A corporate-comparative study of the circle of poverty in the cocoa industry considering Fairtrade policies adopted by Tony's Chocolonely and Lindt & Sprungli

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Date of Submission: 06/06/2025
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Preface

My interest in this research topic stemmed from two Bachelor's courses I took during my second year in the Business and Economics major and during my third year when I was on exchange at Universidade Católica Portuguesa in Lisbon.

One of the most interesting courses in my curriculum at Tilburg University was Institutional Economics, taught by Dr. van der Laan and Dr. Vrooman. The focus was on understanding different aspects of the world and how they interact with economics; some topics explored included the theory of multinational enterprises, the economics of social activism, and differences in work culture as a country comparison. One of the lectures that impacted me the most was "Institutional Effects: The Case of Inequality in Africa," based on a research article written in 2023. Dr. Vrooman delivered this lecture, explaining Kuznets' waves and their application to the economic situation in Africa. I recall that the figure depicted a state of inescapable inequality. This realization sparked my academic interest in researching inequality and the circle of poverty in the African continent.

During my exchange semester, I decided to take a course on economic development because I was interested in this social aspect of economics. During this period, I studied various theories of development, ranging from modernization theory to sustainability frameworks, including post-growth theory. During these months, the lecture on Dependency Theory by Andre Gunder Frank was the one I was most passionate about, as I could correlate it with the topic of inequality in Africa. Learning about the world system of core and periphery country dependency was a new perspective that is very important when discussing development, especially in the case of underdeveloped countries. I would like to mention that what further established this perspective was another course I took on Portuguese culture, where the impact of colonialism was presented, particularly in the case of former Portuguese colonial states such as

Brazil, Mozambique, and Angola. It was highlighted that one of the main reasons these former colonized states are still developing or underdeveloped is primarily due to their Portuguese colonial past.

Therefore, by connecting everything I have studied and understood from these courses, I developed an interest in the region of West Africa and one of its most widely exported resources, cocoa. This was also because I could intuitively deduce that cocoa, something so simple to us, is a luxury for most farmers or children of the farmers. This represents something beyond macroeconomics: a day-to-day, all-level inequality between the Northern and Southern Hemispheres. Beyond my studies, the motivation for the research topic is also due to a personal visit to a museum. In 2024, I visited the Lindt & Sprungli Chocolate Museum in Cologne, and the initial exhibition focused on the process of farming cocoa. The exhibition also addresses a key focus topic of this thesis, the circle of poverty, which will be explored in the next chapter.

To conclude, Dr. Vrooman has consistently encouraged me to pursue this social justice idea and helped me establish more connections between economics and development, expanding my knowledge and interest beyond what I initially thought possible. My aim with this thesis is to raise awareness that, in the 21st century, significant underdevelopment or unsustainable development persists and to emphasize that companies and consumers should focus on having a positive impact on their supply chains.

This thesis is an original and independent research by D.N. Cotiuga.

Abstract

This thesis aims to investigate how corporate action can affect development factors. The case studies used are Fairtrade policies adopted by two European companies, Tony's Chocolonely and Lindt & Sprungli, in the chocolate industry. Since this industry imports its natural resources from less developed countries, this aligns with development theories such as dependency theory, as former colonizing countries import and profit from cocoa. Therefore, within the selected context, the concepts of economics of colonialism, poverty, and inequality are also discussed.

The research question addressed in this thesis is: Do Fairtrade policies adopted by Lindt & Sprungli and Tony's Chocolonely impact poverty and inequality in Côte d'Ivoire and Ghana?
This explanatory and exploratory research uses quantitative analysis to answer the research question. The methodology employed is primarily statistical, utilizing multiple regression and nested models.
The results showed some significance, especially for inequality; however, the primary limitation that interfered with this research was the unavailability of data for the West African region and company data that were reported at an aggregate level. The companies investigated, Lindt & Sprungli and Tony's Chocolonely, are distinct types of companies in the chocolate industry, with one being recognized for its commitment to equity for cocoa farmers (Tony's) and the other for its market notoriety (Lindt).

The data limitations highlight the core of the scientific problem this thesis aims to address: the inequality between the Northern and Southern hemispheres extends beyond socioeconomic development concepts. It applies even in areas such as statistics. In the discussion of the results from the quantitative analysis, future research is considered, including topics such as macroeconomic accountability and raising the standard of corporate reporting, particularly in sustainability reports.

Table of Contents

List of Tables

List of Figures

Chapter 1 Introduction & Research Design

1.1. Introduction

The aspect of a country's development is one of the top priorities that society constantly works on, as it has no finite level. Considering the collective past, countries have taken different paths and reached various stages of development. However, a notable global circumstance is that the Northern Hemisphere has generally developed more than the Southern Hemisphere, and this inequality appears to have been established since the colonial period. In today's globalized world, every individual can either aid or hinder the development of a country through the supply chain, as we are all consumers, regardless of our social status. This thesis examines the impact of sustainable practices in chocolate companies, specifically Fairtrade policies, on development in the West African region. The research question is: **Do Fairtrade policies adopted by Tony's Chocolonely and Lindt & Sprüngli help reduce poverty and economic inequality in Côte d'Ivoire and Ghana?**

The societal implications of this research raise awareness of the relationship between the inequality between the North and South and the inequality in the cocoa supply chain. The unequal economic relationship between African countries and those that import their resources has persisted since the colonial era. From my perspective, the colonial period irreversibly altered the development trajectory of one of the most resource-abundant continents. During the Scramble for Africa, European powers claimed African territories as if they were uninhabited or undiscovered (Kulik, 2025). This imposed structure created long-lasting dependencies in trade and supply chains, which are important aspects of economic development.

The scientific implications concern the unavailability of data for the region, which implies new values for current years that no institution has published, and the creation of a statistical model that investigates the quantitative impact of the policies adopted by Tony and Lindt on inequality and poverty in Côte d'Ivoire

and Ghana. This implies that the research also considers the broader implications of Fairtrade policies in the context of inequality between importing and exporting states while highlighting the dependency theoretical framework.

This research connects cocoa, a commodity central to the economies of West African nations, to broader macroeconomic and socio-economic issues. Cocoa, consumed globally regardless of wealth status, links the past and present of West Africa to the Global North. Even countries without a colonial history, such as Estonia, the third-largest chocolate consumer, are part of this supply chain (CBI Ministry of Foreign Affairs, 2022). Côte d'Ivoire and Ghana together export approximately 60% of the world's cocoa (Del Prete & Samoggia, 2020) in an industry valued at 48.2 billion USD in 2022 and forecasted to reach 69.1 billion USD by 2030 (Polaris Market Research, 2021). It is worth noting that Europe is the largest consumer, importing 61% of the global cocoa beans (MarkNtel Advisors, 2024). However, stark economic differences are still present between exporting and consuming countries; Côte d'Ivoire's GDP in 2022 was 70 billion USD (World Bank Group Data, 2023), while Switzerland, a country with one of the highest per capita chocolate consumption rates, had a GDP of 818 billion USD (Trading Economics, n.d.). This is nearly twelve times higher. These figures highlight that those who consume cocoa benefit economically far more than those who produce it. For example, a documentary from VPRO captured this inequity vividly: farmers in Côte d'Ivoire taste a chocolate bar for the first time and comment: "To be honest, I do not know what they make of my beans" and "I have heard they are used as flavoring in cooking, but I have never seen it. I do not even know if it is true" (Hallahan, 2014). Beyond economics, this imbalance raises social concerns. The export-import relationship between West African producers and European companies is marked by child labor and trafficking. In 2018, 2.1 million children were farming in cocoa (Terazono, 2018). This is linked to broader challenges: persistent inequality, entrenched poverty, and high demand that drives exploitation. Farmers often cannot afford the products made from their labor (Payne, 2005). Cocoa's supply chain reflects deeper socio-economic and ethical issues that require sustainable development efforts.

The following section presents the theoretical foundations of inequality between the Global North and South. The economic inequalities discussed above align with the dependency theory of Andre Gunder Frank (Frank, 2010). This theory critiques historical power imbalances rooted in colonialism and imperialism, such as those created during the Scramble for Africa. As Nkrumah (1965, p.13) notes: "The products that come from above and below her soil continue to enrich, not Africans predominantly, but groups and individuals who operate to Africa's impoverishment." Slavery ensured that African producers earned far less than the value of their output, a condition that stabilized global inequality and poverty (Terreblanche, 2018). The continuation of poverty in Africa can be attributed to how the continent was divided and economically structured by Global North powers. This research focuses on dependency theory because it suggests a correlation between European chocolate companies, fair trading practices, and equitable payment for farmers. These practices should reflect the market prices and economic justice.

The following paragraph introduces the global supply chain of the chocolate industry, the Fairtrade movement, and how companies like Tony's Chocolonely and Lindt & Sprüngli apply these principles. Cocoa farmers still earn less than USD 1.90 per day. Forced labor, including children, is widespread. Excessive demand also leads to deforestation and biodiversity loss (Lamare et al., 2023). In 1997, efforts were already underway to address these issues with the establishment of Fairtrade International. Since 2004, it has consisted of two branches: Fairtrade International, which sets standards and supports producers, and FLO-CERT, which monitors compliance with these standards (Dine & Granville, 2012, p. 277-279). As of 2022, more than two million farmers worked under Fairtrade certification. Of these, 26% were cocoa producers. Fairtrade Premiums totaled €223 million, and 1,539 small-scale producer organizations and 347 hired labor organizations participated (Shahbandeh, 2024). These numbers highlight Fairtrade's role in the cocoa sector. One of its key strategies is providing a minimum price and a premium for organic production (Fairtrade International, n.d.). According to the Fairtrade Foundation publication, a Fairtrade premium represents: "On top of the price farmers and workers receive for their

produce or labor, they receive an extra sum of money to invest in improving the quality of their lives" (Fairtrade Foundation, 2025, Fairtrade Premium section).

One of the motivations behind exploring the topic of development is the existence of the Sustainable Development Goals (SDGs) and the 2030 Agenda for Sustainable Development. Regarding the West African region and all the developing and underdeveloped parts of the world, all the targets are important, highlighting the significant development gap between core and peripheral countries. For example, the goals for Ghana and Côte d'Ivoire start with the first target, *'no poverty*,' and progress up to the last target, *'partnerships for the goals*.' In contrast, for European countries, it can be deduced that the focus would be oriented towards the last targets, such as *'peace, justice, and strong institutions'*. All of the SDGs have the following mission: "recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests" (United Nations, 2025). This background motivation for exploring poverty and inequality suggests future research on the connection between Fairtrade and the SDGs, as well as the impact of the cocoa supply chain on development goals.

As a general trend, more companies are adopting sustainability standards related to topics such as Corporate Social Responsibility (CSR). In the chocolate industry, Lindt & Sprüngli is one of Europe's best-known chocolate companies. Lindt mentions on its website that it sources cocoa beans from Ghana, noting that 90–95% of global cocoa production is located in West Africa (Lindt & Sprüngli, 2024).
On the other hand, Tony's Chocolonely, a Dutch company, primarily focuses on Fairtrade principles in its supply chain. It claims to fight cocoa production exploitation and pay farmers a living income premium (Tony's Chocolonely, 2024). To explain where these two companies situate themselves financially, Lindt had a net income of CHF 855.8 million in 2023 (Lindt & Sprüngli, 2023, Annual Report), while Tony earned €150.2 million in revenue. The two companies differ in scale and reporting. Tony's Chocolonely

reports extensively on its equity programs, while Lindt emphasizes financial performance over social impact. This contrast justifies a comparative analysis of the companies' Fairtrade strategies outcomes.
It is worth noting that a research gap exists regarding corporate data. Lindt, a long-established company, provides limited data on its social impact. Tony focuses more on Fairtrade outcomes, but it is difficult to access its financial outcomes, which raises questions about its long-term viability. The premiums Tony refers to are also considered financial help for the farmers' income. They can be used for investments in agricultural developments, such as machinery, training, fertilizers, central water pumps, and nurseries for cocoa trees. These aspects enhance farming productivity (Tony's Chocolonely, 2025, Tony's Impact Section). In the 2023/2024 season, Tony reported revenues of €200.1 million, with a gross margin of 40.5%, and paid €2,200 per metric ton to Ivorian farmers and €2,005 to Ghanaian ones. Apart from these implementations, Tony achieved 100% traceability of cocoa beans, a score Lindt did not match due to gaps in tracing other cocoa products (Lindt & Sprüngli, 2023).

Another important issue that should be acknowledged is how local governments in Ghana and Côte d'Ivoire address poverty and inequality. European government reports acknowledge the imbalance between demand and natural resource exploitation but do not suggest ways for these countries to diversify their economies. There is little discussion about how shifts in demand, such as a move toward artisanal chocolate, might affect local farmers. Côte d'Ivoire, as the world's largest cocoa exporter, is particularly vulnerable. Therefore, Fairtrade policies should have a significant impact in helping farmers and the societies of Côte d'Ivoire and Ghana develop sustainably so that they can face the trends and challenges that may arise in the cocoa industry.

To conclude this introductory chapter, which has presented the motives for studying these topics and the research question, the next chapter will discuss the literature and theoretical framework to understand the societal and scientific aims of quantitative analysis. The thesis concludes with a discussion chapter that

interprets the results in greater depth and discusses their implications for future research and for a society that should prioritize sustainable development.

1.2 Research Design

This thesis is supported by explanatory and exploratory research, considering that insufficient data is available for the Western African region. Given that the analysis is defined by a statistical model of multiple regression, conducted with two dependent variables, two independent variables, and two control variables. The research question aims to investigate the effects of Fairtrade policies on poverty and inequality. Consequently, one of the dependent variables will be the poverty rate, and the other dependent variable was initially planned to be the Gini Index. Given the data unavailability issue, as the last Gini index available for Ghana is from 2019 and for Côte d'Ivoire from 2021, this did not match the time frame of this study, which is 2021-2024. Another issue with using the Gini Index was the difficulty of the calculations, which did not align with the researcher's abilities, as explained in the study "A regression method for estimating Gini index by decile" (Shen & Dai, 2024). Therefore, the research design was modified during the writing process, specifically in the Data and Methodology section, and it was decided that the two dependent variables would be the poverty rate and the Human Development Index. All of the variables are also detailed quantitatively in the third chapter. The hypothesis created for the statistical model are:

The Null Hypothesis presents no statistically significant effect of Fairtrade policies from Tony's Chocolonely and Lindt & Sprüngli on poverty and inequality in Côte d'Ivoire and Ghana. The Alternative Hypothesis suggests that Fairtrade policies implemented by Tony's Chocolonely and Lindt & Sprüngli have a positive impact on poverty and inequality in Côte d'Ivoire and Ghana.

