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Civil War and Human Capital

On how civil war influences human capital accumulation

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1 Introduction:

Africa is often referred to as the poorest continent of the world. This continent, with the second largest surface in the world, accounts for about 14.7 % of the world population and is thereby a potentially big economic power. Due to numeral causes that may include the spread of deadly diseases and viruses, corrupt government, failed central planning, a lack of literacy, absence of accessible foreign capital and frequent armed conflict, the region is also the most undeveloped in the world (UnitedNations, 2005). The last of the above named factors, armed conflict, can be seen both as an effect and as a cause of the economic failure and is therefore subject to an increasing number of researches.

For the seventh year running, no major interstate conflict was active in 2010. Over the decade 2001–10, only 2 of the total of 29 of the world's major armed conflicts have been interstate (SIPRI 2011). This trend started in 2004, when the conflict between Iraq and the multinational coalition led by the United States and the United Kingdom and the long-standing conflict between India and Pakistan over Kashmir ended or didn't meet the requirements to be categorized as a major interstate conflict. While interstate wars most obviously kill and maim people, both directly and indirectly through famine and disease, civil wars can cause even more damage than other types of conflict, and leave a country much more destroyed (SIPRI 2009 ; SIPRI 2010). This is because they tend to penetrate deeper into societies and their functioning, social, governmental and economic. The short-run impact of war is clearly disastrous, but there is mixed evidence on how long the economic effects on human capital and quality of life endure (Blattman and Miguel 2009)

Research done on the effects of civil war could be categorized in macro and micro research. Blattman and Miguel (2009) stated that there are contradictory outcomes in the two different research types on the legacies of civil war. They note that this might be caused by the different outcomes they search for. Although it is assumed that both micro and macro-economic scholars share the goal of finding the key to protecting the economy during a civil war, and therefore maybe prevent more severe effects of the civil war or even prevent a new one, only recently they seemed to have opened up their eyes for each other's research outcomes.

They state that the leading question is not whether wars harm human capital stocks, but rather in what ways, how much, for whom, and how persistently—all crucial questions for understanding war's impacts on economic growth and inequality, as well as priorities for post-conflict assistance (Blattman and Miguel, 2009).

This is what I will try to do in this thesis, by making a contribution to the existing literature on the economic effects of civil war. I will present three theories on the effects of civil war on human capital accumulation and an overview of empirical researches and test if the empirical evidence is conformable with the theory, focusing on the educational side of human capital. Using empirical evidence found in Sub Saharan Africa between 1960 and 2000[1], I hope to find mechanisms that explain how the destruction of human capital in a civil war influences the economic growth

The main objective is thus to gain insight into the ways civil wars influence the accumulation of skills, experience and knowledge in Sub Saharan Africa and how this affects the economic growth. To achieve this objective, several questions need to be answered. First, I will try to find what the theories conclude about the influence of civil war on economic growth via capital. The ones that I try to answer in this thesis are: 1) How does human capital affect economic according to the Solow growth model? 2) How does a civil war affect the accumulation of human capital? And 3) How does the destruction of human capital affect the steady state of an economy?

To achieve the objective using the empirical evidence, the following questions are answered using empirical researches: 1) how does civil war affect the enrollment rate? 2) How does the civil war affect the grade completion? 3) How does civil war affect the outflow of human capital and the killing of higher educated?

The remainder of this thesis will be as follows: Chapter 2 will present a theoretical overview of the effects of civil war on economic growth and the theoretical background of human capital accumulation. Chapter 3 will present the theoretical framework of this thesis and in chapter 4 the empirical evidence will be analyzed. In chapter 5 follows the discussion and conclusion.

2 Theory and background

2.1 Introduction

This chapter will present an insight in the theories on the relation between human capital and economic growth and the effects of civil war on economic growth. To be able to do so, first it explains how economic growth emerges, using a Solow growth

[1] The conflicts included are Angola, Burundi, Chad, Ethiopia, Mozambique, Nigeria, Rwanda, Sierra Leone, Somalia, Sudan, Uganda, Zaire and Zimbabwe, following the definition of Gyimah-Brempong and Corley (2005). Some countries that experienced civil war (like Liberia) are not included in this set due to a lack of data on some variables.

model to determine what drives economic growth. In what ways civil wars affect economic growth is briefly listed, before focusing on the role human capital has when it comes to economic growth. The last part of this chapter introduces three theoretically possible growth models showing the effects of civil war on the accumulation of human capital.

2.2 Determinants of economic growth

Scholars of economics search in general for one answer: what is the ultimate drive of an economy. To find this answer, one must look at the growth patterns and how productivity can increase within that economy, since economic growth is driven by the increase of productivity. On an individual level, enlarging capital can increase productivity. This economic use of capital includes several forms. The most obvious is the physical capital, which includes every physical object an individual possesses or can use for production, like land or machinery. Other forms of capital include social capital (social connections between and within networks) and the capital that will be the focus of this thesis: human capital.

