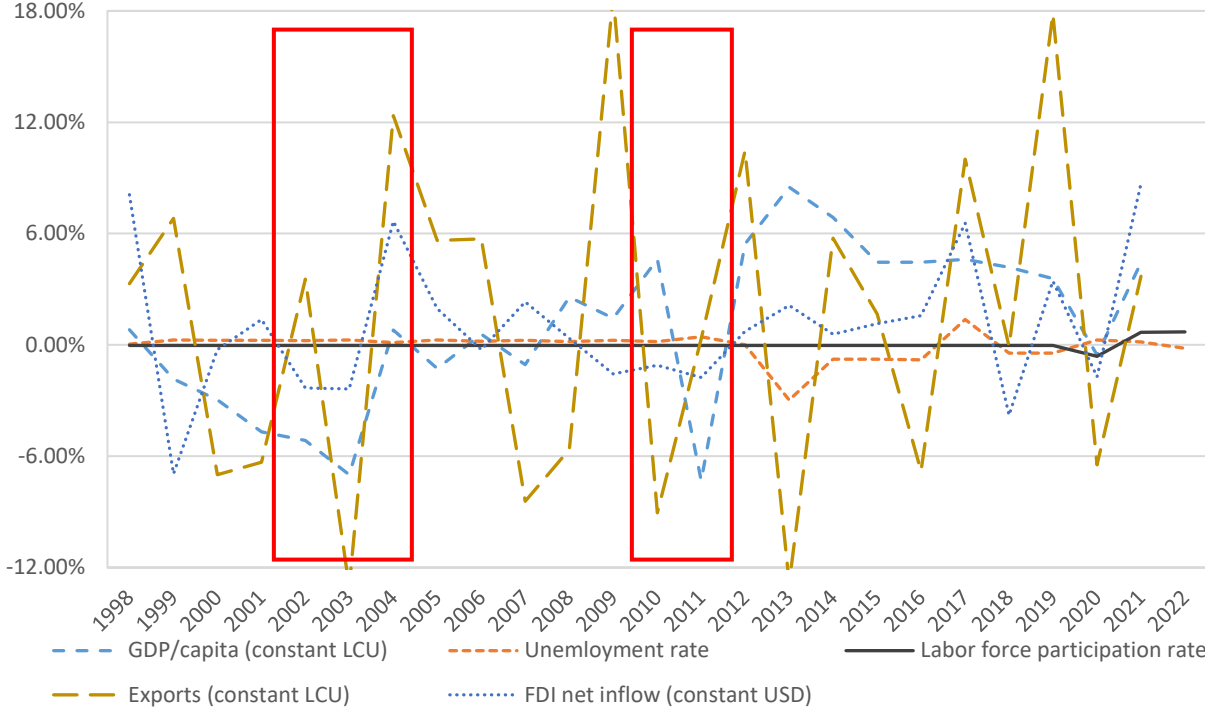
Notes: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. The 10<sup>th</sup>, 50<sup>th</sup> and 90<sup>th</sup> percentiles are selected for illustration – other deciles are available from the author on request. Standard errors computed using the delta method are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

Table A6. Quantile decomposition of disposable-income gaps between non-Christian vs. Christian groups, selected deciles, by year