Chapter 2 Literature Review

This literature review will examine the connection between the most important concepts related to the research question, such as inequality, the cycle of poverty, dependency theory, and colonialism, from an economic perspective. The reason for approaching them in detail is to illustrate why companies like Tony's and Lindt adopt Fairtrade policies and how it impacts the development of Côte d'Ivoire and Ghana. The economics of colonialism will be discussed from the perspective of Fred Monroe Gottheil, as his 1977 writing, "On an Economic Theory of Colonialism," provided mathematical descriptions of the output and input of colonialism, particularly regarding the export of natural resources from colonized countries. It also acknowledged the different economic views of colonialism and the research gap at that time. The concept of the circle of poverty will be reviewed primarily through the ideas of Peter Bauer and his writings, such as "The Vicious Circle of Poverty" (1965) and "The Dissent on Development" (1976). Lastly, inequality will be discussed while considering the perspective of Michalis Moatsos. The literature was obtained through online libraries, including JSTOR, Google Scholar, and the Tilburg University online library's WorldCat Discovery.

2.1 Economics of Colonialism

To understand the concept of the circle of poverty and how the African continent and the Western region ended up in this condition, the following section will outline its past through the economic impact of colonialism. It should be mentioned that the circle of poverty refers to: "a state in which a family cannot escape poverty without outside intervention" (Kennedy, 2024, 'Overview' section).

One theoretical definition from an economic perspective will be presented: "Colonialism represents a set of structures that are imposed upon a nation by another to affect international distributions of income and wealth"(Gottheil, 1977, p.85). This definition was chosen to classify colonialism, as it best correlates the dependent theory with the circle of poverty and inequality. The author highlights a gap in the economic

literature: the perspective of the colonized nation on the financial performance of colonialism. This could be because, during the 70s, scholars from former colonized countries were not as present as Western academics, given the discrepancy in the development stages of the global hemispheres. For example, the first university in Cote d'Ivoire was established in 1964 (Département d'histoire de l'université de Cocody-Abidjan, 2007). Most of the former colonized states gained their independence approximately fifteen to twenty years before Gottheil wrote his paper. The fact that Gottheil wrote about colonialism in 1977 as a Western scholar can be considered incongruent with the effects of colonialism in perpetuating discrepancies between the Global North and the Global South.

On the other hand, the paper discusses the duality of colonialism, exploitation, and privilege and how, due to social or even psychological factors, it creates impositions. This appears to be because foreign technology and investment were not utilized for the sustainable development or future of the colonized people. For example, the British colonizers did not let the cocoa farmers in Ghana build their train railway in order to make the cocoa transport more efficient: "The only reason that Asante had not previously built a railway to the coast was because the British colonial office had blocked it" (Heldring & Robinson, 2012, p.21).

2.1.1 A different economic perspective of colonialism

Regarding the economics of colonialism, one more aspect must be mentioned: there is also the economic view that colonialism stopped wasteful wars. Stephen Enke mentioned that colonialism is a development that improves political stability, increases labor productivity, and reduces famine (Gottheil, 1977, p.94). Stephen Enke's works such as "Consumer Cooperatives and Economic Efficiency"(1945), "The Economic Aspects of Slowing Population Growth" (1966) or "Economic Development with Unlimited and Limited Supplies of labor" (1962) suggest that the writer has an interest toward economic efficiency, even if it implies austerity. In another article from 1969, the author reiterates that a primary focus must be on increasing labor without specifying whether it would be forced labor, which would result in an increase in

income per capita that would generate more demand, thereby promoting development. Stephen Enke analyzes this shift as he considers the transition from agriculture to the industrial sector, which bears similarities to Rostow's stages of growth. This framework also encompasses industrialization and capitalistic societies as examples of economic development. Therefore, it can be stated that Enke's definition of colonialism and views were not favored compared to Gottheil's explanation, as they do not incorporate the frameworks of dependency theory or human development theory. Nevertheless, the contrary view of colonialism as economically efficient was necessary to mention in order for the reader to truly grasp how colonialism was perceived and understood by scholars, particularly those from developed countries. To conclude this section in light of the academic views presented by Gottheil and Enke, colonialism as an economic strategy based on efficiency contributed to the underdevelopment of the colonized countries.

2.1.2 Direct vs Indirect Colonial Rule

Considering the two economic perspectives of colonialism presented in the sections above, one social-historical aspect that ties them together is the fact that no standard established dynamic existed between the colonized and colonizer. In an article from 2020 that compares the indirect and direct colonial rule on the African continent, it is mentioned that the French Empire employed a direct strategy through force and hostility, while the British Empire chose an indirect rule through cooperation (Muller Crepon, 2020, p. 707).

However, the author presents the exceptions to this dynamic, with one of them being the forced colonization of the Ashanti kingdom in Ghana, which had initially experienced direct colonial rule by the British but, given the continuous nationalist movements of the Ashanti people, the colonial dynamic shifted to indirect. The reasons behind the different approaches to colonial rule between the British and French are primarily concerned with internal political governance and formation, as well as the historical

methods by which other regions were colonized. For example, the British Empire applied self-governance before in Canada and South Africa (Muller Crepon, 2020, p. 715).

Given the framework of indirect and direct colonial rule, cocoa production also plays a significant role for Côte d'Ivoire and Ghana, as it is one of the most exported resources to the colonial powers. Cocoa farming was made mandatory during Côte d'Ivoire's colonial period, exhibiting forced labor. As the farmers from Côte d'Ivoire opposed these measures, they migrated to other parts of the country to expand their land holdings and stop farming for European plantations. After independence, the newly formed government provided aid to local farmers and expanded land to grow the cocoa sector with the help of migrant workers from Mali and Burkina Faso (Ould et al., 2004, p. 7). However, considering the indirect colonial rule of Ghana, the next section will detail the relationship between cocoa production in this context.

2.1.3 The Case of Ghana

In light of the theories and perspectives discussed on colonialism, one aspect that will be reviewed is how Ghana managed its cocoa production during and after colonial times. The reason for presenting the case of Ghana is due to its economically contradictory situation: Ghana was the largest producer during the colonial period but was overtaken by Côte d'Ivoire after independence (Bajan, 2023).

In Ghana's case, cocoa production declined after independence, and the country is no longer the world's largest cocoa exporter, as it was under British rule (Leiter & Harding, 2004). Although, an interesting contradiction arises because the industry sector was not developed with British aid as the colonial power did not want to invest its money in the cocoa industry in Ghana (Hymer, 1971, p. 141); instead, the sector was developed using Ghanaian finances. This was because they were afraid the farmers would neglect the production. They also did not understand the farming process and considered it unhygienic, which justified the low price of the chocolate products sold in Europe. After independence, the government's

involvement in production resulted in a limited potential: "Government agencies often became involved simultaneously in price stabilization efforts that disconnected the producer price from the market price, planting subsidies, fertilizer and pest control assistance, and husbandry improvement programs to encourage increased production" (Leiter & Harding, 2004, p.124). It also created problems regarding payment to producers because, in the late 1960s, the government paid farmers less than the world price (the price customers pay for the product) as cocoa became a source of tax revenue (Leiter & Harding, 2004).

It can be perceived that once the government of Ghana got involved, the production level went down because they perpetuated the colonizers' work ethic, resulting in unfair wages and austerity. Therefore, the legacy of colonialism remains present in sectors that impact development, as it affects both the macro and micro levels.

2.2 The Circle of Poverty and Its Economic Implications

One concept that represents the connection between the past and present economic inequalities in the African continent is the circle of poverty. As described by P.T. Bauer in an article (1965), the circle of poverty is the inescapable obstacle that poor countries face regarding development or raising the national income. The outcomes of the circle of poverty are narrow markets, small demand, insufficient government revenues for public spending, low healthcare, and insufficient private investment. This illustrates the connections between development theories and inequality presented throughout this literature review.

These aspects are interconnected and can be both cause and effect, which makes the circle of poverty vicious. Another explanation offered in this article is that poverty is inescapable because there is a need for more financial resources. However, because these countries are already in a poor state, they cannot afford an extra state of austerity (Bauer, 1965, p. 5), such as imposing extra taxes or adopting a financial

mentality of saving for tomorrow when there is not enough money for today. From a fully economic point of view, the issue stems from the demand and supply relationship and the aspect of low productivity levels: "On the supply side, there is the small capacity to save, resulting from the low level of real income. The low real income is a reflection of low productivity, which is largely due to the lack of capital.[...] On the demand side, the inducement to invest may be low because of the small buying power of people, which is due to their small real income, which again is due to low productivity" (Bauer, 1965, p.5). The author presents a cyclical relationship between these economic factors to illustrate several aspects that contribute to the issue of poverty. In the mentioned article, Bauer adopts a somewhat microeconomic approach to the circle of poverty, which results in omitting the fact that poverty also has social and political implications that are still tied to economics through concepts of macroeconomics, such as the dependency theory developed by Andre Gunder Frank in the 1960s.

Therefore, there is a connection between the dependency theory and the circle of poverty in former colonized countries. This is highlighted by the fact that the written approach to international trade theory was not respected: productivity outcomes are distributed to manufacturing countries, but most economic advantages from trading are reserved for core countries, not the periphery (Randall & Theobald, 1985, p. 128).

Dependency refers to the idea that the underdevelopment of some countries is a price paid for the development of others. Given its overall and, in particular, economic history, it is understood as the development of the Global North, specifically the European and Northern American continents, and the underdevelopment of the Global South, including Africa, Latin America, and Asia.

2.2.1 Generational Poverty

Additionally, when discussing the circle of poverty, it is essential to consider that there are two types: generational and situational**.** Continuous poverty perpetuates the cycle of poverty, often related to generational poverty, rather than situational poverty, which occurs due to a specific circumstance.

Generational poverty encompasses economic and societal aspects, including education, health, and culture, as it transcends time and is a per capita issue (Payne, 2005). The cases of Côte d'Ivoire and Ghana represent generational poverty because it has been inherited over an extended period, and it has not recently occurred due to a global event like the pandemic. Given the fact that this is generational, there is an accumulation of socio-economic factors that perpetuate this state of poverty: not enough or no access to health care and education, unemployment, displacement, and low national income, which also affect the individual income of the people (De Schutter et al., 2023, p.18).

In the case of Côte d'Ivoire, healthcare is ranked as one of the poorest not just globally but also in the West African region (World Health Organization, n.d), with a life expectancy of 63.5 years in total, compared to the world average of 71.4 and with most causes of death, as of 2021, being lower respiratory infections and preterm birth complications (World Health Organization, n.d). On the other hand, France, which colonized Côte d'Ivoire until 1960 (University of Central Arkansas, 2025), has a life expectancy of 81.9, and the primary cause of death is ischemic heart disease (World Health Organization, n.d.). Another comparison can be in terms of immigration: in 2024, 79 thousand British nationals emigrated from the UK (Office for National Statistics, 2024), while Ghana, which obtained its independence in 1957 from the UK (Ministry of Foreign Affairs and Regional Integration Ghana, n.d), 970 thousand Ghaninas left the country for the long-term in 2019 (Integral Human Development, n.d). From these statistics, it is apparent that there is a difference in societal aspects between the colonized countries and the former colonizers. This stems from the inequality established by the dependency paradigm, as periphery countries are left less developed than core countries, as observed in the statistical comparisons discussed above. Therefore, the dependency on exporter countries affects the lives of their inhabitants, resulting in even more advanced and challenging poverty and displacement.

2.3 Dependency Theory

This section presents the dependency theory, which examines the connection between the economics of colonialism and the cycle of poverty within a theoretical framework.

The dependency theory emerged as a critique of modernization theory and the five stages of growth (Rostow, 1991): Traditional Society, Preconditions for Take-off, Take-off, Drive to Maturity, and finally, the Age of High Mass Consumption. The issue with the modernization theory was that it assumed all countries must follow a particular pattern of development without accounting for factors such as different histories and cultures. It also ignored the fact that the Global North and the Global South were in opposite economic states because of enforced economic systems like colonialism. On the other hand, if dependency criticized modernization as not accounting for historical economic factors, Andre Gunder Frank's theory can also be questioned through Bauer's reflection on "The Dissent of Development" (1976). It is suggested that the circle of poverty is attributed to an international demonstration effect, which means that the interaction between developed and underdeveloped countries hinders the capital formation of the Global South. What signals development is not dependency or settled progress steps but the following: "Economic achievement and progress depend largely on human aptitudes, on social and political institutions and arrangements which derive from these, on historical experience, and to a lesser extent on external contacts, market opportunities, and natural resources" (Bauer, 1976). This view of Bauer on development is related to Amartya Sen's views in "Freedom of Development" (1999), where it is suggested that underdeveloped countries are also deprived of freedom through poverty, which obstructs social and political development. Sen mentions that these freedoms, such as opportunities for basic education, are constituents of development and complementary. This reflects the idea that social, political, and economic freedom ultimately leads to development and should be treated together in order to achieve progress (Sen, 1999, p. 10). In this case, it appears that poverty in former colonized countries is a form of forced isolation sustained by dependency ties.

2.4 Contemporary Inequality and the Role of Development Strategies

This section introduces the topic of inequality, as researched by multiple scholars, who focus on its actual causes and effects. In an article from 2024 by J. Hickel and D. Sullivan, it is clearly stated that universal convergence, which in terms of development suggests that developing countries converge to the level of developed countries, is unlikely to occur by following a linear path. This concept is similar to the one described by modernization theory. An example of a modernization technique is raising the GDP per capita by increasing the utilization of resources and output (Hickel & Sullivan, p. 1). This article cites one of Michalis Moatsos' papers. A scholar who studies inequality and poverty noted that the percentage of extreme poverty in 2018 in Sub-Saharan Africa was 37%, while in Western Europe, where many chocolate companies are based, it was 1% (Moatsos, 2021, p. 197). This can be classified as a mere example of macro-level inequality between two parts of the world. In order to relate this to the idea of universal convergence, the percentage of the cost of basic needs in extreme poverty is 0% for the Netherlands and 61% for Kenya (Moatsos, 2021, p.198), which means that the idea of Sub-Saharan African countries achieving a similar level of GDP per capita as countries in Europe is technically impossible shortly.

The paper by Hickel and Sullivan illustrates a research inclination towards the views of dependency theory, suggesting that globally, we should not continue to accept the established trade-offs made by core countries to periphery countries. They also acknowledge the ideas of Amartya Sen: "Strategies for poverty reduction and development should not pursue capitalist growth and increased aggregate production as such but should rather focus on increasing the specific forms of production that are necessary to improve capabilities and meet human needs at a high standard, while ensuring universal access to key goods and services" (Hickel & Sullivan, 2024, p. 2). In light of these considerations, the paper presents a need-based analysis that suggests focusing on the output produced and whether everyone has access to it (Hickel & Sullivan, 2024, p. 7). It is worth noting that this article also explores aspects of

ecology and sustainable production. Therefore, it assesses poverty reduction while assuming ideas that do not affect the environment.