One of the most used models to describe economic growth is the Solow model. This model assumes that economic growth is dependent on the total capital, the labour force and the efficiency of the labour force. It assumes a diminishing return on investment in capital and a constant fraction of the capital stock that depreciates each year. The steady state as predicted by Solow will be reached when the investments (and thus the savings) are at the same level of the depreciation. He assumed that people save a fixed share of their income, as shown in Figure 1.

In this diagram y is the national income of a country per capita, as a function of the total capital per effective worker (k). The term per effective worker indicates that the efficiency per worker is taken into account, meaning that workers can produce more output per unit of capital as the efficiency of the production process increases. This positive relation shows a diminishing marginal product of capital added, indicating that every extra unit of capital added per worker causes a smaller growth of income than the previous. The total savings are shown by sy, s being the savings rate. This is the share of the national income that is saved and thus invested.

The third line - $(n+\delta+g)k$ - shows the break-even investment, so when investment is above this rate, the capital stock per effective worker will grow, and when it is below this rate, it will fall. The break-even investment is a function of k and is influenced by factors that cause a decrease in capital per effective worker, like depreciation (δ), the population growth (n), and the labour-augmenting technological progress (g). The

latter factor is the annual growth of efficiency of one labour unit, implying that capital is allocated more effective as the technological progress rate increases. As mentioned before, all three variables (depreciation, population growth and technological progress) lead to a decline of capital stock per worker and therefor require a positive amount of investment to keep the total capital per effective worker constant.

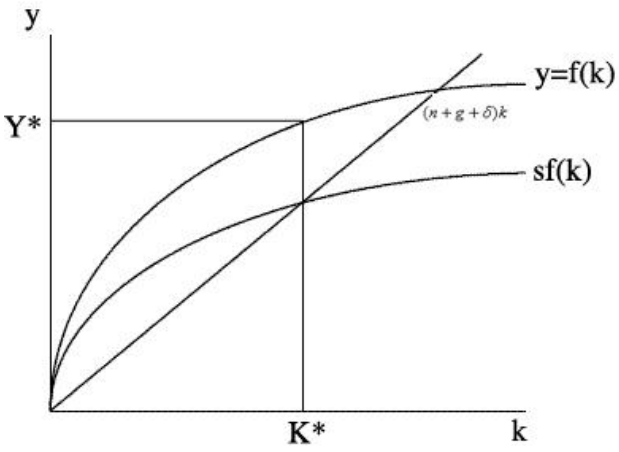

Figure 1: A Solow Diagram

In Figure 1, the steady state is in K* and Y*, since the income per capita will increase as long as it is higher than the investment break-even and decrease when it is below. So in a steady state, Y* is the national income per effective worker, which can be expressed in an equation as Y*=y/eL. In this equation, y represents the national income, L the labour force and e the effectiveness of the labour force. If an increase of the labour force increases the national income with an equal growth rate the national income per capita stays the same when only L grows. This implies that the only factor that causes the national income per capita in a steady state to grow is the change of e. This growth rate of the latter is in the Solow model expressed as g.

The next sections will explain the theories on how a civil war influences economic growth, what human capital is and how human capital accumulation is affected by a civil war. Hereafter, the theoretical framework on which the empirical evidence is tested is explained.

2.3 How civil war affects economic growth

All types of war influence the economy of the involved states, and from a theoretical point of view there is no consensus about the effect of armed conflict on economic growth (for an overview: Gyimah-Brempong and Corley (2005)). Civil wars, however, tend to be more destructive and cause different effects[2]. Different theories try to explain the recovery after a civil war. The Chicago-school-based neoclassical theory argues that economies should recover relative quickly after a conflict, as well as a civil conflict and they should move towards a new steady state (see Lucas 1988). Others claim that the time-consuming, mostly structural, parts of the economy like human capital slow the recovery down.

In his paper on the economic consequences of war, Collier (1999) describes five categories of effects on the economy: destruction, disruption, diversion, dissaving and portfolio substitution.

Included in destruction are all the resources made unusable by the civil war. This includes all the deaths and disabled within a labor force, the demolishing of infrastructure that cannot be used for production later on. Collier notes that civil wars, since they tend to be fought with less technological advanced weapons, cause less destruction (at least of physical capital) then international wars.

The second category is the social disruption that results from civil wars and the subsequent social disorder. For example: the decreasing safety of the transport of goods and people could cause an increase in the transfer costs like securing the cargo. This may lead to higher prices for products and services. Another effect included is the suppression of civil liberties thereby reducing the efficiency of public expenditure (Isham, Kaufmann et al. (1996); in: Colleir(1999)).

The diversion of public expenditure from output-enhancing activities is the third type Collier mentions. This means that the regular expenditures that would lead to a higher output (like on education or on infrastructure) have to be reduced in order to reduce the direct effects of the war. The example Collier offers is the empowerment

[2] Some scholars find no significant growth impact of civil war, like Barro and Lee (1994) and Caselli et al. (1996). Easterly et al. (1993) find no statistically significant relationship between war casualties and growth rate.

of the army over that of the police force and the rule of law. As a result institutions like property rights, on which everyday life is based, diminishes and daily life becomes more costly.