	2002			2008			2015			
	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	10 <sup>th</sup> pctile	50 <sup>th</sup> pctile	90 <sup>th</sup> pctile	
Non-Christian	4.855*** (0.024)	6.140*** (0.013)	7.441*** (0.026)	4.968*** (0.026)	6.174*** (0.014)	7.320*** (0.016)	4.869*** (0.030)	6.253*** (0.012)	7.485*** (0.022)	
Christian	5.031*** (0.032)	6.419*** (0.019)	7.858*** (0.031)	5.145*** (0.029)	6.419*** (0.018)	7.555*** (0.025)	4.956*** (0.033)	6.325*** (0.020)	7.695*** (0.027)	
Overall gap	-0.175*** (0.040)	-0.279*** (0.023)	-0.417*** (0.041)	-0.178*** (0.039)	-0.245*** (0.023)	-0.235*** (0.030)	-0.088* (0.045)	-0.072*** (0.023)	-0.210*** (0.035)	
Endowments	-0.259*** (0.035)	-0.298*** (0.020)	-0.579*** (0.040)	-0.102*** (0.036)	-0.214*** (0.020)	-0.175*** (0.024)	-0.035 (0.050)	-0.129*** (0.021)	-0.272*** (0.038)	
Constant (Unexplained)	0.544 (0.816)	0.039 (0.439)	0.246 (0.768)	-3.047*** (0.994)	-0.770 (0.543)	-1.703** (0.756)	1.092* (0.558)	0.282 (0.273)	-0.114 (0.432)	
Returns on endow.+Constant	0.084* (0.051)	0.019 (0.027)	0.162*** (0.051)	-0.076 (0.051)	-0.031 (0.027)	-0.059* (0.035)	-0.052 (0.063)	0.056** (0.028)	0.063 (0.048)	
Explained\Endowments Effects	Demographics of hhd. head	0.062*** (0.016)	0.027*** (0.008)	0.001 (0.016)	0.054** (0.022)	0.025** (0.011)	-0.045*** (0.013)	-0.035 (0.027)	0.005 (0.011)	0.017 (0.019)
	Head ethnicity	-0.224*** (0.028)	-0.136*** (0.015)	-0.034 (0.029)	0.091*** (0.029)	0.029** (0.014)	0.053*** (0.018)	0.065 (0.043)	-0.007 (0.017)	0.064** (0.032)
	Head education	-0.027 (0.022)	-0.083*** (0.012)	-0.189*** (0.025)	-0.020 (0.022)	-0.058*** (0.011)	-0.096*** (0.014)	-0.131*** (0.030)	-0.082*** (0.012)	-0.237*** (0.024)
	Head employment	-0.049** (0.019)	-0.040*** (0.011)	-0.096*** (0.021)	-0.040** (0.018)	-0.033*** (0.010)	0.012 (0.012)	0.085*** (0.022)	-0.001 (0.008)	-0.045*** (0.012)
	Household composition	-0.037** (0.018)	-0.027*** (0.010)	-0.021 (0.019)	-0.044** (0.021)	-0.029*** (0.011)	0.028** (0.013)	0.036 (0.031)	0.000 (0.012)	-0.016 (0.023)
	Administr. region	0.015 (0.022)	-0.040*** (0.012)	-0.240*** (0.023)	-0.142*** (0.019)	-0.149*** (0.010)	-0.128*** (0.012)	-0.056*** (0.013)	-0.044*** (0.007)	-0.055*** (0.011)
	Unexplained>Returns Effects	Demographics of hhd. head	-0.271 (0.472)	-0.520** (0.254)	-0.488 (0.454)	1.400*** (0.466)	0.449* (0.251)	0.337 (0.345)	-1.296*** (0.488)	-0.494** (0.238)
Head ethnicity		0.113 (0.077)	0.096** (0.041)	0.129* (0.074)	-0.174** (0.069)	-0.095** (0.037)	-0.057 (0.051)	-0.213*** (0.079)	0.017 (0.038)	0.007 (0.061)
Head education		-0.091 (0.073)	-0.023 (0.039)	0.155** (0.071)	0.360 (0.468)	-0.308 (0.258)	0.659* (0.363)	0.113 (0.072)	-0.017 (0.035)	0.207*** (0.056)
Head employment		0.130 (0.245)	0.315** (0.132)	0.015 (0.240)	0.136 (0.262)	-0.290** (0.141)	0.087 (0.194)	0.201 (0.246)	0.101 (0.119)	-0.301 (0.190)
Household composition		-0.138 (0.292)	-0.006 (0.156)	-0.098 (0.284)	0.512 (0.583)	-0.010 (0.313)	0.522 (0.428)	0.282 (0.272)	0.322** (0.130)	0.462** (0.210)
Administr. region		-0.203 (0.592)	0.117 (0.319)	0.202 (0.543)	0.737* (0.411)	0.994*** (0.234)	0.095 (0.337)	-0.231* (0.132)	-0.156** (0.064)	-0.018 (0.102)
Observations	10,709			12,196			12,100			

Notes: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. The 10<sup>th</sup>, 50<sup>th</sup> and 90<sup>th</sup> percentiles are selected for illustration – other deciles are available from the author on request. Standard errors computed using the delta method are in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