In terms of development, an OECD review from 2016 of Côte d'Ivoire stated that its economic target for 2020 was to emerge (OECD Development Pathways, 2016, p. 17). The Merriam-Webster dictionary defines emergence as the act of emerging, which refers to something newly formed or visible (Merriam-Webster, 2025). An economic definition of emergence that appears in the Journal of Economic Behavior and Organization is: "Emergence occurs when wholes (e.g., the economy) produce outcomes that differ categorically from those that the parts (e.g., human agents) can produce individually" (Harper & Lewis, 2012). Regarding cocoa, the focus was on increasing its presence in the value chain through transportation and water transportation (OECD Development Pathways, 2016, p.40) by implementing the main idea of emergence. In a table illustrating the aspects of the diversified and industrialized economy, there are few aspects related to high-potential agro-industries of the cocoa product, such as building the brand of "Made in Côte d'Ivoire" (OECD Development Pathways, 2016, p.121), which would give more corporate visibility and therefore would be possible to result in emergence in the value chain. It must be noted that this report does not include information about the Fairtrade elements that some farmers in Côte d'Ivoire receive, such as Fairtrade premiums, nor does it mention if these specific Fairtrade policies had any impact on the local economy.

However, the OECD paper, in its section dedicated to diversified and industrialized economies, mentions the following: "plans to overhaul them comprehensively to tackle poor access to services and key inputs for small farmers and their physical dispersion, perhaps by combining some of them and locating them close to major input suppliers" (OECD Development Pathways, 2016, p.38). This indicates that development plans are also oriented towards efficiency and acknowledge the difficulties that farmers experience, as seen in the small-sized farm described by Carol Davis during her research in the village of Bangolo. On the other hand, this idea raises concerns regarding the underdevelopment of rural areas,

which results in deepened local inequality, and in the development strategy that would be implemented. The difference in impact from the Fairtrade premiums given to small and large farmers illustrates the connection between inequality and Fairtrade policies.

As described in the latest Fairtrade Monitoring Report (2024), Fairtrade premiums, especially for small-scale producers, go directly back into production, business organization, and financial development. At the same time, the smallest percentage is invested in support for workers or environmental practices (p.20). Therefore, this raises questions in the literature about how workers in small-scale production enterprises are actually assisted and how these premiums concretely benefit them. This assumption can be debated because hired labor organizations invest 75% of their Fairtrade premiums into social investment, meaning that small-scale enterprises aim to develop themselves to become hired labor organizations and then expect them to invest in society. It is worth mentioning that both categories invest the lowest percentage, 1%, in environmental measures, which raises questions regarding the strategy in light of the climate change impacts on the agricultural sector, which affects most of the Global South region. Consequently, many scientific gaps need to be investigated, using both quantitative and qualitative methods, as well as examining the discrepancies between large-scale cocoa producers and small-scale farmers and their impact on the global cocoa supply chain.

2.4.1 Fairtrade and Scientific Gaps in Cocoa Research

A gap in the literature is the autonomy that producers or producing companies have regarding the Fairtrade premiums and the regulations that Fairtrade International would consider upon detailed ground investigations. As presented in the section above, the 2023 case study (Lamare et al., 2023) that investigates sustainability in the chocolate industry, along with the experience of one researcher, Carol Davis, in Côte d'Ivoire's cocoa plantation, is presented. The research examined the supply chain of cocoa to chocolate, typically from bars to beans. Carol Davis observed farmers who were not part of the

Fairtrade program. In the village of Bangolo, she observed a lack of access to proper health care and education. Also, she got to see a very small-sized producer organization where the whole family, including children, was involved in the farming process: "Ibrahim's harvest was tiny, amounting to an average of four bags of cocoa beans per year. As a sharecropper, Ibrahim had to return two-thirds of his harvest income to the owner of the land (Lamare et al., 2023). One thing that must be considered is that, typically, small-scale producers participating in Fairtrade are not like Ibrahim, working solely with their family, because they must comply with specific standards, including micro-development initiatives such as digital systems and written contracts (Fairtrade Standard for Cocoa, 2023). These observations suggested that it might be complicated for Fairtrade to reach the small farmers, who often resort to child labor to be time-efficient in transporting cocoa for export.

Future research can examine the extent to which Fairtrade mechanisms impact the farmer's market in the cocoa supply chain. Therefore, the relevance of the research question is enhanced because it proves the necessity of investigating how the outcomes of Fairtrade policies adopted by two companies in the industry positively or negatively affect the economic situations of poverty and inequality in Côte d'Ivoire and Ghana. An interesting aspect mentioned in the case study is the corporate shift that chocolate companies adopt, creating their own Fairtrade or sustainability measures instead of partnering with Fairtrade International (Lamare et al., 2023). In the next chapter, the sustainability reports of Lindt and Tony, the two companies analyzed in this research, will be discussed as they have Fairtrade measures but not Fairtrade International collaborations. Nevertheless, this movement of global acknowledgment that farmers need to be adequately paid has created the standards companies now use.

2.5 Conclusion of Literature Review

In conclusion, through the literature review, we can understand why there is a fundamental inequality in the chocolate industry supply chain and why this aspect of generational poverty stems from the colonial past and is perpetuated in the present. The measures that we take as a society, through Fairtrade or the

companies' Fairtrade measures, represent steps taken to break the cycle of poverty and austerity for the farmers. It is worth analyzing the companies in the chocolate industry and their sustainable measure towards a fair living income for the farmers because most people are consumers and represent an important aspect of the global chain, one that can shift dynamics and hierarchies. The literature sources that were presented and analyzed are meant to highlight the connection between theoretical notions and how they apply in society. For the economics of colonialism, dependency theory and circle of poverty pioneering and formative ideas were discussed, while the concept of inequality is presented through more recent research. The analytical framework offers an in-depth understanding of the ideas that consolidate the research questions and the aim of the quantitative analysis. The next chapter will describe the process of data collection and processing.

Chapter 3 Data and Methodology

This chapter presents the data for the analysis that has been collected, and the methodologies to be used in the next chapter include the statistical analysis of the research question: Do FairTrade policies adopted by Tony's Chocolonely and Lindt & Sprungli help reduce poverty and economic inequality in Côte d'Ivoire and Ghana? The data that was selected is quantitative and is primarily based on processing corporate and macroeconomic data analysis to obtain the data table. It should be mentioned that the values for the financial variables such as annual investments and GDP are converted to the USD currency.

3.1 Data analysis: Methodology and Model

The following paragraph will explain the quantitative analysis methodology with the main regression model and its variables. As stated through the research question and the hypothesis, the model is intended to analyse primarily how two independent variables, taken from the reports of Lindt and Tony in order to represent the Fairtrade policies, affect two dependent variables, the poverty rates of Ghana and Côte d'Ivoire and the Human Development index also of both countries.

The statistics program I used is SPSS due to academic knowledge and prior experience. According to theoretical texts, multiple regression is the statistical methodology that works best with the intention of the research question. This is due to the fact that there are more factors, such as multiple Fairtrade policies, that affect poverty and inequality, because: "Multiple linear regression analysis is a method for estimating the effects of several factors concurrently" (Schroeder et. al, 2017). The statistical technique I chose is nested models for each dependent variable, within multiple regression; the first model contains only the dependent variable, the two controlling variables and the dummy variable created for the companies. This is to show if there is any variance in the HDI and poverty rate explained without the implication of Fairtrade policies. The larger model includes the same variables as in the smaller one, based on the nested model statistical method, but it also includes the annual investments and farmers variable. The larger model is aimed at analyzing if adding more factors, than just GDP and Population,

explain the variance in the dependent variable better and if, in a regression model, farmers or annual investments have an effect on poverty rate and HDI.

The equations 1 to 4 for each dependent variable are the following:

Model 1: $Y1 = \beta0 + \beta1 * GDP + \beta2 * Population + \beta3 * Company$ *(eq. 1)*

Model 2: $Y1_2 = \beta0 + \beta1 * GDP + \beta2 * Population + \beta3 * Company + \beta4 * AnnualInv + \beta5 * Farmers$ *(eq. 2)*

Model 3: $Y2 = \sigma0 + \sigma1 * GDP + \sigma2 * Population + \sigma3 * Company$ *(eq. 3)*

Model 4: $Y2_2 = \sigma0 + \sigma1 * GDP + \sigma2 * Population + \sigma3 * Company + \sigma4 * AnnualInv + \sigma5 * Farmers$ *(eq. 4)*

H0: $\beta4 = 0, \beta5 = 0$; H0: $\sigma4 = 0, \sigma5 = 0$.

HA: $\beta4 \neq 0 \parallel \beta5 \neq 0$; HA: $\sigma4 = 0; \sigma5 = 0$.

The Null Hypothesis states that: there is no statistically significant effect of Fairtrade policies, such as annual investments in sustainable cocoa sourcing programs and number of farmers included in these farmers, from Tony's Chocolonely and Lindt & Sprungli on poverty and inequality in Cote d'Ivoire and Ghana. The motivation behind the analysis of this hypothesis is to look at the policies in particular without the effect of the controlling variables on the independent variables. As mentioned, this was done in order to be able to look at how the annual investments and number of farmers involved in the programs, together behave directly towards the dependent variables, poverty rate and HDI.

Given the realistic limitations of investigating two countries where not enough data is available and looking at two companies that are different in size, financial-wise, two controlling variables will be added to observe more concrete results of the statistical analysis. These are population and GDP, both for Ghana and Côte d'Ivoire. I also intended to add more controlling variables, such as production of cocoa metric tonne from each company but the results are on an aggregate level. In my opinion this affects the validity

of the statistical analysis even more given that there is already one independent variable on an aggregate level. The decision to choose a regression model is because it is the most optimal way to study the relationship between concepts that are part of macro and microeconomics; this way, it is more facile to interpret and draw conclusions about the relationship between these variables, which to sum might be intuitive but not proved yet.

In regards to statistical modelling methodology, it must be mentioned that initial drafts were nested models with three models and independent samples t-test analysis. The nested models with three equations had the same two first models and the third model had two extra variables, the interaction terms between annual investments and GDP and farmers and population. The issue was that the interaction term had very high levels of multicollinearity, with VIF values of approximately 17000 which means that the models were wrong and those interaction terms needed to be eliminated. This was because of the limitation that the data is small and the aggregate level of the farmers and annual investments variables creates the effect of overfitting data. An independent sample t-test was also not performed because the dummy variable used to represent the companies does not represent something similar to a treatment effect, or they are not coded as 0 for “No” and 1 for “Yes”, they just represent the companies - therefore a group means test could not be performed.

3.2 Data methodology - Independent Variables

This section will present the data used for the independent variables of the statistical regression models that correspond to the hypothesis deducted from the research question. I obtained the data for the independent variables from the Sustainability Reports of Lindt and Sprungli and the Annual Reports of Tony's Chocolonely, all of which are available on the companies' websites. It is worth mentioning that the analysis is from 2021 until 2024, based on the reading of these reports. This is because no quantitative data was available in the Sustainability Reports of Lindt and Sprungli from 2010 until 2018, with the company only presenting qualitatively what their sustainability targets are every year. Also, in the year

2018, Côte d'Ivoire was not part of the Lindt and Sprungli Farming Program until 2021 (Lindt & Sprungli Farming Program, 2025). This program represents an equivalent of the Fairtrade practices in terms of fair payment to the cocoa farmers (Lindt & Sprungli, 2018, p.13).

Therefore, these aspects strain the ability to find data from multiple years, making the research more oriented to the present effects of these fair trade practices. It is important to mention these limitations in terms of reflecting the aim of this research - to analyze these companies on an equal basis, which is the time frame because otherwise, the analysis and conclusions would be distorted from a factual reality. On the other hand, it can also raise future questions in regards to a more in-depth corporate analysis of Tony's Chocolonely and Lindt & Sprungli, considering their role in the chocolate industry and the responsibility for sustainability, because it is surprising that Côte d'Ivoire started taking part of the Fairtrade program of Lindt very recently.

Regarding the data table for the statistical analysis, the following concepts from the Lindt Sustainable Reports will be used: Costs for Responsible Sourcing of Cocoa (2024, p.54) or Annual investment in responsible sourcing of Cocoa and Farms within the Farming Program. These two elements represent the independent variables for the statistics models. The costs for sourcing Cocoa include supplier premiums equivalent to farmers' premiums, certification premiums for Cocoa sourced outside of Lindt's specific farming program and other investments in sustainability (Lindt & Sprungli, Sustainability Report, 2024, p.54). Therefore, the variable Annual Investment in responsible sourcing has a value that shows an aggregate level of multiple regions of the world, not just the West African countries, which also implies that the regression model results will be biased and not represent the specific effects of Lindt's investments specifically for Ghana and Côte d'Ivoire. Thus, it can be mentioned from this stage that the results obtained from Lindt will not reflect the true effects of this Fairtrade policy specifically in Ghana and Côte d'Ivoire, given model specification bias (Pindyck & Rubinfeld, 1998) and random error because of the variable’s noise or lack of clarity (Andrade, 2023).

The second variable, representing the number of farmers involved in the farming program, is also important for the conclusion of the research question because, as seen in the light of the literature presented in Chapter 2, it is the small farmers that are still affected regardless of the Fairtrade efforts because of the inequality between rural and urban farmers (Lamare et al., 2023). The number of farmers is also a variable affected by the unavailability of data for the year 2023, as the number of farmers from Côte d'Ivoire was not published anywhere it will be approximated in terms of growth patterns. The number of farmers from Ghana for 2023 was taken from the text written by Lindt's CEO in an website publication (Lechner, 2023). For the year 2024, it is the same circumstance, but the recent numbers of farmers for both countries can be found on the Farming Program website of Lindt, where they present current details of all the countries that are part of this initiative.

On the other side of the corporate spectrum is Tony's Chocolonely. The company was established in 2005 in the Netherlands with a brand focus on Fairtrade chocolate and the equity of the cocoa chocolate bar supply chain. To create the statistical model with the independent variables equivalent to the ones chosen from the Lindt Sustainability Reports, it will be the Total Amount of Premium Paid, reflecting the Annual investment in responsible sourcing of Cocoa and Farms within the Farming Program and the Number of Farmers Impacted like Lindt's Farms within the Farming Program. Total Amount of Premium Paid includes farmgate price, Fairtrade premiums and living income premium (Tony's Chocolonely, 2023/2024, p.37). Also, it is worth mentioning that Tony uses a total number of farmers impacted from both Ghana and Côte d'Ivoire, as opposed to Lindt, where the numbers are presented separately for each country - hence the need for controlling variables also in the case of Tony's Chocolonely. Also, another aggregated value is the total amount of premium paid because, as observed in their reports, the company pays certain premiums per metric ton, but the reports only publish the total number of metric tonnes of Cocoa sourced from both Ghana and Côte d'Ivoire, not on an individual level. Considering that in the case of Tony's, both the farmers and the investment variables are presented at an aggregate level of Ghana and Côte d'Ivoire results together, the economic reflection will become more oriented to a company-level

comparison. These are important aspects when thinking of their effect on the poverty rates in Côte d'Ivoire and Ghana and also in terms of how they impact the internal inequality of the cocoa farming sector that is part of the agriculture domain, which is highly important in a country's development. The following table will show the values of the independent variables, as found in the reports of the companies:

Table 1 Data for the Annual Investment Variables.