The fourth category is dissaving, an effect Collier describes as: “analytically similar to the destruction of the capital stock.” This means that savings done in the past are reduced or vanished. Livestock might be killed or taken, land disowned or left and the banking system collapses.

The last sort of effect he identifies is the portfolio substitution in which private agents will engage. Due to the worsening of the economic environment, agents tend to move their assets out of the country. Collier remarks that these assets should be understood to include physical and financial capital as well as human capital (Collier 1999).

2.4 Human capital as a factor of economic growth

To understand how the general effects of civil war as stated above relate to the effects it has on human capital, one must know how human capital is contributing to an economy and how it relates to the other sorts of capital. In general, human capital consists of all kinds of assets from which an individual cannot be separated. These include knowledge, skills, health and values, factors that can be trained or need (medical) care. Schooling, training, courses or medical care can therefore be seen as investments in human capital (Becker, 1975).

An ongoing discussion takes place about the importance of the different capitals, and which is the leading determinant factor of economic growth in general. Galor and Moav (2004) claim that after the first stage of development, in which physical capital is most important, human capital takes over as the principal drive of the economy. This is because inequality in physical capital creates a stimulating effect on the economy, causing a more complex industry and the need for more schooled employees and thereby leading to an incentive to invest in human capital (Galor and Moav 2004).

Aside from the question of which sort of capital is most important, this means that a general growth of the levels of capital is required. This is why the accumulation of human capital has been topic of numerous studies.

To simplify, there are two basic categories of human capital: education and health. Education, the focus of this thesis, can in many ways increase the productivity of an individual, as every job requires some kind of skill for which training is needed. Better-educated people tend to be able to use more complicated technologies and thus have the possibility to be more productive. (Becker *et al.*, 1990)

Health is a factor that needs to be taken care of to increase the productivity of an individual. A certain amount of health is required to work at all, and from that point on the productivity of an individual increases with a diminishing marginal return together with the health level. The healthier an individual, the more he can focus on his work and social live and thereby his wellbeing, both adding to its productivity (Becker *et al.*, 1990; Hartog and Maassen van den Brink, 2007).

In the Solow model, an increase in productivity would lead to a higher production, pushing y upwards for a give k, together with the savings. In Figure 2 y=f(k) shifts to y=f(k)', increasing the savings so that the steady state shifts from K* to K*'. The rise of the national income per capita, from Y* to Y*', is a single shift and not a yearly based growth rate, although the adjustment to the new steady state could take several years. The annual growth rate of per capita income is still determinant by g.

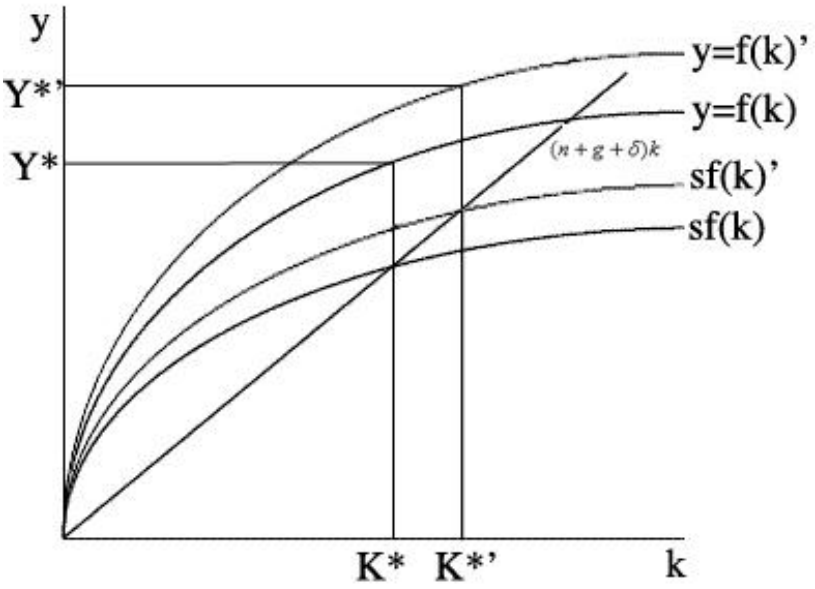

Figure 2: A Solow model showing a one-time shift of productivity

A characteristic of human capital is that it is more dependent on the policies of a government compared to the other forms of capital. The government generates the

greater part the supply of both health and education. This makes it more vulnerable for corrupt regimes but also for civil wars, especially because civil wars tend to destruct the public service systems (more than intrastate wars) (SIPRI 2009).

Another feature of human capital is pointed out in the Human Development Report of 2005. It claims that inequalities in education are among the most powerful drivers of inequalities in income, health and opportunity, and thereby the opportunities to participate in society and influence political processes (UnitedNations, 2005). This indicates that not the average level of education and health are important determinants of economic growth, but rather the inequality or the level of the least fortunate[3]. This is important when studying civil wars, since some parts of a society will be more affected by the war, possibly casing a greater equality.