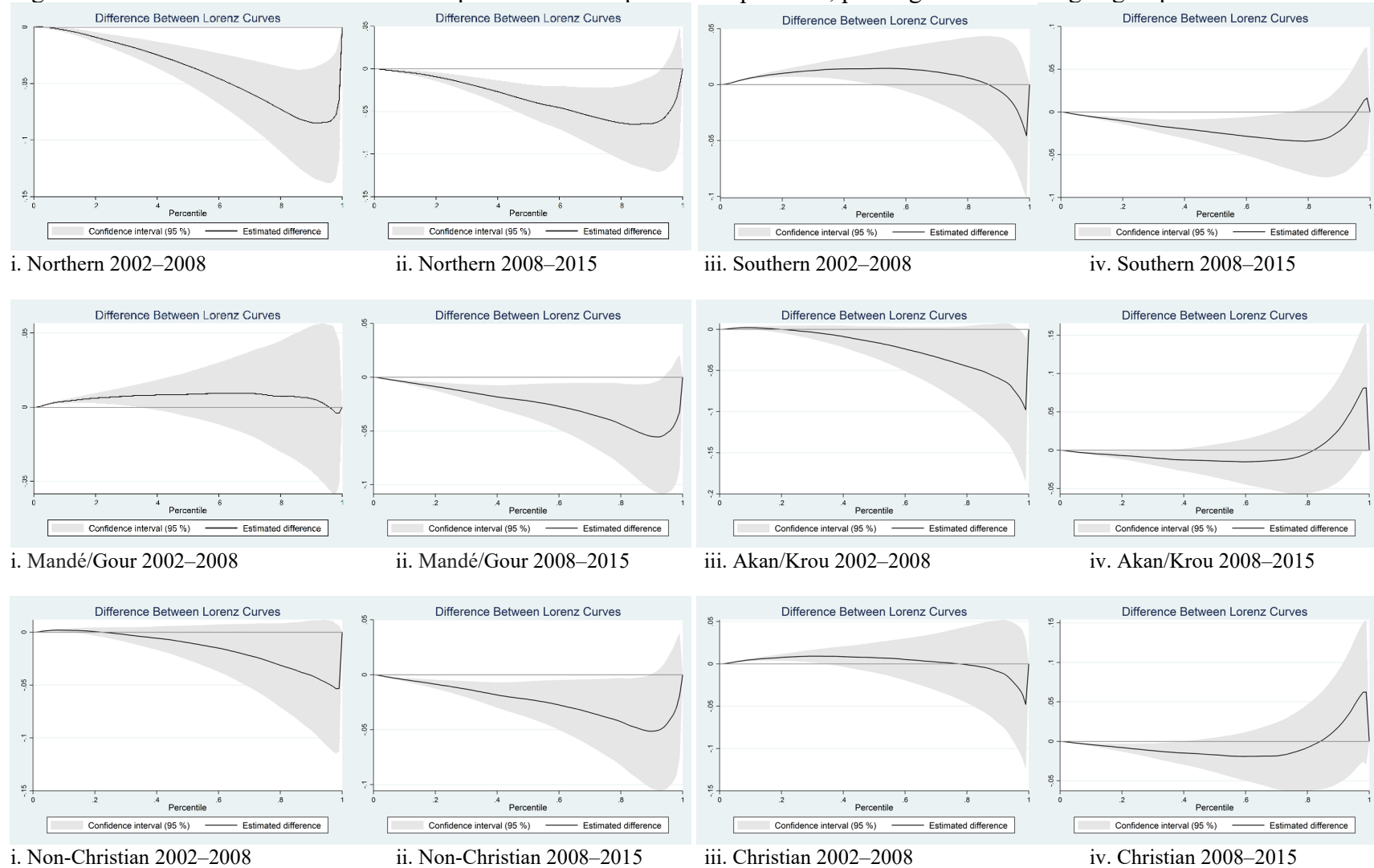
Figure A1. Selected macroeconomic indicators, 1997–2022 (Growth rates – % for monetary variables, %-point for rates)



Notes: This figure complements Figure 1. FDI net inflow growth rates are divided by 10 for presentation purposes. Unemployment and labor-force participation rates are ILO estimates, and their growth rate is shown in percentage-point terms.

Source: World Bank (2023).

Figure A2. Lorenz curve differences for disposable income per adult equivalent, privileged–disadvantaged groups



Source: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. Confidence intervals computed by bootstrapping.

Figure A3. Lorenz curve differences for disposable income per adult equivalent, total population