Source: Lindt & Sprungli Annual Sustainability Reports, 2021-2024; Tony's Chocolonely Annual Reports, 2021-2024

Company	Country	Investments	Farmers	Year
Lindt	Ghana	22.75	69101	2021
Lindt	Côte d'Ivoire	22.75	5462	2021
Tony's	-	4.3	8921	2021
Lindt	Ghana	33.63	78198	2022
Lindt	Côte d'Ivoire	33.63	16926	2022
Tony's	-	7.95	14763	2022
Lindt	Ghana	36.49	78000	2023
Lindt	Côte d'Ivoire	36.49	~ approx 27000[1]	2023
Tony's	-	11.99	17740	2023
Lindt	Ghana	41.09	61050	2024
Lindt	Côte d'Ivoire	41.09	40800	2024
Tony's	-	11.99	20296	2024

[1] No data available for 2023 Cote d'Ivoire, so the number was determined through approximation of growth trends

3.2.1 Data Methodology - Dependent Variables

This paragraph will present the methodology behind the dependent variables, poverty rate and Human Development index.

The importance of the poverty rate is intuitively connected to the concept of poverty, which is part of the research question and to the aim of this study - to analyze modern-day sustainable solutions from corporate actors to solve or reduce poverty. The poverty rate I chose for this study is the international poverty line, considering purchasing power parities, which are "the rates of currency conversion that try to equalize the purchasing power of different currencies, by eliminating the differences in price levels between countries "(OECD, 2022). I selected this specific poverty rate because of the issue of data availability; there are no poverty rates directly published in a transparent manner for both Côte d'Ivoire and Ghana. In the case of Ghana, the poverty rates used in the data table will be the ones from a document published by the World Bank that for the year 2021 has an estimate of a 10.2% poverty rate and for 2022, 2023 and 2024 forecasts (World Bank, 2022). The reason I chose to use these estimates and forecasts is because, at the moment and from 2021 until 2024, there was no new measurement of the poverty rate in Ghana, and these percentages are the data used by the World Bank. The same report was also done for Côte d'Ivoire by the World Bank, and the same type of estimates and forecasts will be used for the dependent variable poverty rate (World Bank, 2023).

The other dependent variable will be the Human development index, which is a measure that looks at development not just from an economic perspective but also in terms of Education, health, and political freedom; this aspect connects with Amartya Sen's view on development, which is relevant in today's world because social aspects can't be ignored when it comes to one's country trajectory of development. When searching for data, the issue of inequality between underdeveloped periphery countries and developed core countries is visible. However, the last available HDI posted by the United Nations Development Programme for all countries is 2022, which means that regardless of the countries investigated, the HDI for 2023 and 2024 had to be obtained through calculations.

The life expectancy rates 2023 for Ghana and Côte d'Ivoire were found from an academic source, "World Population Prospects" (2024) from the United Nations. The data for 2024 was found on a website called Statistical Times. This could be because, at the time of writing, 2024 is a recent year, and the statistics for Côte d'Ivoire and Ghana are not yet available. It should be noted, considering the topic of inequality between developed and developing countries, that France's latest life expectancy rate can be found on the national website Institut National de la Statistique et des études économiques, which also details the demographics of 2024. To enhance the aspect of inequality, the latest data available for education concepts for the UK is from 2024, and it is not based on estimations (OECD, 2024). This is to show that it's easier to find data for developed, Western countries, rather than developing and undeveloped states.

The following paragraph will explain the methodology of the HDI calculations. On the official website of the Human Development Reports, the only available data for both Côte d'Ivoire and Ghana is until 2022. In order to determine the values for 2023 and 2024 for both countries, I will apply the following formula (Kumar A. - University of Victoria, n.d):

Original HDI = ⅓ Life Expectancy + ⅓ Education + ⅓ Per Capita Income *(eq. 5)*

The reason for choosing this formula is, first and foremost, the fact that it is straightforward in regards to using social and economic concepts to determine the human development index. In the explanation of the formula, it is mentioned that the original HDI refers to the arithmetic way of calculating this variable and that Education implies adult literacy rate and total school enrolments (Kumar A. - University of Victoria, n.d). It is worth mentioning that the reason for choosing the formula presented by the University of Victoria is also because they are a research institution focused on social justice and economic development (Anisef, Lennards, 2019). Also, in a 2018 revision of this HDI formula by the United Nations Development Programme, it is mentioned that Education is calculated as average and expected years of schooling (p.22) and the per capita income is reflected as the GNI per capita. These updated measures will be applied.

In order to calculate the HDI of Ghana and Côte d'Ivoire for 2023 and 2024, the values of life expectancy, Education and per capita income for both countries are needed. For Ghana, the life expectancy rates in 2023 and 2024 are 65.5 (United Nations Department of Economic and Social Affairs, 2024) and 65.7 (Statistics Times, 2024). Moving on to the concept of Education, the average years of schooling represented, according to the UNESCO Institute of Statistics, is the "Average number of years of schooling attained for the age group 20–24 years" the data is only available for 2022 when the average years of schooling in Ghana was 9.56 years. The exact availability situation, only for 2022, is for expected years of schooling, which is 11.59 (Global Data Lab, 2025). As mentioned above, given the complexity and unavailability of finding data for later years and that according to a UNESCO Institute Statistics document from 2023 about the SDG4 Quality Education target in Ghana, the trends for 2023 and 2024 show that changes in education factors are significantly stagnant. Therefore, I assume the average and expected years of schooling for 2023 and 2024 will be altered by +0.05 for each year (p.2). For the GNI per capita of Ghana, at the moment, only the value for 2023 is available, which is 2360 US dollars determined with the Atlas method (World Bank Group, 2023), which is a conversion method that averages the exchange rates over the following three years (World Bank Data Help Desk, 2024). For 2024, the same value will be applied because no other economic institution organs, like the IMF, have used new calculations for the GNI per capita from 2024 or 2025.

Table 2 Values for the HDI calculations for Ghana.

Source: Global Data Lab, 2025; Statistics Times, 2024; UNESCO Institute of Statistics, 2022; UNESCO Institute of Statistics, 2023; United Nations Department of Economic and Social Affairs, 2024; World Bank Group, 2023.

Year	Life Expectancy	Average Years of Schooling	Expected years of Schooling	GNI per capita[2]
2023	65.5	10.00	12.00	2360
2024	65.7	10.02	12.02	2360

The same sources will be used to determine, in the case of Côte d'Ivoire, the values for 2023 and 2024 of life expectancy, average years of schooling, expected years of schooling and GNI per capita. The life expectancy of Côte d'Ivoire in 2023 is sourced from the United Nations Department of Economic and Social Affairs 2024 publication and for the year 2024 from Statistical Times. For the average years of schooling, the UNESCO Institute of Statistics has the latest available data from 2021, which was 6.27 years. Also, the same institution published the report in 2021 of the country's report regarding the SDG4 target - where, similarly to Ghana, the 2022, 2023 and 2024 estimations suggest stagnant or minor differences (p.2). Therefore, the principle of enlarging the value by 0.05 for each year will also be applied in this case because the education trend is based on growth. The expected years of schooling for Côte d'Ivoire are also sourced from Global Data Lab, a website from the Institution of Research Management from Radboud University, where the only value available is from 2022, reaching 10.10 years. The principle of updating the values with +0.02 for the next 2 years will also be applied here. The reason for not applying the same increase of 0.05 as I did for Ghana is to enhance the difference in development between the two countries, because Ghana has objectively and historically higher scores than Côte d'Ivoire. The GNI per capita of Côte d'Ivoire is also from the World Bank Group data calculated with the Atlas method, where only the 2023 value is posted, which is 2470. Once again, as in the case of Ghana,

[2] This is an estimated number for 2023 and 2024 by repeating the value of 2022 as the last available publicly data

this value will be kept the same for 2024 because there is no other available data from other economic publications. The following table will show this data that will be used in the next chapter to calculate the HDI for Côte d'Ivoire:

Table 3 Values for the HDI calculations for Cote d'Ivoire.
Source: United Nations Department of Economic and Social Affairs, 2024; Statistics Times, 2024; UNESCO Institute of Statistics, 2022; UNESCO Institute of Statistics, 2021; World Bank Group, 2023; Global Data Lab, 2025.

Year	Life Expectancy	Average Years of Schooling	Expected Years of Schooling	GNI per capita
2023	61.94	6.34	10.12	2470
2024	62.11	6.39	10.17	2470

The calculations of the Human Development Index for both countries will be calculated using the data in the table and presented in the next chapter , in order to generate the data table that will be used for the regression model.

3.2.2 Data Methodology for Controlling Variables

This section will discuss the controlling variables used in the statistical analysis: GDP and Population; the academic reasoning for using controlling variables is: "to remove confounding variance and provide researchers with an enhanced ability to interpret findings" (Atnic & Simmering, 2021, 'Abstract') the first one is chosen to match the concept of poverty, a central topic in the research question, and to also be a macroeconomic nuance of the Annual Investments variable. Population is a fundamental aspect to be considered when discussing inequality, and it was chosen considering the number of farmers variable. The following table will present the values for the population and GDP of Ghana and Côte d'Ivoire from 2021 until 2024. The current population number is sourced from Worldometer, a website that updates the number of people everywhere in the world who die or are being born at the moment of writing. The GDP

of Ghana is available in the World Bank Group Data publication from 2021 until 2023. In order to obtain the 2024 GDP, the publications of the Ghana Statistical Service were consulted, and in 2025, shown in the Appendix for the Nominal quarterly GDP series, all four quarterly values of the GDP in 2024 (p. 17) add up to 1.176 trillion Ghanaian cedis, which are the equivalent of 75.85 billion US dollars. The Nominal GDP is chosen because the other GDPs extracted from the World Bank Group, from 2021 until 2023, are not adjusted for inflation.

In the case of Côte d'Ivoire, the same website will be used for population numbers and the GDP until 2023. The IMF (2025) published the GDP of Côte d'Ivoire in 2024, which is 86.99 billion dollars. Given all this information, this is the table of the controlling variables from 2021 until 2024. These values are also not adjusted for inflation, as in the case of Ghana.

Table 4 Values for the controlling variables, GDP and Population.
Sources: Worldometer, 2025; Ghana Statistical Service, 2025; World Bank Group Data, 2023; IMF, 2025.

Population Ghana	GDP Ghana	Population Côte d'Ivoire	GDP Côte d'Ivoire
32518665	79.52	29639736	72.79
33159152	74.26	30395002	70.17
33787914	76.37	31165654	78.88
34427414	75.85	31934230	86.99

Lastly, this paragraph discusses the presence of the dummy variables. As presented along this chapter, the data-finding limitation will make this research more focused on a company-comparison rather than country comparison as well. The dummy variable for companies has 1 for Lindt which will be the reference category because Lindt has individual values for each country for the farmers variable,

compared to Tony's which uses aggregate levels also for farmers. During the data set creation, a variable for countries will also be created where Ghana is coded as 1 and Cote d'Ivoire as 2 for the purpose of clearance in regards to matching the GDP, Poverty rate, HDI, Population and the individual values for farmers from Lindt for each country.

Finally, the data set used in the statistical analysis will be presented in this chapter, although the calculation for the HDI variable is detailed in the next chapter.

Table 5 Data Set for Statistical Analysis.

Source - Appendix 2

COUNTRY	COMPANY	YEAR	POVERTYRATE	HDI	ANNUALINV[3]	FARMERS	POPULATION	GDP
1	1	2021	0.102	0.6	22.75	69101	32518665	79.52
2	1	2021	0.097	0.53	22.75	5462	29639736	72.79
1	2	2021	0.102	0.6	4.3	8921	32518665	79.52
2	2	2021	0.097	0.53	4.3	8921	296397365	72.79
1	1	2022	0.095	0.602	33.63	78198	33159152	74.26
2	1	2022	0.098	0.534	33.63	16926	30395002	70.17
1	2	2022	0.095	0.602	7.95	14763	33159152	74.26
2	2	2022	0.098	0.534	7.95	14763	30395002	70.17
1	1	2023	0.092	0.614	36.49	78000	33787914	76.37
2	1	2023	0.107	0.54	36.49	27000	31165654	78.88
1	2	2023	0.092	0.614	11.99	17740	33787914	76.37
2	2	2023	0.107	0.54	11.99	17740	31165654	78.88
1	1	2024	0.088	0.616	41.09	61050	34427414	75.85
2	1	2024	0.103	0.542	41.09	40800	31934230	86.99
1	2	2024	0.088	0.616	11.99	20296	34427414	75.85
2	2	2024	0.103	0.542	11.99	20296	31934230	86.99

[3] These are the same values as Table 1 but converted to a single currency, the US dollar like the poverty rate and GDP

In conclusion, all the data illustrated in this chapter will be used in the regression analysis presented in the next chapter. It is worth considering along the analysis, the limitations and the bias that the unavailability of data for some years or in some circumstances might have an effect on the results and in answering the research question.

Chapter 4 Analysis

4.1 Quantitative Background Analysis

This section is meant first to present the colonial cost calculation, correlated to the literature presented in the discussion on colonialism and how it impacted poverty and inequality in West Africa. In my perspective, the colonial cost is relevant in the discussion on Fairtrade policies and how they reflect the responsibility of both the consumer and the companies, considering economic history and development opportunities for former colonized countries. The comparison between Ghana and Cote d'Ivoire in terms of colonial cost is also relevant because of the opposite trajectories they had in the cocoa industry; as highlighted in the Literature Review chapter, Ghana was the country with the most cocoa production and exports during colonial time, but in present times this title is held by Cote d'Ivoire which was not a major exporter of cocoa when it was under colonialism. The next chapter will discuss these aspects based on the results obtained.

Secondly, this section will present the calculations for the second dependent variable, the HDI, as mentioned in the Data and Methodology. The detailed calculations will be accompanied by explanations of all the indexes and how they should be calculated according to the Human Development Report from 2023/2024.

4.1.1 Colonial Cost Calculation

In this first paragraph, Gottheil's (1977) equation of colonialism will be presented to quantitatively show that Côte d'Ivoire and Ghana are experiencing permanent macroeconomic loss in the supply chain because of colonialism - one of the core principles of this research on poverty and inequality, focusing on Ghana and Côte d'Ivoire.

$$C = (Ua - Ub) / Ua \qquad \textit{(eq. 6)}$$

The variable $\underline{C}$ represents the coefficient of colonial cost. *Ua* is the social welfare of the colonized state

given the value of a continuous flow of national product that would happen if there was no colonial power and *Ub* is the social welfare of the colonized state, given the value of a continuous flow of national product under the colonial situation (Gottheil, 1977, p.86).