2.5 Accumulation of human capital

The accumulation of human capital is different from the accumulation of other sorts of capital, since human capital cannot be separated from an individual. This means that a transfer of human capital is not a zero-sum game, since the supplier of the human capital does not lose the supplied capital after it has been transferred. For example, once physical capital has been sold, it cannot be sold again. This implies that just transferring human capital increases the stock of human capital.

Most theories on the accumulation of human capital are based on the neo classical theory that it can be seen as a capital and therefore one can invest in it (Bellows and Miguel, 2009). By investing in human capital, individuals may accumulate this type of capital and thereby increase their productivity. According to these theories, individuals have to decide how, and in which of the capitals to invest their endowments. The most important endowments needed to produce human capital are time and money.

Individuals only invest in capital when the expected rate of return is higher than the investment itself. This means that not only the expected value needs to be higher, but also the risk of investing must be covered. Human capital, compared to physical capital, is a more risky and costly investment and will thus only occur when certain conditions are met. To show this, Becker (1990) created a model to indicate the connection between physical and human capital. He shows the rates of return of the two kinds of investments by illustrating the two of them in a framework of

[3] For evidence that a more equal distribution of health has a more positive economic growth than a higher average health level, see: Deaton (2003).

comparative advantage. In comparing the rates of return, the main difference that stands out this the difference in investment in time and money.

The time in between the investment and the return of human capital is larger than then that of physical capital. This is because an investment in human capital is worth nothing on its own, and it is only paying off when one can increase future production. Physical products can be sold or used instantly after the production, thus an instant return in capital.

Both of the two main categories of human capital (education and health) are costly to transfer. The education part of human capital, knowledge, experience and skills are costly to transfer because it has to be translated into a language or other methods of communication before one can use it or transfer it. (Becker 1990) For example: a farmer can explain for hours about his land, but most of his knowledge is based on experience and hard to make clear to somebody who has never planted a seed before. Human capital is most effectively transferred when a “teacher” has direct contact with the “student”, so the teacher can choose the communication matter to transfer the human capital. Either way, an effort is made from both sides to complete the transfer and therefore these investments need to have a profitable prospect for the two agents before they agree on starting the training.

Best example to show this is the on-the-job training, where a company agrees on training (or paying a training for) employees. During this training period, the employee cannot produce anything for the company, and even costs are more than normal, since the training has to be paid for. The reason why a company would train an employee is to produce extra or more specific skills (accumulative human capital), which should improve the productivity of the employee later on (Becker 1975). In this example Becker clearly shows how training is a form of investment that should pay off at a later time.

This is shown in Figure 2, showing an income line as expected for two individuals ranging in age from 18 to 65. Person A invests in education in the first part of the diagram, and because he has to pay or take a loan to do so, he generates costs. After he finished his education, he starts working and because his experience and on-the-job training make him more efficient, he increases his productivity and thereby his earnings. Later, after health problems and ageing knowledge enforce a decline in efficiency, his income will decline.

Person B starts working right away and only increases his productivity by experience and on-the-job training. If person A invests in education, the ‘costs’ he makes during

the period of education are the money he invests in education and the income he would have earned if he would have been working. If the sum of these two is smaller than the extra income he would earn after his income exceeds the income of person B, he will choose to invest in education. In the diagram: if the sum of area 1 and 2 is smaller than area 3, so area 3 is the gross return on education.

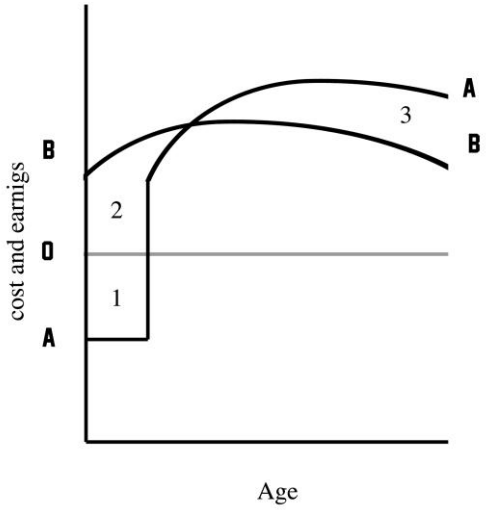

Figure 3: The pay-off of investments in education

Thus human capital is in almost every way more expensive and therefore more risky to invest in, for individuals and companies or other organizations, compared to physical capital. This characteristic is important in the next section, which is about the effects of civil war.