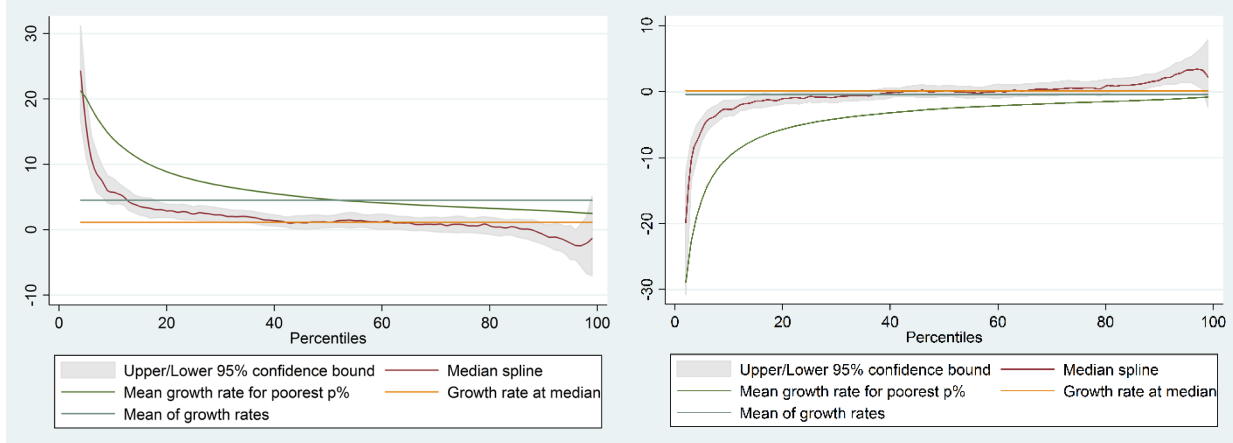


i. 2002–2008

ii. 2008–2015

Source: Author’s analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. Confidence intervals computed by bootstrapping.

Figure A4. Growth incidence curves for disposable income per adult equivalent, total population

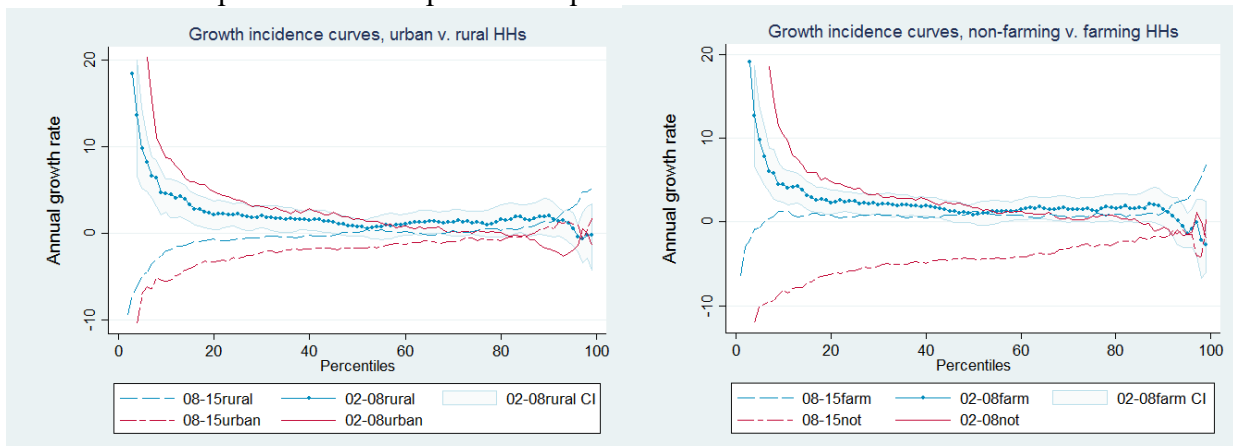


i. 2002–2008

ii. 2008–2015

Source: Author’s analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. Confidence intervals computed by bootstrapping.

Figure A5. Alternative privileged–disadvantaged group demarcations for growth incidence curves of disposable income per adult equivalent