This research paper focuses only on the cocoa production sector, hence the formula will be adjusted to reflect this point:

$$C_{cocoa} = (Ua_{coca} - Ub_{cocoa} / Ua_{cocoa} \qquad \textit{(eq. 7)}$$

As mentioned in the article, the colonial cost represents: "the burden of having a colonial power dictate terms of development and trade." This can be applied to Cote d'Ivoire and Ghana, using the estimated cocoa production during colonial years, specifically the benchmark year of 1930, for the Ub variable. In regards to the Ua variable the data that will be used represents the cocoa production during the 1960s, the independence moment of both states; this decision was taken due to the fact that there aren't any publicly available quantitative estimation of the cocoa output in a non-colonial scenario. However, this represents a topic for future research which will be approached in the next chapter.

According to Anti Slavery International, Ghana achieved a record in export in 1936 of 311 thousand tonnes of cocoa (Ould et al., 2004), which at that time was worth 46.65 million dollars (Winton, 2017). In 1939, Côte d'Ivoire, under French colonial rule, Côte d'Ivoire exported 56 thousand tons of cocoa (De Planhol, 1947), worth 8.4 million dollars (Winton, 2017). In 1964, Ghana produced 430 thousand tons of cocoa which actually represents one of the highest levels of output the country achieved, given that at that time the prices were declining (Kolavalli & Vigneri, 2011, p. 202-203). According to the Winton publication, in 1964 one tonne of cocoa was worth 250 US dollars, which means that the value of the cocoa output from Ghana in 1964 was 107.5 million. In 1939, Côte d'Ivoire, under French colonial rule,

exported 56 thousand tons of cocoa (De Planhol, 1947[4]), worth 8.4 million dollars (Winton, 2017). In Cote d'Ivoire's case, a chart extracted from a report published by the United States Department of Agriculture - Foreign Agricultural Service (2025) shows that the country produced approximately 170 thousand tons of cocoa in 1964 (p.5). Applying the same conversion method from Winton source, this production output is equivalent to 42.5 million US dollars.

Table 6 Variables Data for Colonial Cost Function

Based on the sources presented above

YEAR	Ua_{GHANA}	Ub_{GHANA}	$Ua_{COTE\ D'IVOIRE}$	$Ub_{COTE\ D'IVOIRE}$
1936 / 1939	-	46.65	-	8.4
1964	107.5	-	42.5	-

The following calculations will show the colonial cost by covering the variable Ua with the values from 1964, as a hypothetical production level if there was no colonial regime, and the variable Ub with the values from 1930s to represent the colonial time:

C_{GHANA} = (107.5 million$ - 46.65 million$) / 107.5 million$ = 0.56 million$ *(eq. 8)*

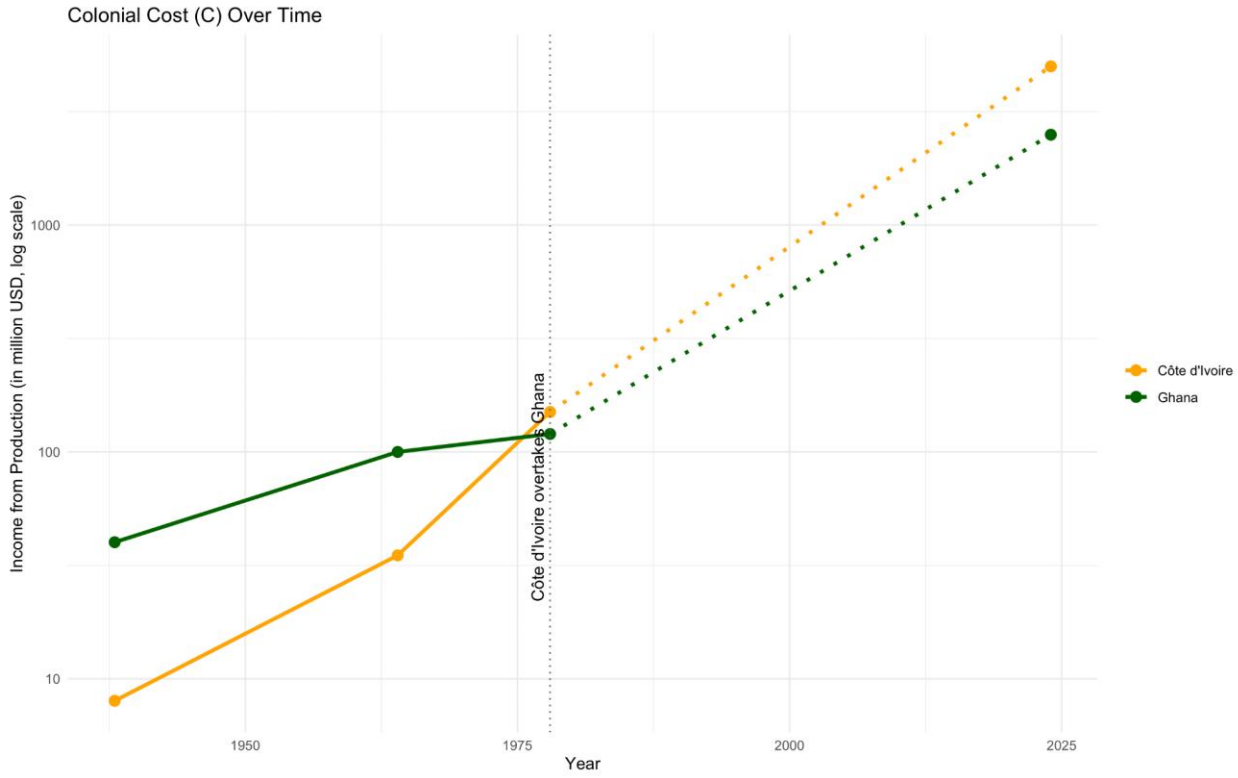
$C_{COTE\ D'IVOIRE}$ = (42.5 million$ - 8.4 million$) / 42.5 million$ = 0.8 million$ *(eq. 9)*

The following graph aims to enhance the understanding of the relationship between the export of cocoa during colonial period, independence and present moment The most recent data shows that Ghana is predicted to export for the 2024/2025 season 500 thousand tons (Adombila, 2024), which is currently worth 1.55 billion dollars (Ghana Cocoa Board, 2024). Cote d'Ivoire is expected to export a maximum of 1.53 million tons (Aboa, 2024), worth 4.68 billion dollars (Byrne, 2024). There is also a dotted line to show the moment in time when Cote d'Ivoire overpassed Ghana in cocoa production (Bajan, 2023) and

[4] This reference has been translated from French

from that point onwards the graph also shows two dotted lines for each country as mathematical linear projections of the trajectory until 2024:

Figure 1 Representation for colonial cost estimation for Ghana and Cote d'Ivoire.
Source: Author's own calculations based on data from: Ould et al. 2004; Kolavalli & Vigneri, 2011; de Planhol, 1947; United States Department of Agriculture, 2025; Ghana Cocoa Board, 2024; Aboa, 2024; Byrne, 2024; Bajan, 2023.



The graph shows that in the 1930s, Ghana had a much higher production income than Cote d'Ivoire due to the difference in export administration in both countries. For example, in 1937, farmers from Ghana refused to sell cocoa to European buyers because their price offerings were unfair (Hudson, 2022); they still managed to be the largest producer. This could also be because, as described in the Literature Review, the cocoa sector was not developed by colonial help in Ghana (Hymer, 1971, p. 141). Hence, the colonial cost for the cocoa sector is lower in Ghana. On the other hand, in Cote d'Ivoire in the 1930s,

production was almost ten times lower than in Ghana. It emerged to converge during independence to become the most important exporter. The difference between the two countries' ways of producing can also be due to the colonial regime because France had harsher measures like forced labor, which negatively influenced the trajectory of cocoa production until independence (Ould et al., 2004, p.7). Therefore, this can be a historical explanation for the higher colonial cost for Cote d'Ivoire.

The following paragraph will explain more in depth the context of the West African countries' cocoa production trajectory. In the case of Côte d'Ivoire's trajectory, the country overtook Ghana as the world's largest cocoa exporter in 1978 (Bajan, 2023). The fact that after independence, Ghana was not the largest cocoa exporter questions the accountability of the former colonial power for developing the cocoa export sector. There is also a difference in how the cocoa sector emerged in Ghana, as the small farmers did not use labor-intensive practices. The colonial authority did not influence it (Ould et. al, 2004). After independence, Ghana's decline in the cocoa sector resulted from internal policy activities such as the overvaluation of the Ghanaian currency in the 1980s (IMF, 1993, p.17). This meant the currency's value was higher than it should have been in terms of its capital capabilities. External reasons, such as liberalization, also caused companies to become involved in the cocoa industry, resulting in higher prices for farmers (Ould et. al, 2004, p.26). Ghana is, therefore, no longer the largest cocoa exporter due to internal economic policy and trade development issues.

The result of the colonial cost for Ghana cannot be interpreted as full accountability from the colonizing country. Economically speaking, the cocoa sector in Ghana was more prosperous during colonial times. This is not to say that the UK created a sustainable development for Ghana's economy because the colonizing country still interfered with the logistical development of the small farmers' crops (Heldring & Robinson, 2012, p.21). In light of the literature considering indirect and direct colonial rule and the results obtained, it can be concluded that regardless of the system adopted the colonized state was in a state of economic loss.

4.1.2 Human Development Index Calculation

In this section the values of the second dependent variable, HDI, will be calculated for the missing years 2023 and 2024, based on Equation 5 from the Data and Methodology chapter.

It must be mentioned that all three concepts are interpreted at an index level in order to keep the calculation results between 0.00 and 1.00. The Life Expectancy index formula is determined by the minimum and maximum established in the Human Development Report from 2023/2024, which are 20 and 85:" The justification for placing the natural zero for life expectancy at birth at 20 years is based on historical evidence that no country in the 20th century had a life expectancy at birth of less than 20 years. Maximum life expectancy at birth is set at 85, a realistic aspirational target for many countries over the last 30 years " (Human Development Report, 2024, p.3). This is the calculation formula:

Life Expectancy Index = (Life Expectancy Years - 20) / (85 - 20) *(eq. 10)*

The Education Index is calculated by taking in consideration average years of schooling and expected years of schooling. These two variables of education must also be indexed, with a maximum of 15 for the former and 18 maximum for the latter (Sustainable Development Index, n.d.): "The maximum for expected years of schooling, 18, is equivalent to achieving a master's degree in most countries. The maximum for mean years of schooling, 15, is the projected maximum of this indicator for 2025" (Human Development Report, 2024, p.3) The formulas for education also extracted from the same report are the following:

Education Index = (Average Years of Schooling Index + Expected Years of Schooling Index) / 2 *(eq. 11)*

Average years of Schooling Index = Average Years of Schooling / 15 *(eq. 12)*

Expected Years of Schooling Index = Expected Years of Schooling / 18 *(eq. 13)*

The GNI per capita index, the representative of per capita income variable, is also calculate by using this formula from the Human Development Report (p.4):

GNI per capita index = [ln(GNI per capita value) - ln(100)] / [ln(75000) - ln(100)] *(eq. 14)*

The same report explain the reason for choosing the minimum value of 100 and maximum of 75000: "The low minimum value for gross national income (GNI) per capita, $100, is justified by the considerable amount of unmeasured subsistence and nonmarket production in economies close to the minimum, which is not captured in the official data. The maximum is set at $75,000 per capita so that additional income above the maximum does not directly contribute to a country's HDI value or improve its Ranking" (Human Development Report, 2024, p.3).

Considering the tables of values for both countries from the Data and Methodology chapter these are the results of the calculations for the HDI for Ghana and Cote d'Ivoire in 2023 and 2024[5], with the full calculations in the Appendix 1:

Table 7 HDI results for Ghana.
Source: Author's own calculations

YEAR	LifeExp	Education	GNI	HDI
2023	0.7	0.667	0.4775	0.614
2024	0.703	0.668	0.4775	0.616

Table 8 HDI results for Côte d'Ivoire.
Source: Author's own calculations

YEAR	LifeExp	Education	GNI	HDI
2023	0.645	0.492	0.4844	0.54
2024	0.648	0.495	0.4844	0.542

[5] Values from Table 2 and Table 3 from the Data and Methodology chapter were used in these calculations

4.2 Statistics

4.2.1 Summary Statistics

As mentioned in the equations of the statistical models (Chapter 3), the dependent variables are Poverty Rate and HDI, which are continuous variables meaning that they can range from minus infinity to plus infinity. As shown in Table 9, the Poverty Rate variable has a minimum of 0.088, which connected to the table above it is the poverty rate of Ghana in 2024, and a maximum of 0.107 from Cote d'Ivoire in 2023; the mean of poverty rate is 0.09775 with a standard deviation of 0.005972. HDI's minimum is 0.530, from Cote d'Ivoire in 2021, and its maximum is 0.616 from Ghana in 2024. The mean of the HDI variable is 0.57225 and the standard deviation is 0.037444.

Table 9 Descriptive Statistics

	N	*Min*	*Max*	*Mean*	*Std. Deviation*
POVERTYRATE	*16*	*.088*	*.107*	*.09775*	*.005972*
HDI	*16*	*.530*	*.616*	*.57225*	*.037444*
ANNUALINV	*16*	*4.30*	*41.09*	*21.2738*	*13.74569*
FARMERS	*16*	*5462*	*78198*	*31248.56*	*25606.913*
GDP	*16*	*70.17*	*86.99*	*76.8538*	*4.94117*
POPULATION_C	*16*	*29639.74*	*32128.4709*	*32128.4709*	*1609.01243*

The independent variables are Annual Investments and Farmers. Annual Investments has a minimum of 4.30, from Tony's in 2021, and a maximum of 41.09 from Lindt in 2024. These descriptive statistics seem naturally deductible because of the difference in size between the companies and their financial

capabilities. The mean for Annual Investments is 21.2738 and the standard deviation is 13.74569. The Farmers variables has a minimum of 5462, the number of farmers from Cote d'Ivoire that were part of Lindt's program in 2021, and the maximum is 78198, representing the farmers from Ghana in the Lindt program in 2022. The mean of this independent variable is 31248.56 and its standard deviation is 25606.913.