2.6 How does civil war affect human capital (accumulation)?

This section will present three different possible models of how a civil war can influence the accumulation of civil war: the catching up effect, the poverty trap model and the single shock theory. The first is based on neoclassical theories and predicts that the economic growth will recover after a civil war and will catch up with the old growth line. This type of recovery is called the catching up effect and is shown in Figure 4a. This diagram shows a possible national income per capita growth line, with a big drop (the civil war) and the recovery. As shown, the growth rate of the income is higher directly after the war, until it catches up with the old growth line. The grey line is the estimated growth the income per capita would have experienced without a civil war. The baseline here is a situation where income per capita grows at a decreasing rate (rather that a constant rate g)

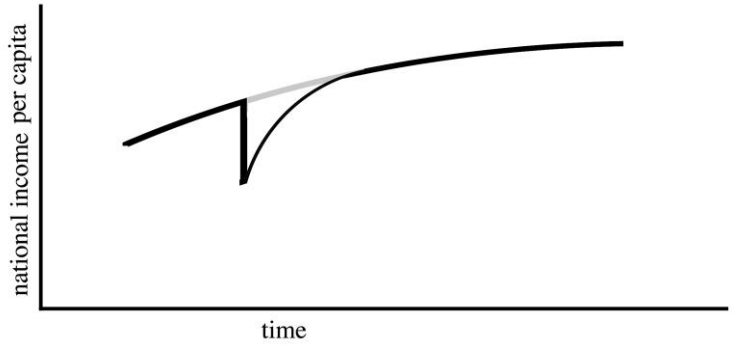

Figure 4a: The catching-up effect.

This model claims that destruction of physical capital during war or other disaster leads to an increase in the rates of return on physical capital directly after the war, relative to the rates of return on human capital. During a civil war, both supply and demand of physical capital will decline, but after the war the demand side of the economy will rise faster than the supply side. This is because the demand will rise as soon as the migrants return or the survivors start to produce again, whereas the physical capital needs to be build or bought.

The gap created in the supply side will encourage entrepreneurs to invest and to produce as efficient as possible. As an effect, the technology level of the production tends to increase, requiring a higher level of skills. With this, the demand for human capital rises[4]. This positive relation is counterintuitive, since the two kinds of capital are mostly substitutes: time or money that is spending on physical capital cannot be invested in human capital. But this contradiction can be countered by the gap in supply that is left after a civil war (Bellows and Miguel, 2009).

The latter is shown in Figure 4b, which is derived from the Solow growth model. In this model, the horizontal line does not represent the capital per effective worker, as in the original model, but human capital per effective worker (h). In this model, n would change from the growth rate of the labour force to the growth rate of the skilled labour force and δ would represent the depreciation rate of knowledge and skills, implying that education and skills need to be trained or being practised to keep them on the same level. The technological progress rate (g) represents rate at which the effectiveness grows of the transferring systems of human capital. For example educational systems or on-the-job-training.

[4] Becker (1990) remarks that when too much knowledge is destroyed, an economy loses the foundation for further accumulations of knowledge-whether embodied in people or disembodied in technologies-which is the essence of economic growth.

The catch-up model predicts that during a war, the human capital stock decreases following to the grey arrow, and the investments lower from point a to point b. But because the lines do not change, rates of return are so high in point b that investments will increase, until they reach point a again. So the steady state after a civil war will be the same on the long term.

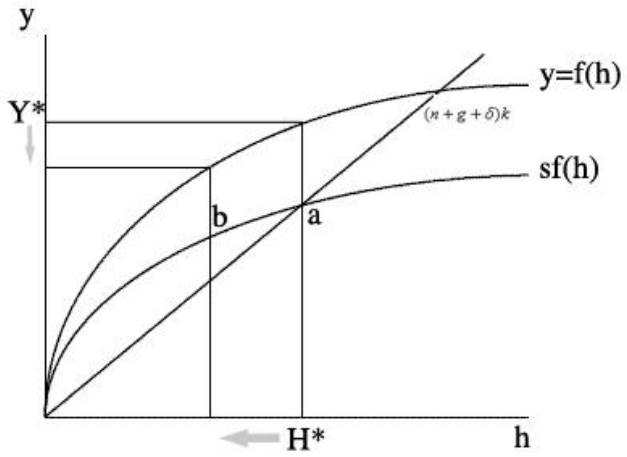

Figure 4b: The catching-up effect in a Solow model

Other approaches argue that the steady state will be influenced by the civil war and thus will the economy not return to the same steady state and so the same growth path. Instead the economic state might only recover to a lower level economy, with a lower productivity, thus reinforcing the chances of new conflicts (Rodrik 1999 , Collier 1999). Figure 5a shows an income per capita growth curve as predicted by this type of models. Again, the grey line represents a prediction of the income growth without a shock caused by a civil war and the black line the predicted growth according to the poverty trap model when a civil war occurs.

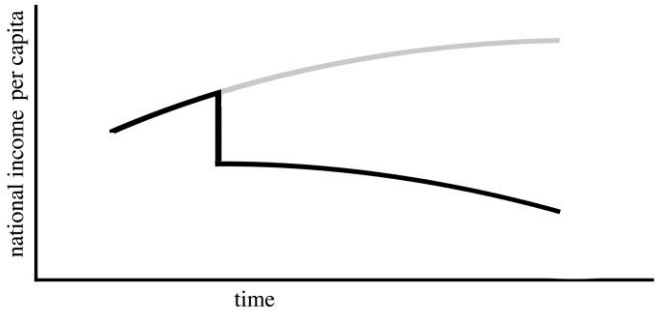

Figure 5a: The poverty trap model

These theories are based on poverty trap models, which predict that if an economy is an unusual low level of development it may get stuck on that level. This is because neither labour nor capital is available and investments in one of the both will not be made, due to low marginal return to capital. In contradiction with the neo-classical model, this model claims that increasing return to scale, complementarities or negative feedback effects will keep the return on capital low in the lowest stages of economic development (Rodrik 2006).