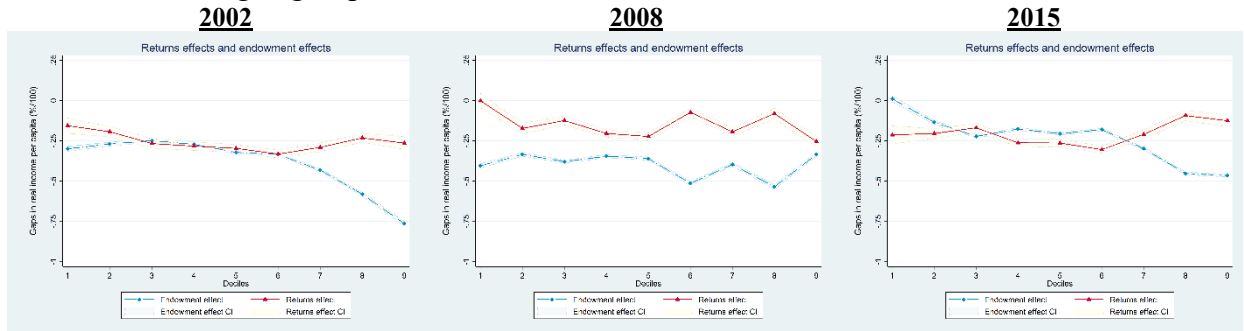


i. Urban vs. rural

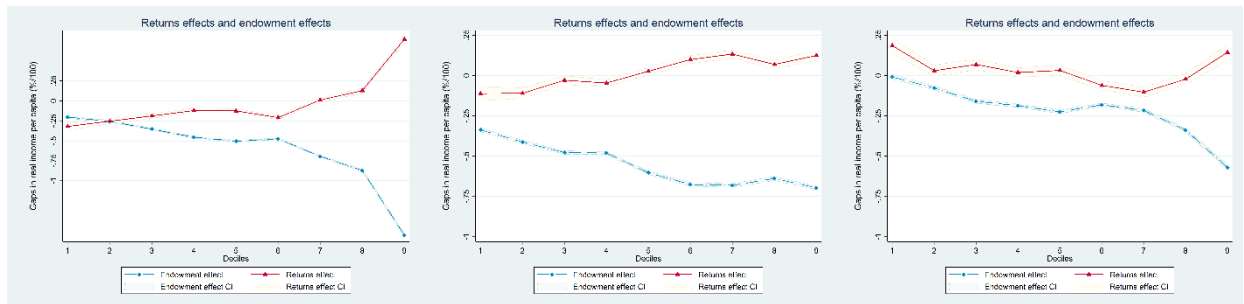
ii. Non-farming vs. farming households

Source: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. Confidence intervals computed by bootstrapping.

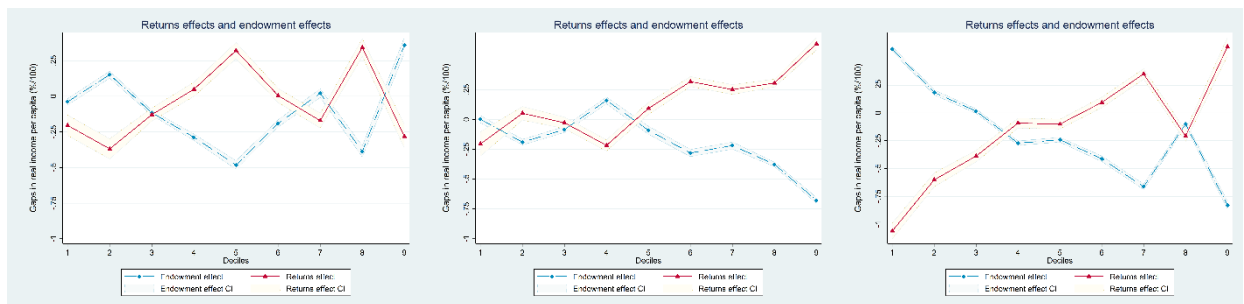
Figure A6. Unconditional disposable-income decile gaps, alternative demarcations of privileged vs. disadvantaged groups: Returns and endowment effects