The controlling variables for the regression models are GDP and Population. The minimum value for the GDP is 70.17, Côte d'Ivoire in 2022, and the maximum is 86.99 for Cote d'Ivoire in 2024; the mean of the GDP variable is 76.8538 and the standard deviation is 4.94117. The Population variable was centered by dividing it to 1000 and then created a new variable for the new values called Population_C; this was done because the values of the Population variable were too large compared to all of the other variables in the data set (Aiken et.al, 1991). Population_C has a minimum of 29639.74 and a maximum of 32128.4709, with a mean of 32128.4709 and a standard deviation of 1609.01243. From the descriptives table it is clear that for all of the variables there are 16 values and no missing values in the whole dataset.

Lastly, after obtaining the descriptive statistics results, dummy variables were created to represent the companies and the countries, in light of their historical dynamic for this research as described in the Data and Methodology chapter. The variable dCompany has an equal percentage, of 50% each, for both values 0 and 1; 0 is labelled for Tony's and 1 for Lindt. The same coding strategy was applied for dCountry, the dummy variable for countries, where there is also an equal percentage and 1 is representative for Ghana and 0 is for Cote d'Ivoire. The reasoning for giving Lindt and Ghana the reference categories is because the company has a distinct number for farmers from each country, compared to Tony's; and also in regards to Ghana there is one more specific value for the number of farmers from Lindt then in Cote d'Ivoire and this aspect is marked in Table1 from the Data and Methodology chapter.

4.2.2 Correlations

Table 10 Pearson Correlations

Between poverty rate, HDI, fair trade policies and moderators

	Poverty Rate	HDI	ANNUALINV	FARMERS	GDP	POPULATION_C	dCompany
Poverty Rate	1	-.635**	-.064	-.234	.472	-.578*	.000
HDI	-.635**	1	.056	.513*	-.009	.929**	.000
ANNUALINV	-.064	.056	1	.663**	.133	.179	-.918**
FARMERS	-.234	.513*	.663**	1	.147	.528*	-.638**
GDP	.472	-.009	.133	.147	1	.219	.000
Population_C	-.578*	.929**	.179	.528*	.219	1	.000
dCompany	.000	.000	-.918**	-.638**	.000	.000	1

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at 0.05 level (2-tailed)

In this section the correlations between all of the variables shown above will be discussed. The results were achieved by conducting the Correlate Analysis in the SPSS program. As shown in Table 3, I find statistically significant correlations at both the 0.01 and 0.05 alpha significance level between the following variables: poverty rate and HDI, poverty rate and the dummy variable for the countries, HDI and farmers, HDI and the dummy variable for the countries , annual investments and farmers, annual investments and the dummy variable for companies and farmers and the dummy variable of companies. The Pearson Correlation value between poverty rate and HDI is - 0.635, which is only significant at an alpha level of 0.01. The negative value that is close to -1.00 suggests that there is a moderate to strong negative correlation meaning that they move in opposite directions: when the poverty rate increases the HDI decreases which is true logically in terms of development because the HDI is also dependent on

economics aspects like the poverty rate. The correlation coefficient between poverty rate and the dummy variable of the countries is - 0.605 with a significance at 0.05 alpha level; the correlation is also moderate to strong negative, which again suggests an inverse relationship. Considering that the dummy variable is coded 1 for Ghana and 0 for Cote d'Ivoire, this negative correlation suggests that the lower values of the poverty rate are for Ghana.

HDI and farmers have a coefficient of 0.513, which is a moderate positive relationship, significant at the 0.05 alpha level. This implies that when the HDI rises, the number of farmers rises which can mean that more jobs are created that accounts for development. HDI is also very strongly correlated with the dummy variable for the company variable, having a coefficient of 0.986 significant at a 0.01 alpha level - this could be translated as the higher values of the HDI belong to the highest value, 1 in this case, of the dummy variable for the countries.

There is also a positive moderate to strong correlation between annual investments and number of farmers, of 0.663 only significant for the 0.01 alpha level. The correlations suggest that a higher value of investments is associated with a higher number of farmers that participate in the sustainable farming programs of the companies. The correlations between annual investments and the dummy variable for the companies is very strong and positive, with a coefficient of 0.918 that has a significance at an alpha level of 0.01. This positive relation can be observed from the data set because the higher investment values come from Lindt which is coded as 1.

The last significant correlation of the data set is between the dummy variable for the companies and the farmers variable. It is a positive moderate to strong relationship with a correlation coefficient of 0.638 that is significant at a 0.01 alpha level.

Given these correlations summaries, the issue of multicollinearity should be addressed because there are Pearson coefficients that exceed the value of 0.8 (Signori, 2011). It can be highlighted from this point on that the results of the regressions will be affected because there is multicollinearity between: the dummy variable of the company variable and annual investments, since their correlation coefficient is 0.918. This will affect the results in terms of multicollinearity for all of the larger models because they contain the annual investments variable.

This research will use an alpha level of 0.05, as a statistical convention for confirmatory research (Maier & Lakens, 2022) and in this case the only statistically significant correlations that will be considered are between poverty rate and the dummy variable for the companies, HDI and farmers - the latter correlation can already indicate a statistically significant result in terms of the regression analysis for the HDI as dependent variable and the farmers.

4.2.3 Model Estimation Results

As mentioned in the Data and Methodology chapter, this research will analyze separate regression models for poverty rate and for the HDI, as they are the dependent variables. The statistical aim is to check if the regression models reject the null hypothesis, which is: there is no statistically significant effect of Fairtrade policies from Tony's Chocolonely and Lindt & Sprungli on poverty and inequality in Cote d'Ivoire and Ghana.

This section will present the statistical analysis and result interpretations of the nested models for the poverty rate as the dependent variable considering the equations 1, 2 from the Data and Methodology chapter.

Table 11 Regression Coefficients Poverty Rate

Predictors	1	2
Constant	.052	.043
dCompany	.000	.011
GDP	.001	.001
Population_C	$5.519e^{-7}$	$3.702e^{-10}$
AnnualInv	-	.000
Farmers	-	$-1.068e^{-7}$
R squared	.226	.452
R squared change	.226	.226
F	1.166	1.650

*p <.05, **p <.01, ***p <.001

Model 1, based on eq. 1 from chapter 3 results from the regression analysis is:

Y1 = 0.052 + 0.001 * GDP + $5.519e^{-9}$ * Population_C + 0.000 * dCompany.

Model fit interpretation

For Model 1, the results of the F-test are: R2 = *0.226, F(3,12) = 1.166, p = 0.363*

The fact that the p-value is larger than the alpha level of 0.05 means that the results of the model for the test are not statistically significant. This also suggests that the model with only the control variables is a poor fit. The R-square results suggest that only 22.6% of the variance in the poverty rate variable is explained by this model, but considering the F-test result this is not statistically significant. The regression sum of squares and the residual sum of squares are not statistically significant.

Coefficients Interpretations

The coefficients of this model, as seen in the column 1 of Table 11, are also not statistically significant. Therefore, the null hypothesis fails to be rejected for the model with only the control variables.

The equation (eq.2) of Model 2 with the statistical results is: $Y1_2$ = 0.043 + 0.001 * GDP + $3.702e^{-12}$ * Population_C + 0.011 * dCompany + 0.000 * Annual Inv - $1.068e^{-7}$ * Farmers.

Model fit interpretation

For the second model of the poverty rate, the F-test results are: $R^2 = 0.452, F(5,10) = 1.650, p = 0.234$

The p-value is larger than the alpha level of 0.05, which means that the model fit for the second model, which includes the two main independent variables, is not statistically significant. Since the methodology of nested models was applied, the difference between the two models is not statistically significant in terms of the model fit when adding the annual investments and farmers variable. The delta R-square has a value of 0.226 and a F Change value of 2.065 which is also not statistically significant, meaning that adding the variables of annual investments and farmers don't improve the explained variance of the poverty rate. In this case, the regression sum of squares and the residual sum of squares are also not statistically significant.

Coefficients Interpretations

In the second column of Table 11, only the GDP variable is statistically significant at a 0.05 alpha level: $\beta = 0.001, t(10) = 2.504, p = 0.031.$

This means that the GDP variable explains slightly on its own, the variance in the poverty rate. However, the coefficients of the control variables are not included in the null and alternative hypothesis, which means that even though the GDP is statistically significant the null hypothesis fails to be rejected.

The following section will present the analysis and interpretations of the nested models for the HDI as dependent variables, with the same null and alternative hypothesis to be investigated, based on the equations 3 and 4 from Chapter 3.

Table 12 Regression Coefficients HDI

Predictors	1	2
Constant	..629	.678
dCompany	-.006	-.041
GDP	-.001	-.001
Population_C	$-1.81e^{-5}$	$-1.711e^{-5}$
AnnualInv	-	.000
Farmers	-	$1.311e^{-6}$*
R squared	.091	.541
R squared change	.091	.450
F	.398	2.358

*p <.05, **p <.01, ***p <.001

The equation results for Model 1 based on equation 3 are:

Y2 = 0.629 - 0.001 * GDP - 1.813e-7 * Population_C - 0.006 * dCompany

Model fit Interpretations

The F-test for the Model 1 has these results: R2 = 0.091, F(3,12) = 0.398, p = 0.757

Given that the p-value is higher than the alpha level of 0.05, the F-test is not statistically significant, and the model with only the control variables is a poor fit. The R-square result means that the model explains 9.1% variance in the dependent variable, the HDI, hence the residual sum of squares being higher than the regression sum of squares, which means that there is more variance unexplained; but these results are not statistically significant because the F-test is not significant, which means there is enough evidence to enhance that the null hypothesis cannot be rejected. The regression sum of squares and residual sum of squares are not statistically significant.

Coefficients Interpretations

For Model 1, as seen in the first column, no coefficients are statistically significant at an alpha level of 0.05.

The equation results for Model 2 (eq. 4), that has the HDI as dependent variable, are:

Y22 = 0.678 - 0.001 * GDP - 1.711e-7 * Population_C - 0.041 * dCompany + 0.000 * AnnualInv + 1.311e-6 * Farmers

Model fit Interpretations

Considering the nested model technique, the difference between Model 1 and Model 2 has to be interpreted. The F-change has a value of 4.908, which is statistically significant with a p-value of 0.033 and a delta R-square value of 0.45, which means that the model with the more variables added, annual investments and farmers explains 45% more variance in the dependent variable than the model that only has the control variables. However, the results of the F-test for Model 2 are not statistically significant at an alpha level of 0.05: $R2 = 0.541$, $F(5,10) = 2.358$, $p = 0.116$.

Therefore, although adding more variables to the initial model is statistically significant, the model fit between the dependent variable, the HDI, and the other independent variables, annual investments, farmers, GDP, and population-centered, is poor. On the other hand, the regression sum of squares is higher than the residual sum of squares with 0.01, which means there is less unexplained variance of the dependent variable compared to the smaller model because the R square is higher for Model 2. However, all of this is statistically insignificant because of the F-test's p-value, which is larger than 0.05.

Coefficients Interpretation

For Model 2 as observed from column 2, only the Farmers variable is statistically significant at an alpha level of 0.05 in relationship to the HDI: $\beta = 1.311e\text{-}6$, $t(10) = 3.096$, $p = 0.011$

This means that one unit increase in the Farmers variable, keeping all of the other variables at a constant level, produces a 1.311e-6 increase in the HDI. Considering the alternative hypothesis, that only one of the independent variables' beta coefficients must be different from zero, the null hypothesis can be rejected.

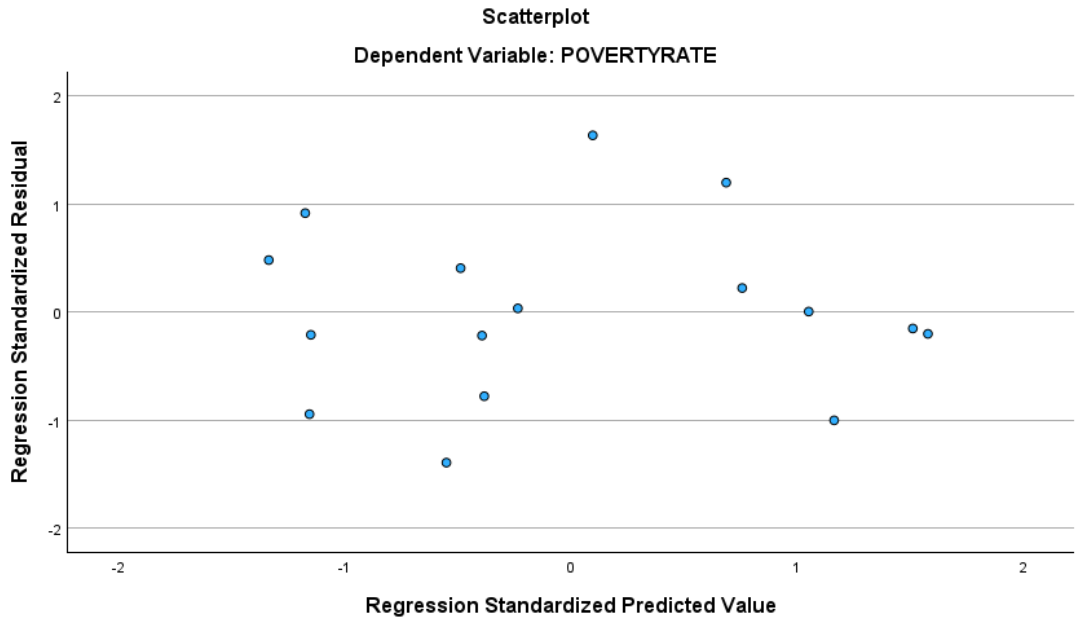
4.2.3 Limitations

One of the main limitations is the small sample size. This is due to the aggregate level of both Lindt and Tony's for the main independent variables which makes it difficult to detect a specific effect for Cote d'Ivoire and Ghana specifically. The unavailability of data is another issue in regards to the HDI as the only publicly available HDI was determined until 2022 and the ones for 2023 and 2024 are based on data from 2021 and 2022, trends and forecasts. This limits the validity of the dependent variable, the human development index. Additionally the fact that one of the companies, Lindt & Sprungli, only included Cote d'Ivoire in their Sustainable Cocoa Farming program in 2021 limited the time frame for this investigation. All of the aspects also result in bias, especially the aggregate level issue because we can't conclude that the results from the two main independent variables are only for Cote d'Ivoire and Ghana or even for them separately; there is no publicly available data on each country from the companies in the chocolate industry.

In the case of all of the regression models, the limitation of multicollinearity is met in the same situation as mentioned when discussing the correlation results: the VIF value for the dummy variable of the companies is 7.176 and the VIF for annual investments is 7.684. This can be because of how the data was found because the values in annual investments are the same for both companies for Ghana and Cote d'Ivoire, meaning that each value from Lindt and Tony's repeat themselves two times. On a bigger level, the issue is the aggregate level and the fact that the data from the reports of the companies don't present how much investments were put in the cocoa sourcing programs separately for each country.