This poverty trap model could be explained in the Solow model by a change in the relation between the capital and the income per capita. The y=f(h) line would show an extra curve at the lower capital levels. This implies that the marginal rate of return not only diminishes, but also shows an increase at lower levels of human capital per capita. The diagram as shown in Figure 5b, shows this extra curve. If the human capital per capita decreases and shifts from H* to the left, two scenarios are possible. If it stays right of h^, investments will be bigger than the break-even line and so the steady state H* will on the long term again be the steady state. If, however, the destruction of human capital will cause the h to fall below h^, the break-even rate is higher than the investment, causing a decline in investment and thus a decline in the income per capita.

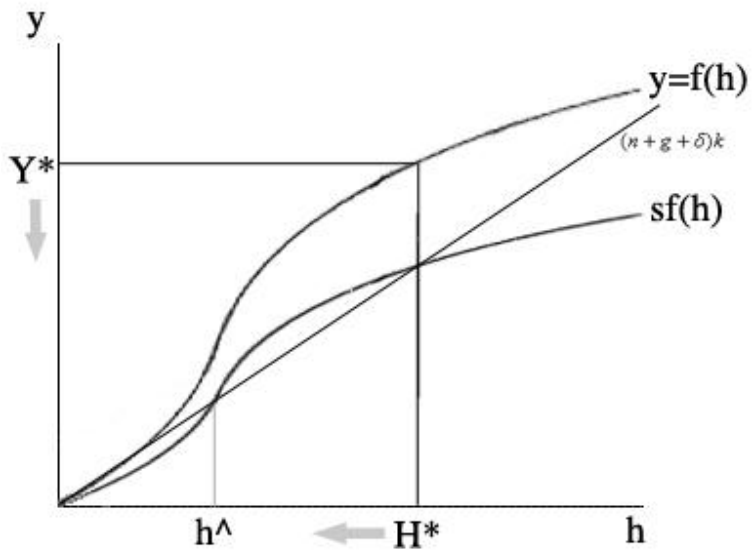

Figure 5b: The poverty trap in a Solow model.

A third possible result of a civil war on economic growth is that the national income per capita experiences a single downwards pushing shock, but remains on the same growth level. Figure 6a indicates how this could look in a diagram.

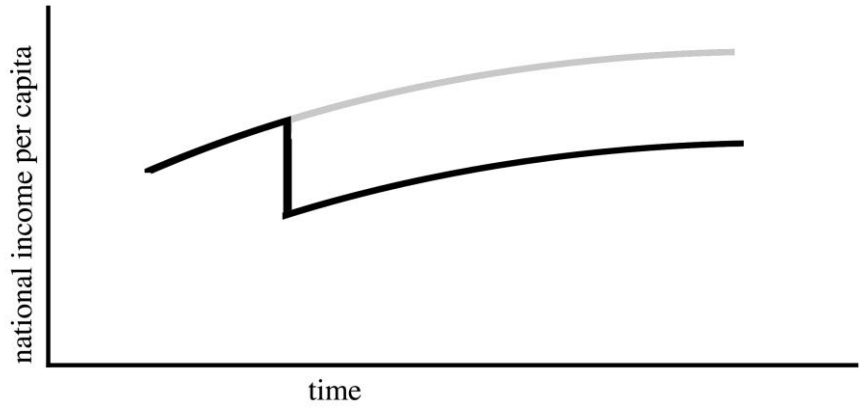

Figure 6a: A single shock theory.

This model predicts that the economy does not lose its ability to grow, but only loses efficiency in growing. In the Solow model, this would look as shown in Figure 6b. In this model, the y=f(h) curve shifts downwards, implying a lower steady state, but the rate of g does not change, so the growth per year stays the same.