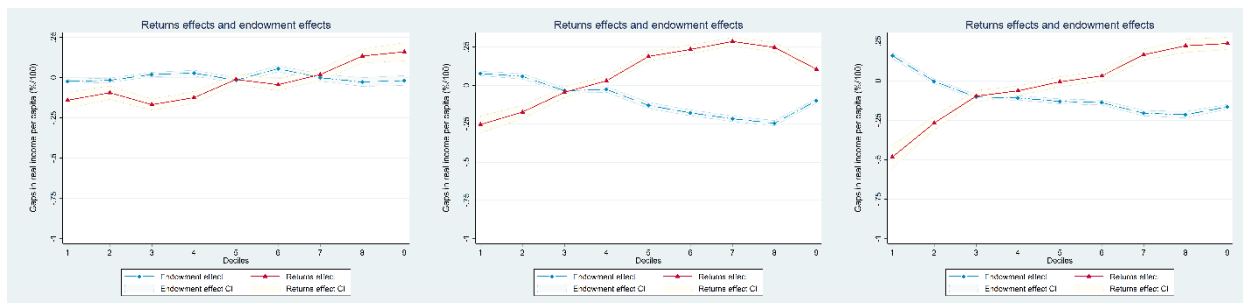
i. Urban vs. Rural residence



ii. Nonfarm vs. Farm HH



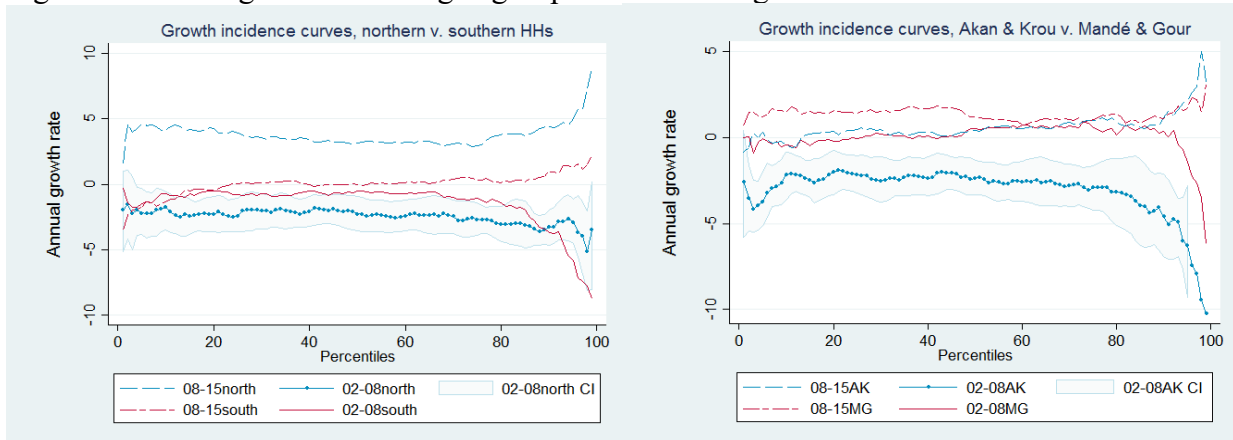
iii. Male vs. Female HH head



iv. Married vs. non-married HH head

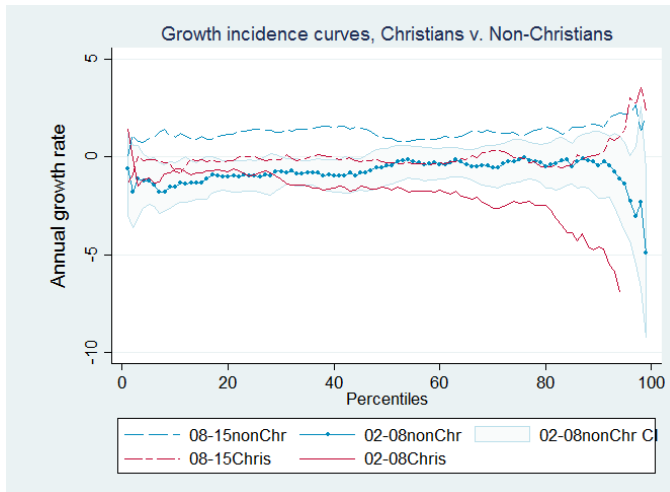
Source: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. Confidence intervals computed using the delta method.

Figure A7. Privileged–disadvantaged group labor-income growth incidence curves



i. South vs. North region

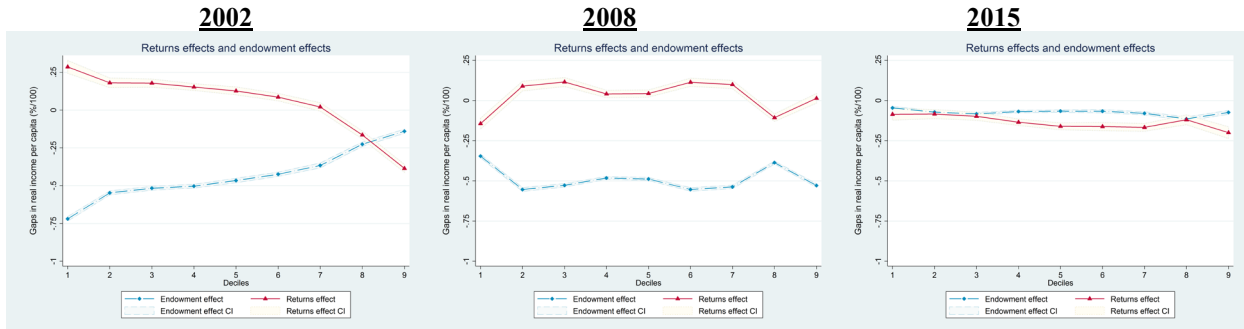
ii. Akan, Krou vs. Mandé, Gour HH head



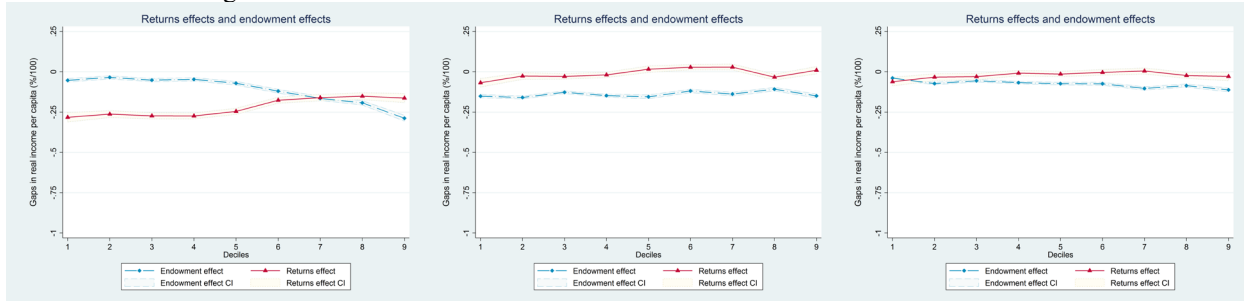
iii. Christian vs. Other HH head

Source: Author’s analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. Confidence intervals computed by bootstrapping.