Other limitations can be overfitting the data by using too many variables for a small data set, given the time frame is from 2021 until 2024 and the lack of separate data available for Cote d'Ivoire and Ghana. An important limitation that will be discussed for each dependent variable model is the assumption of homoscedasticity: "the variance of errors is the same across all levels of the IV (independent variable)" (Osborne & Waters, 2002, p.4). To test this limitation, the *plot* option was selected in SPSS when coding a linear regression. The scatter plot for the poverty rates as dependent variable and the two independent variables and moderator is the following:

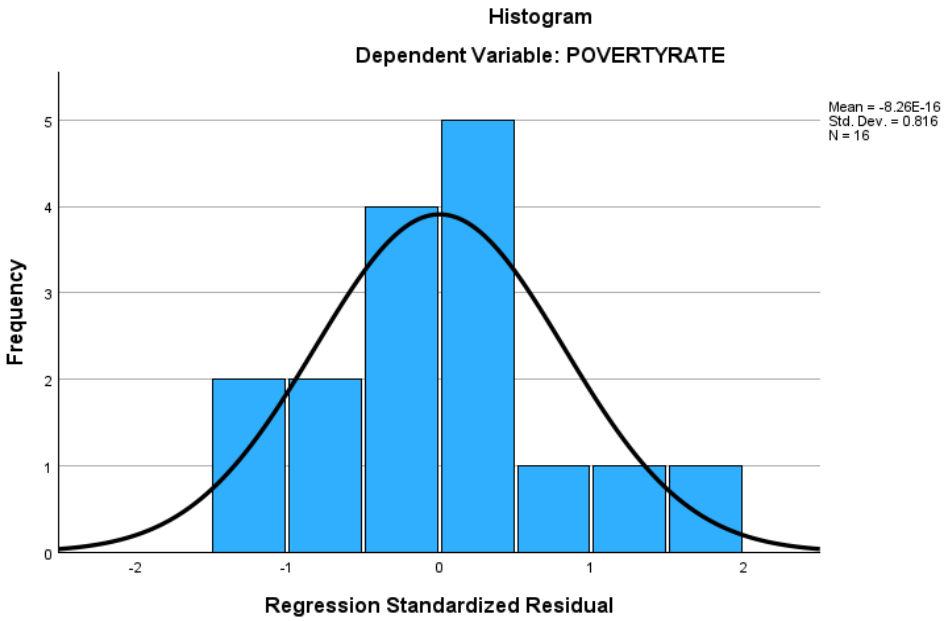
Figure 2 Plot for testing Homoscedasticity



It can be observed that the dots resemble a cloud which suggests that errors are not spread in a particular direction considering the values of the independent and controlling variables. This means that there is homoscedasticity, which makes the choice of the p-value valid.

The same SPSS coding technique can also generate a histogram for the residuals in order to test the normality of residuals.

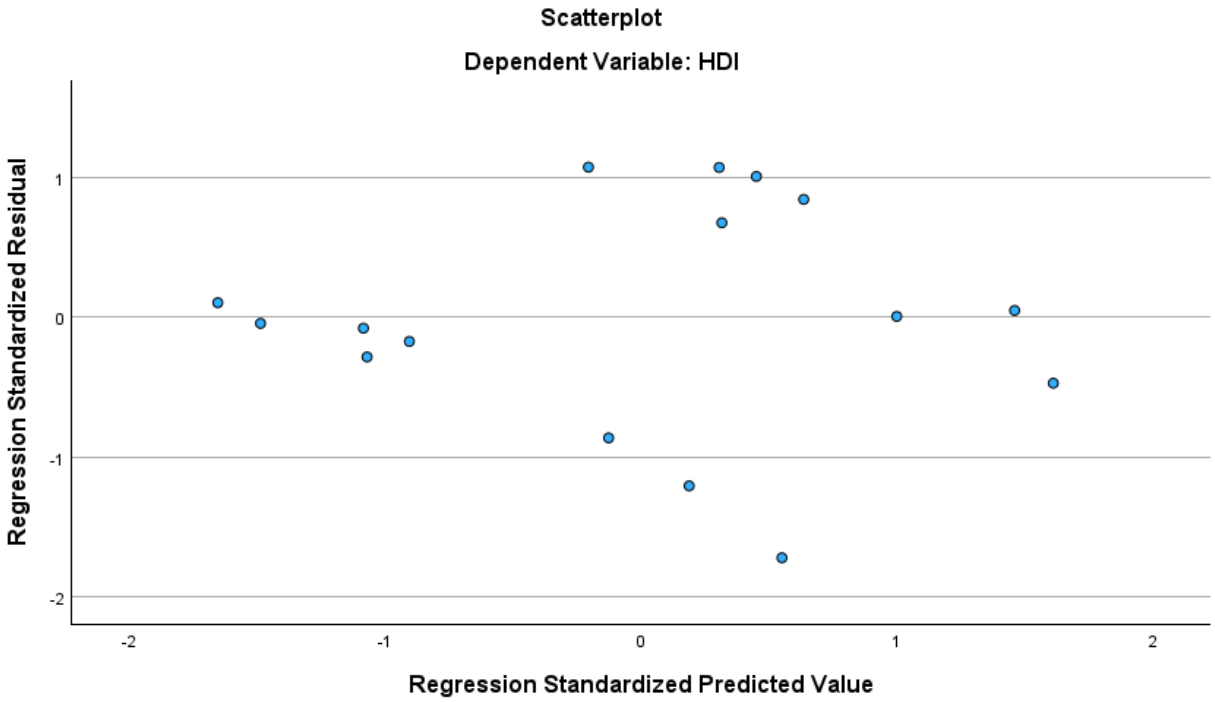
Figure 3 Plot for Normality of Residuals



It can be observed that the curve is bell-shaped, which means that the errors are normally distributed and the assumption for normal distribution is met.

The same statistical method of coding was applied for the models with HDI as dependent variable and this is the result for the homoscedasticity test:

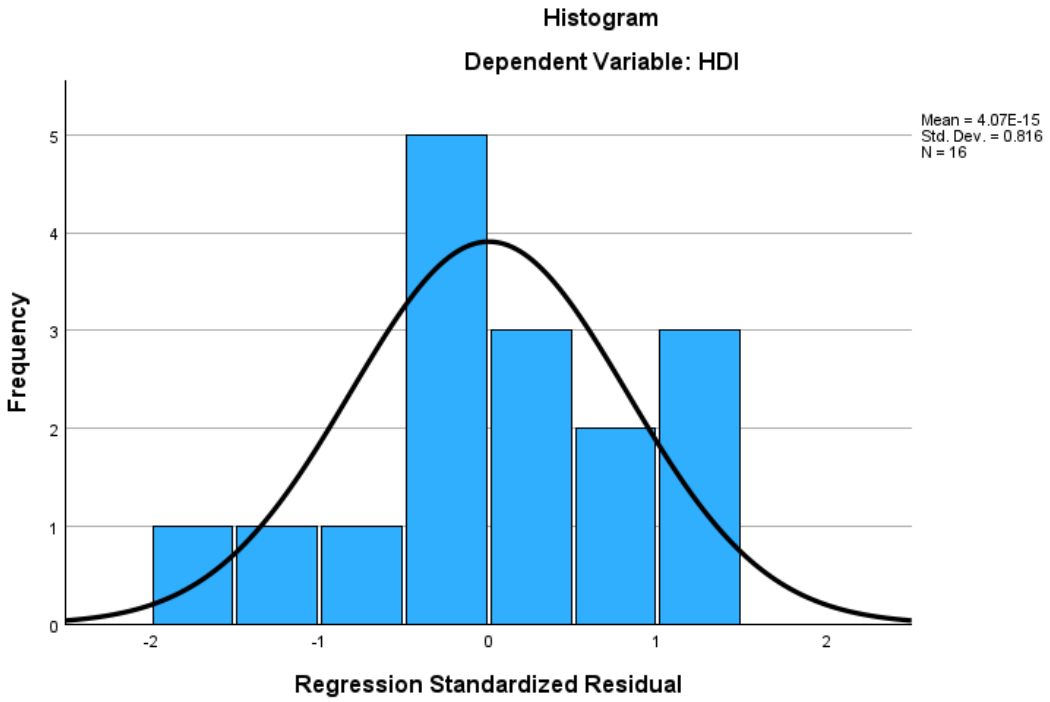
Figure 4 Scatter plot Homoscedasticity for HDI



The dots in this figure are also spread around, with the clear vision that there is no funnel illustrated, meaning that for the regression models with HDI as dependent variable, the errors are constant across all levels of the independent variable.

The histogram obtained in order to analyze normality of residuals presents a bell-shape that is slightly skewed to the right, so negatively skewed. This still means that the residuals are approximately normally distributed.

Figure 5 Histogram of Normality of Residuals



Therefore, there are some limitations, especially in terms of data, that interfere with drawing clear conclusions even with the results provided. Although they can also be considered as bridges for new and more research into the topic - even considering exploratory research in order to obtain specific data on the countries, for example field research or surveys within the companies or in the countries.

The next chapter will focus on answering the research question based on the findings and analyzing how the scientific gap is improved and what can be done in future research of corporate actions from companies that belong to Core countries, in order to combat inequality and poverty in Periphery countries.

Chapter 5: Discussion & Conclusion

This chapter will connect the statistical results of the analysis with the theories presented in the second chapter, the literature review. The conclusions drawn will also reflect future research prospects in light of this thesis's results, observations, and limitations. The research question the study investigated was: **Do Fairtrade policies adopted by Lindt & Sprüngli and Tony's Chocolonely help reduce poverty and inequality in Ghana and Côte d'Ivoire?**

5.1 Discussion for Colonial Cost Results

From the first section of the analysis chapter, the quantitative background analysis, the colonial cost results will be interpreted in more depth. The graph obtained (Figure 1) clearly shows the difference in trajectories of the two countries, Côte d'Ivoire and Ghana, regarding cocoa production export. The mathematical results also show that Côte d'Ivoire has a higher colonial cost than Ghana.

Considering an economic perspective, the colonial cost could illustrate the colonizing country's responsibility to the colonized state. Regarding the cocoa production sector, the obtained colonial cost for Côte d'Ivoire is 0.8 million US dollars for the difference in output during the colonial regime and independence as a time frame. Given the colonial cost interpretation and the dependency theory framework, it could be considered that France, the country that colonized Côte d'Ivoire, made Côte d'Ivoire lose 0.8 million US dollars during the colonial period.

This conclusion is correlated with the concept of development and accountability, which is nuanced in the dependency theory presented by Andre Gunder Frank and explained in the second chapter of this research. The theoretical framework mentions that core countries, which represent the colonizing powers, are the ones that keep the periphery countries — the colonized states that are primarily in the Global South — dependent and in a perpetual state of underdevelopment. It can be correlated with the colonial

cost of underdevelopment from this dependency effect: “contemporary underdeveloped is in large part the historical product of past and continuing economic and other relations between the satellite underdeveloped and the now developed metropolitan countries” (Frank, 1966, p.5). This suggestion illustrates that the colonial cost is the result of a past dependency that perpetuated in the present and future and resulted in the underdevelopment of the colonized states and development of colonizing states. In my opinion, the fact that Côte d'Ivoire has a higher colonial cost does not disregard the accountability that the UK would also have towards Ghana regardless of the value of these calculations. This is because both Côte d'Ivoire and Ghana have almost a perpetual status of underdeveloped countries in the world system (United Nations Development Programme, 2025).

5.2 Limitations of the HDI Calculations

The following section will discuss the HDI calculations and their variables: life expectancy, education, and income. As mentioned in the previous chapter, the education variable represents the average and expected years of schooling. For Ghana and Côte d'Ivoire, the latest available data was from 2022. The calculations for the next two years are based on trends and expectations from reports of the UNESCO institution. Regarding the future estimation and my estimation of a 0.02 growth in education trends for Cote d’Ivoire and 0.05 for Ghana, it cannot be a difference of 1.00 from year to year because the development in both countries is not fluctuating drastically. To further explain this point, during the research I performed a sensitivity analysis where I had altered the scores of the HDI components for both countries with 0.02 and in another trial with 0.05. The numeric results were exactly the same with only the 4th decimal differing, which means by approximation that the numbers in regards to trends of growth between 0.02 and 0.05 do not differ.

The latest publicly available GNI data for Ghana and Côte d'Ivoire is 2023. The decision to keep the same value for 2024 was made because no economic institution had published newer values, which could have impacted the calculations of the GNI. On the note of broader inequality, in a publication from 2024 of the

European Commission, the GNI data for all of the European countries that are part of the EU and the United Kingdom are presented in order to illustrate revisions and implications (European Commission, 2024, p. 46 for France; p. 106 for the United Kingdom).

To conclude this section, personal expectation reflects the fact that if there was a published HDI for 2023 and 2024 or the elements to calculate the HDI were not settled through estimation of trends, the calculations could have had more reliability for the further statistical analysis. As a researcher, I also believe that especially elements from the education concepts like expected average years of schooling, could have been available through actual field research or surveys done in Cote d'Ivoire and Ghana. Although, it should be mentioned that this kind of research technique entails more time and financial reserves than available for this thesis. Therefore, this type of specific research could happen in future studies of institutions like UNESCO Institute of Statics or the United Nations Development Programme.

5.3 Discussion of Statistical Results

This section will discuss the results obtained from the statistical analysis, considering the literature presented in the second chapter, the data and methodology process, and the conclusions explained above. The statistical technique used was nested models to obtain how Lindt and Tony's Fairtrade policies—annual investments in sustainable cocoa sourcing programs and the number of farmers involved in sustainable cocoa farming—impact poverty and inequality in Côte d'Ivoire and Ghana. The results showed that the null hypothesis could not be rejected in the case of poverty as a dependent variable. There is insufficient evidence that the annual investments and the number of farmers involved in responsible cocoa sourcing impact poverty in the two countries. This could also be because of the way the corporate data is reported by the companies in the chocolate industry.

One of the most significant issues in terms of data collection was that the annual investment variable from both companies was reported at an aggregate level. This is specifically an issue for Lindt's values because

they import cocoa beans from other regions, like Ecuador or Madagascar. In this case, the values for annual investments from Lindt are not particularly valid only for Côte d'Ivoire and Ghana.
Lindt had individual data for each country regarding the farmer's variable, making the results for the farmer's variable more valid. In the case of Tony's, all of the data available from their annual reports were on aggregate levels. However, they only import from Ghana and Côte d'Ivoire, making the study possible on a company level but not a country level. On the other hand, for the regression of the nested model with HDI as the dependent variable, even though the larger model (Model 4) still had a poor fit, the farmers' variable had a relatively small positive statistically significant effect on the HDI (β= *1.311e-6, t(10) = 3.096, p = 0.011)*. The significant p value at an alpha level of 0.05 allows the null hypothesis to be rejected.