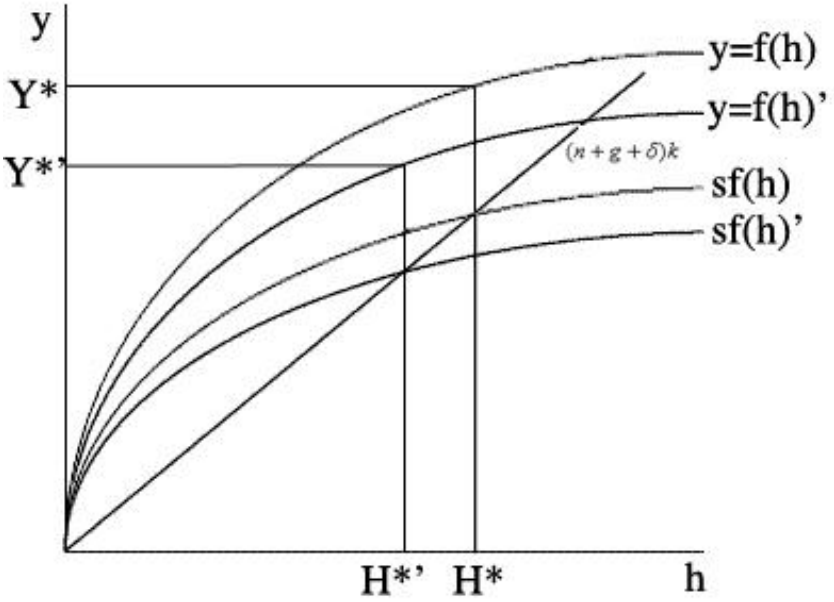

Figure 6b: A single downward shock in a Solow model

2.7 Summary

To summarize this chapter, a civil war has destructive effects on economies and thus on economic growth. As one sort of capital, human capital is a factor that determines the growth of an economy. Since the transaction costs of transferring human capital are high and it does not pay off instantly, it is only in more developed economies that investments in human capital take place. During a civil war, levels of both physical and human capital decrease.

According to the theories in this chapter recovery can follow three different patterns: 1) According to the catching-up effect, the human capital stock per capita lowers, causing the savings rate to exceed the investment break-even rate and thus an increase in investments. This will cause a rise of the capital stock per capita, until the old steady state is reached and g will function as the growth rate. 2) The conflict trap model assumes that the investment rate of human capital at lowest level of capital stock per capita is lower than the break-even rate. Thus when to much human capital is destroyed, investments after a war will decrease and so will the national income. 3) The one-time shock theory predicts that a civil war decreases the steady state, but remains on the same growth rate.

3 Methodology

Since this thesis is a literature survey, some features and characteristics of this type of survey need to be mentioned. This chapter will explain what different approaches on empirical evidence are included in this thesis and what risks are involved with a literature survey. Afterwards it presents a short introduction in the research area.

3.1 Micro and macro approaches on empirical evidence

The effects of civil war on an economy have been observed from different scientific angles. One distinction that can be made is macro and micro-economic based research. Micro-economic research focuses on a specific case or predetermined research area to search for causal effects of micro-finance, education, health and other social based programs. The evidence of these types of research is called hard evidence (Rodrik, 2008), meaning that the evidence is found in a randomized, or if that is impossible natural, experiment without intervention of another (data collecting) organization (Kanbur *et al.*, 2005). The outcomes of such research is mostly of high average quality, but are scarcely of further use in policy making since they lack of quantitative value.

Macro-economic research focuses on gaining information about economic growth international trade and fiscal/macro policies, on national levels and international scales. It is mainly focused on finding average numbers or trend that then would count for most of the research field. These macroeconomic-based researches, as Rodrik (2008) describes, can be useful for creating large policy schemes and programs, and are mostly used by international organizations. Since the data is collected over entire countries and usually indirectly (not by doing field research) the outcomes are dubbed soft.

This distinction will be the leading framework used in the analysis part; to test whether the micro or macro based outcomes are more in line with the theory.

3.2 Method: a literature survey

This is a literature research, which summarizes and compares existing literature. As a result there are some restrictions that need to be taken in account.

First, the collection of data is related to the economic status during a civil war. The number of scholars doing research on the economic effects of a civil war is not big and since it is hard to collect good databases in warzones, one should be aware of a possibly smaller reliability of the data. And although the number of scholars working in this area is increasing, this declines the pool of researches that I could use now.

In addition, another restriction comes from the complexity of a civil war. No civil war is the same and effects can be different in time and place. This is also an effect of the destructive characteristics of a civil war, as it disturbs about every aspect of a society and thus leaves real complex chaos of interrelated consequences.

The last feature is related to the outcome of the war. Scholars must take safety in account while doing research and as a consequence the most literature is based on data from relatively fast recovering countries. These countries have a smaller chance of a recurrence of an armed conflict. So this might bias the outcome of literature analysis like this one.

3.3 Research Area

In this thesis the civil wars of Sub-Saharan Africa (SSA) will be examined. This area is located South of the Sahara desert on the African continent. It contains the poorest

countries of the world and was host of 25% of the major armed conflicts of 2009 as reported by the Stockholm international peace research institute (SIPRI 2010).

Africa's recent history is mostly shaped by the consequences of the decolonization. Aside from Liberia and Ethiopia, all the African countries gained their independence after the Second World War. The independent countries were mostly left without a legal government, in cultural confusion and economic uncertainty. Some of the most important natural resources were taken, leaving fewer possibilities to develop independent economies. And since the borders of most countries did not represent the inhabitants social structures, there was a lack of cultural heritage and funds for a national governance (Gilbert and Reynolds, 2008).