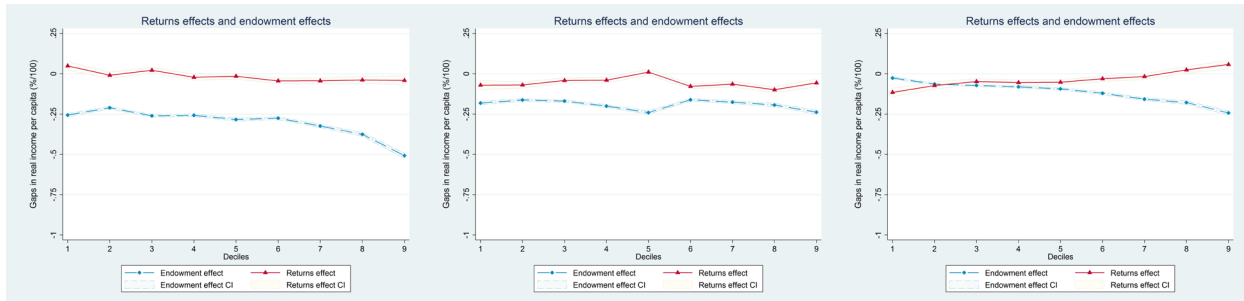
Figure A8. Privileged–disadvantaged group gaps by unconditional labor-income decile: Returns and endowment effects



i. South vs. North region



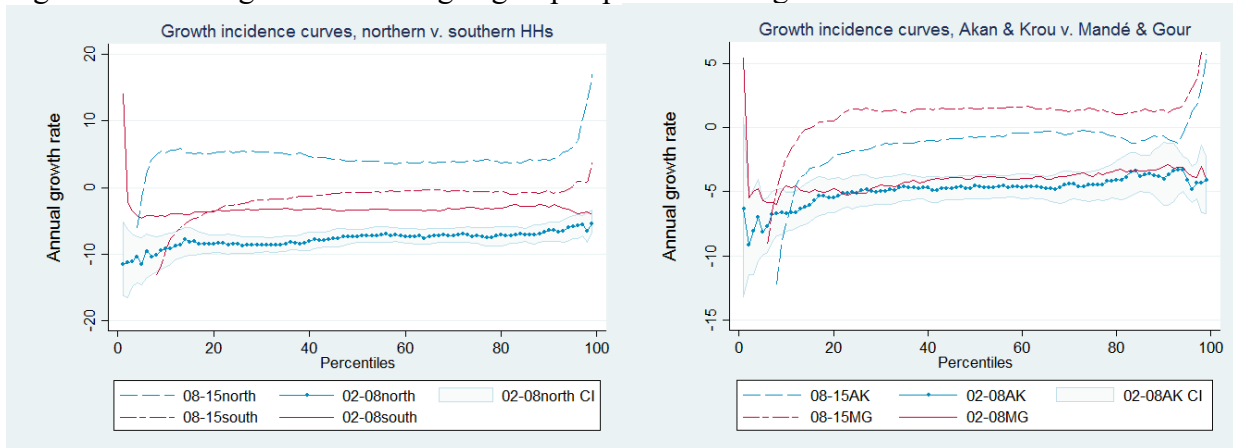
ii. Akan, Krou vs. Mandé, Gour HH head



iii. Christian vs. Other HH head

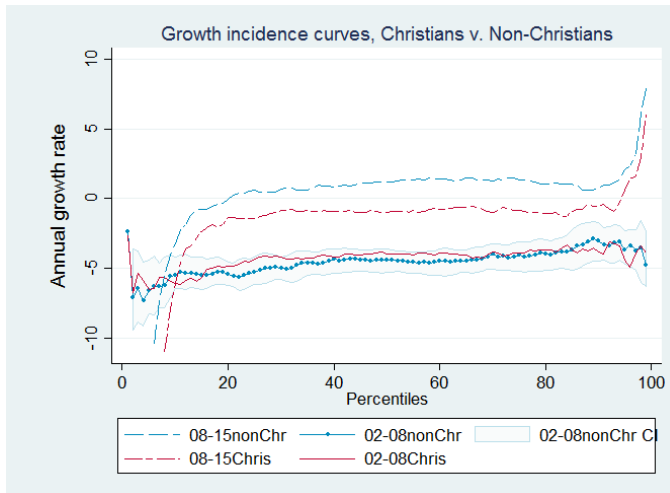
Source: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. Confidence intervals computed using the delta method.