A conclusion in this case can be that the more farmers from Côte d'Ivoire and Ghana are involved in sustainable cocoa farming programs, the more the HDI of these two countries will rise. This could be because some of the aspects that create the HDI are GNI and education. The significant results for the farmers variable in regards to the HDI could suggest that the cocoa programs from the companies help raise the GNI per capita. Given that they entail giving farmers premiums and a fair wage, these specific improvements can help eradicate child labor or forced labor, which can help improve the average years of schooling and expected years of schooling quota.

It was unexpected to find that the confounding variables were not relevant in predicting the two dependent variables because the null model with only the GDP and Population was anticipated to have a significant effect on the HDI based on personal views and literature (Anand & Ravallion, 1993). Also, it was surprising to get insignificant statistical results for the effect of the annual investment on the poverty rate because these investments entail Fairtrade premiums that are paid to farmers. This can be an extra reflection of internal inequality and income disparities in the farming industry because, as mentioned in former chapters, small farmers are not easily reached or impacted by Fairtrade actions. Therefore, in

regards to a focus on the poverty rate, the non-significant statistical results enhance the fact that Fairtrade policies alone cannot have an entirely positive effect; there is a need for governmental support and erosion of corruption in order to support small farmers as well, that might not be able to be part of the Fairtrade program.

To conclude this section, the fact that farmers are the only variable statistically significant for the HDI corresponds to the idea that development is not just economic or should not only focus on profit growth but also highlight social improvement.

5.4 Future Research

This section of this chapter will highlight future research areas that can stem from the results and the observations based on this thesis, such as investigating other company categories from known actors to specific UK and France founded companies in regards to the impact on Cote d'Ivoire and Ghana.
To research how companies' Fairtrade policies affect inequality and poverty in the West African region—or other regions that represent the periphery—it would be advisable to include more companies from the chocolate industry in future statistical analyses. Other companies of similar size to Lindt that could be analyzed are Mondelez International, Ferrero, Nestlé, and The Hershey Company.

Mondelez International has a direct partnership with FLOCERT, a branch of Fairtrade International that focuses on Fairtrade standards being respected by both sides of the supply chain, importer and exporter (Fairtrade Foundation, n.d.). Given that Mondelez International was accused of deforestation to expand cocoa production (Rizzi, 2024) and palm oil production (Greenpeace International, 2018), it is worth researching how the present effects of this partnership affect socio-economic development in Côte d'Ivoire and Ghana. Mondelez International, Nestlé, and The Hershey Company have also been accused of being aware that farmers would engage in child labor on the cocoa plantations in Côte d'Ivoire that served the companies (Balch, 2021). This aspect can introduce another study area around the cocoa

industry: the difference in corporate standards between European and American companies regarding Fairtrade policies. It is often implied that European companies are more regulated (European Commission, 2024), and how this reflects on the producers should be observed—whether there is a negative or a positive correlation.

A limitation of this paper and similar research on chocolate companies is that companies report their data on an aggregate level. Based on this research's data limitations, companies in the chocolate industry should report their results regarding sustainable actions individually for each country. The statistical analysis of this research would have been more significant if Tony's and Lindt had reported the annual investments in cocoa sourcing for each country rather than as a total.

This paragraph illustrates climate change and environmental sustainability aspects, which are important to mention when discussing the supply chain of chocolate. Natural resources are finite. Climate change threatens cocoa production, both in yield and quality. Fairtrade Foundation has started projects in Ghana to address this, including dynamic agroforestry. This practice combines cocoa trees with other crops, providing additional income outside the primary harvest season (Fairtrade International, n.d.). However, according to Kumeh (2024), this shift to long-term cocoa farming risks food insecurity by displacing local food production.

Given that each producing country has different conditions, the investments have different effects. For example, Ghana and Côte d'Ivoire experienced approximately twenty yearly floods between 1980 and 2020. Ghana, in particular, had one wildfire per year, while Côte d'Ivoire had one landslide per year (World Bank Group, 2021). Therefore, a company's investments in cocoa sourcing programs impact the country's development differently because, besides common floods, they also have different natural hazards. This means, for example, that annual investments in sustainable cocoa sourcing might be higher in terms of climate change actions for Ghana rather than for Côte d'Ivoire depending on the gravity.

In this case, another future research topic emerges: Given that the economies of Côte d'Ivoire and Ghana depend on agriculture and the cocoa crop, how does climate change impact the countries' development in terms of cocoa export?

Additionally, considering the reflections on the colonial cost results, a future research topic that looks at the inequality concept could be the accountability towards former colonized countries regarding macroeconomics and economic development. The question of accountability could be whether it should come only from the countries that colonized the specific country. For example, should France be the only country responsible for the underdevelopment of Côte d'Ivoire, considering the dependency theoretical framework? Or, in the present context of economics, should institutions like the European Union, the International Monetary Fund, or the World Bank also be considered present perpetrators of inequality and poverty in former colonial countries?

However, to investigate this aspect of accountability for underdevelopment in the chocolate industry or cocoa sector, future research can also look at how specific French or British chocolate companies impact the development of Ghana and Côte d'Ivoire, as they are the first two largest cocoa exporters. One aspect that must be considered is that most French-owned chocolate companies, like Debauve & Gallais—primarily producing luxury or artisanal chocolate products—do not import cocoa beans from Ghana or Côte d'Ivoire. This raises the question of whether the cocoa beans from these countries are considered high quality, and if not, whether the excessive demand of the supply chain reduced the quality of cocoa beans from Ghana and Côte d'Ivoire. Alternatively, in the case of UK-based chocolate companies, there is one company that has a similar focus on Fairtrade and equal pay as Tony's: Divine Chocolate, where 45% of the company is owned by a trade organization for cocoa farmers based in Ghana (Divine Chocolate, 2007). Since this company imports cocoa beans only from Ghana, the aggregate level would not be a limitation factor.

A final suggestion is conducting a similar research but instead of using the HDI, to reflect inequality, the Gini Index could be one of the dependent variables; “Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution” (World Bank Group, 2025, Metadata Glossary). In my perspective, the Gini index could also be a good model fit in general as it has a more economical view than the HDI, but as mentioned all through the research social development should not be neglected and considered only economic development. As mentioned in the Research Design section of the Introduction chapter, this thesis aimed at the beginning of the research process, to use the Gini index in the statistical analysis to represent the inequality concepts. Due to unavailability of data, the values for the 2023 and 2024 years had to be calculated, but due to difficulties in regards to the advanced level in calculations this research used the HDI as a variable that represents inequality.

5.5 Societal and Scientific Relevance

The scientific relevance of this research is the calculation of HDIs for Ghana and Côte d’Ivoire for the years 2023 and 2024. As mentioned before, these values only exist until 2022. Given the explanations presented in the Data and Methodology chapter on how these values were obtained, the HDIs for Ghana and Côte d’Ivoire calculated can be used in future research. Another scientific implication is statistical analysis, which connects corporate action, from the Fairtrade framework, with macroeconomic aspects of poverty and inequality. This research also looks into two companies of different sizes based in Europe. Therefore, future research can use the same companies but investigate other Fairtrade policies used by the companies or other development measures than the one presented in this thesis. As mentioned in the previous section, future research can also investigate other types of companies in the chocolate industry and how they impact the development of exporter countries.

The societal relevance of this research is the awareness that it brings towards the inequality between the periphery and core countries and the constant and perpetuated underdevelopment through the cycle of

poverty. These macroeconomic concepts are tied to the Fairtrade Organization through one of the most important supply chain actors, the consumer. This thesis highlights that consumers are responsible for taking accountability towards companies and countries. Firstly, given the data limitation during the research process, the chocolate companies are advised to report their data more clearly and not at an aggregate level, especially for Fairtrade aspects. Another societal implication that would be advised is creating offices representative of the companies where locals can be more educated towards administrative jobs, to decentralize the focus only on the agriculture sector.

On the other hand, companies can also be an important factor in solving internal inequality, such as importing from smaller farmers or improving the connection between smaller and larger farmers. This could be done by donating farming machinery or fertilizers previously used by the large farms to the smaller farmers to create circular sustainable transactions. Another societal implication is the topic of accountability, as discussed from the results of the Colonial cost calculation. The accountability of former colonizing countries towards the (un)developed countries should be a point of discussion on how present economic institutions like the IMF, actually impact the social-economic development of the countries in the Global South.

This thesis manages to have both societal and scientific implications regarding the development of former colonized countries by looking into the Fairtrade aspect of the cocoa supply chain and how the relationship between companies and consumers can make future improvements for the trajectory of exporter countries that seem to still be dependent on wealthier countries.

5.6 Conclusion of Discussion Chapter

In conclusion, this research's statistical analysis does not reject the null hypothesis for poverty but rejects it for the inequality variable. At the same time, because poverty and inequality are not only represented by the poverty rate and the HDI in society, the research question can be a starting point for this supply chain

topic: Do Fairtrade policies adopted by Lindt & Sprüngli and Tony's Chocolonely help reduce poverty and inequality in Côte d'Ivoire and Ghana?

The results show that only the number of farmers participating in both companies' sustainable cocoa sourcing programs positively impacts the HDI index of both countries, which suggests a favorable implication in reducing inequality. In regards to the societal and scientific relevance of this study, the results highlight the positive effect of Fairtrade policy, especially the ones that directly impact the people from the resource region. This could mean that Fairtrade policies oriented towards job creation or education have a more significant effect in reducing inequality. In my perspective, this research study can be used in other future studies as a reference for why it is necessary to explore these kinds of topics, especially in the present situations of the world, such as climate change and political instabilities that can result in global wars. These topics will always affect underdeveloped countries that do not have enough resources to sustain themselves. In the case of Côte d'Ivoire and Ghana, the cocoa sector will remain a colonial legacy that implemented development in both countries. However, in my perspective, it also perpetuated inequality at a macro level, such as child labor, visible higher rates of poverty for formerly colonized countries, and higher underdevelopment in rural areas. These realities did not help eradicate poverty.

Therefore, if studies like this one—or others that investigates countries that do not even have recent demographics available in the context of international supply chains—keep on existing, then regardless of whether the analysis is statistically significant or not, awareness is being brought to areas of the world. This will remain a primordial aspect in a global society that wants sustainable development.

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Appendix 1 - HDI complete calculations

$LifeExp_{GHANA2023}$ = (65.5 - 20) / (85 - 20) = 0.7
$LifeExp_{COTE\ D'IVOIRE\ 2023}$= (61.94 - 20) / (85 - 20) = 0.645

$Education_{GHANA2023}$ = (10.00 / 15 + 12.00 / 18) / 2 = 0.667
$Education_{COTE\ D'IVOIRE\ 2023}$= (6.34 / 15 + 10.12 / 18) / 2 = 0.492

$GNI_{GHANA2023}$= [ln(2360) - ln(100)] / [ln(75000) - ln(100)] = 0.4775
$GNI_{COTE\ D'IVOIRE\ 2023}$= [ln(2470) - ln(100)] / [ln(75000) - ln(100)] = 0.4844

$HDI_{GHANA2023}$ = ⅓ * 0.7 + ⅓ * 0.667 + ⅓ * 0.4775 = 0.614
$HDI_{COTE\ D'IVOIRE\ 2023}$= ⅓ * 0.645 + ⅓ * 0.492 + ⅓ * 0.4844 = 0.54

$LifeExp_{GHANA2024}$ = (65.7 - 20) / (85 - 20) = 0.703
$LifeExp_{COTE\ D'IVOIRE\ 2024}$ = (62.11 - 20) / (85 - 20) = 0.648

$Education_{GHANA2024}$ = (10.05 / 15 + 12.05 / 18) / 2 = 0.669
$Education_{COTE\ D'IVOIRE\ 2024}$ = (6.36 / 15 + 10.14 / 18) / 2 = 0.494

$GNI_{GHANA2024}$= [ln(2360) - ln(100)] / [ln(75000) - ln(100)] = 0.4775
$GNI_{COTE\ D'IVOIRE\ 2024}$ = [ln(2470) - ln(100)] / [ln(75000) - ln(100)] = 0.4844

$HDI_{GHANA\ 2024}$ = ⅓ * 0.703 + ⅓ * 0.669 + ⅓ * 0.4775 = 0.616
$HDI_{COTE\ D'IVOIRE\ 2024}$ = ⅓ * 0.648 + ⅓ * 0.494 + ⅓ * 0.4844 = 0.542

Appendix 2 - Sources for Data Set

Variable	Description	Source
Poverty Rate	"ratio of the population whose income falls below the poverty line" (OECD, 2022)	World Bank - Côte d'Ivoire (2022) World Bank - Ghana (2022)
HDI	Human Development Index	UNDP (2025), UNESCO Institute of Statistics (2023-2024), World Bank Group (2023), Global Data Lab (2025), Statistical Times (2024)
Annual Inv	Annual Investments in sustainable cocoa sourcing	Lindt & Sprungli Sustainability Reports (2021-2024), Lechner A. (2023), Tony's Chocolonely Annual Reports (2021-2024)
Farmers	Farmers part of the Sustainable Cocoa Sourcing Programs	Lindt & Sprungli Sustainability Reports (2021-2024), Lechner A. (2023), Tony's Chocolonely Annual Reports (2021-2024)
GDP	Gross Domestic Product	World Bank Group (2023), IMF (2025), Ghana Statical Service (2025)
Population_C	The centered values of population for Cote d'Ivoire and Ghana	Worldometer (2025)

Appendix 3 - SPSS Syntax Code

```
RECODE COMPANY (1=1) (2=0) into dCompany.
EXECUTE.

FREQUENCIES VARIABLES = dCompany.

RECODE COUNTRY (1=1) (2=0) into dCountry.
EXECUTE.

COMPUTE POPULATION_C = POPULATION / 100000.
EXECUTE.

DESCRIPTIVES VARIABLES=POVERTYRATE HDI ANNUALINV FARMERS GDP
POPULATION_C
  /STATISTICS=MEAN STDDEV MIN MAX.

FREQUENCIES VARIABLES=dCompany dCountry
  /ORDER=ANALYSIS.


CORRELATIONS
  /VARIABLES=POVERTYRATE HDI ANNUALINV FARMERS GDP dCompany  POPULATION_C
  /PRINT=TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.


REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE
  /CRITERIA=PIN(.05) POUT(.10) TOLERANCE(.0001)
  /NOORIGIN
  /DEPENDENT POVERTYRATE
  /METHOD=ENTER dCompany GDP POPULATION_C
  /METHOD=ENTER dCompany ANNUALINV FARMERS POPULATION_C GDP
```

```
  /SAVE LEVER.


REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE
  /CRITERIA=PIN(.05) POUT(.10) TOLERANCE(.0001)
  /NOORIGIN
  /DEPENDENT HDI
  /METHOD=ENTER dCompany GDP POPULATION_C
  /METHOD=ENTER dCompany ANNUALINV FARMERS POPULATION_C GDP
  /SAVE LEVER.
```