Figure A9. Privileged–disadvantaged group capital-income growth incidence curves



i. South vs. North region

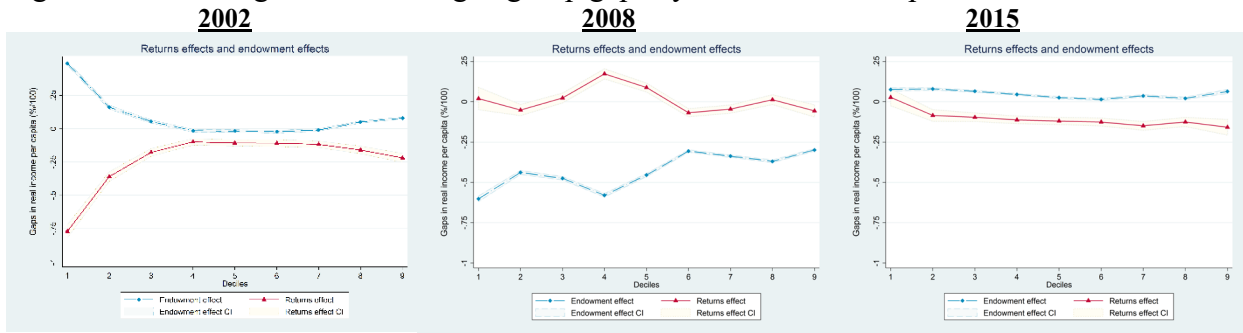
ii. Akan, Krou vs. Mandé, Gour HH head



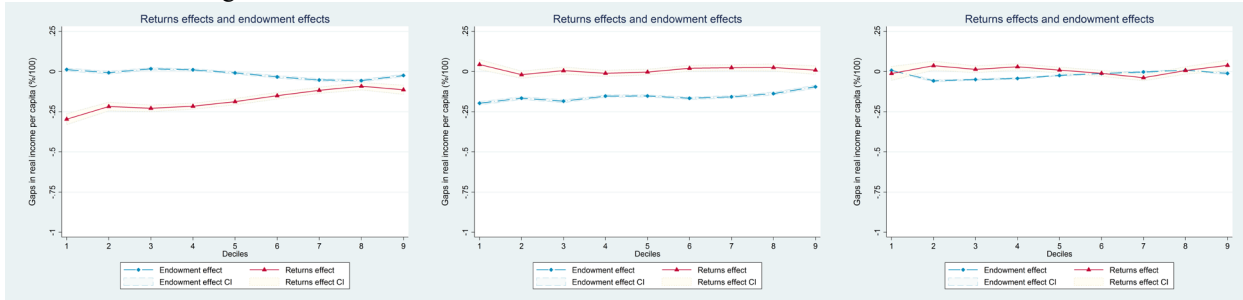
iii. Christian vs. Other HH head

Source: Author's analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. Confidence intervals computed by bootstrapping.

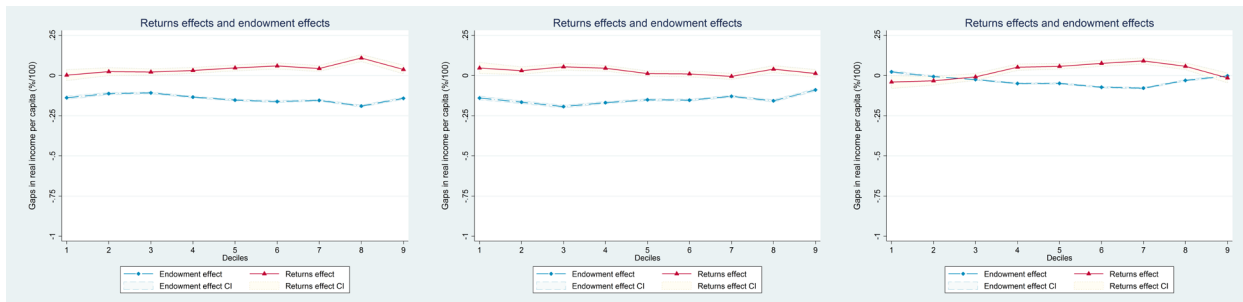
Figure A10. Privileged–disadvantaged group gaps by unconditional capital-income decile:



i. South vs. North region



ii. Akan, Krou vs. Mandé, Gour HH head



iii. Christian vs. Other HH head

Source: Author’s analysis of SHLS 2002, 2008, 2015 (LIS 2019). Population-weighted samples. Confidence intervals computed using the delta method.