Living standards in SSA are among the lowest in the world. And it gets worse: SSA is the only part of the developing world where per capita income and living standards have declined over the last three decades (Gyimah-Brempong and Corley 2005). Of the 135 countries in the sample of Human development report 2010, only 3 –the Democratic Republic of the Congo, Zambia and Zimbabwe- have a lower Human Development Index rating in 2010 than in 1970. But not all countries in SSA follow this pattern. Four of the SSA countries (Ethiopia, Botswana, Benin and Burkina Faso) are in the top 25 of countries that have made the greatest progress in improving the HDI (UnitedNations, 2010).

One of the causes for the decline in the less fortunate countries is the impact of HIV. Sub-Saharan Africa has just over 10% of the world's population, but is home to more than 60% of all people living with HIV—25.8 million. In 2005, an estimated 3.2 million people in the region became newly infected, while 2.4 adults and children died of AIDS. Among young people aged 15–24 years, an estimated 4.6% of women and 1.7% of men were living with HIV in 2005 (UNAIDS, 2005).

The declining standard of the living was correlated with the increase in the occurrence of civil wars. Depending on the definition of civil war, about 20 SSA countries have experienced at least one period of this type of conflict since their independence in the 1960s. Extreme examples of countries that experienced civil war almost continually were Angola, Mozambique and Sudan. While the numbers of civil wars have declined in other parts of the world, the incidence and intensity of civil wars have increased in this region. Of the 27 active armed conflicts going on around the world in 1999, about 41% of them were civil wars taking place in SSA, a region with less than 11% of the world's population (SIPRI, 2000 in: (Gyimah-Brempong and Corley, 2005)

The economic performance of SSA over the last three decades has been dreadful, leading some observers to refer to this growth performance as a 'tragedy' (Easterly and Levine, (1997); Atardi and Sala-i-Martin, 2003). According to Bodea and Elbadawi (2008), SSA has not only been caught in a conflict-underdevelopment trap in the past year, but they predict an unstable future for the region. The main cause for this is Africa's ethnic fractionalization, meaning that a lot of different ethnical groups live in a country. The past regimes were not able to handle this problem and only non-fractional democracies are able to do so (Bodea and Elbadawi 2008).

Other studies find that the economic background of the continent, causing a high risk of conflict, was the main force behind the dark clouded future of the continent. An exceptionally bad economic performance increased the occurrence of civil war, pulling the bigger part of Africa in a poverty trap (Collier and Hoeffler, 2002). Whether the social environment creates economic conditions or vice versa is not taken in account.

Despite all the efforts, in 2009 still about 30 million children that live in sub-Saharan Africa do not attain school, 16 million of them are girls. In that same year, there were 17 countries worldwide with more than 500,000 out-of-school children. Nine of these countries are located in sub-Saharan Africa. In Ethiopia, about 2 million children were not in school in 2009. This represents 16% of the country's primary school-age population, which nevertheless reflects considerable progress since 1999, when the figure reached 63%. (UNESCO, 2011)

Many other sub-Saharan African countries have managed to significantly reduce their numbers of out-of-school children during the last decade. Between 1999 and 2009, the share of out-of-school children declined by more than 30 percentage points in Burundi, Madagascar, Mali, Mozambique, Niger and the United Republic of Tanzania. Much of this progress has been attributed to the abolition of school fees. Nevertheless, the proportion of children out of school remains very high in the following countries: Equatorial Guinea (46%), Côte d'Ivoire (43%), Niger (41%), Burkina Faso (36%) and the Central African Republic (31%). (UNESCO, 2011)

4 Analysis

During a civil war the human capital is damaged in several ways. One of the most obvious effects is the destruction of schools, and thus directly impacting the means to obtaining schooling or training. Other effects include the reduction of the governmental expenditures on education (Lai and Clayton, 2007). the fear of learning because it increases the chance of death and as a result of this it might create gaps

in educational levels among civilians. One of the most evident negative impacts on schooling found is that the negative impact on schooling is stronger in areas where the genocide intensity was higher (Akresh and de Walque, 2008).

This chapter focuses on the effects civil war has on the educational portion of human capital. It will give an oversight of the existing micro and macro literature concerning this topic in SSA. The studies are split up in three sections; in section 4.1 school enrolment, in section 4.2 grade completion and the last (section 4.3) looks at the brain drain (the outflow of human capital) and the killing of higher educated individuals. One could think of the first two as being the start of human capital accumulation, and therefore the impact of any shock is mainly on the accumulation process. The third subject (the outflow of human capital and the killing of higher educated) stands out since it also includes the destruction of yet existing human capital. The last section of this chapter is an evaluation of the evidence, summing up the different mechanisms found in the literature.

4.1 Enrolment

Student enrolment is the number of students in attendance at a school. Numerous scholars choose school enrolment as a measurement of schooling quality because the numbers are relatively easy to obtain and are quite straightforward to present in studies. In addition, it is also a method to measure the possibility of access to the schools for the pupils and thereby assess the inequality and the infrastructure of the educational sector.

Even before a war starts, enrolment rates are of influence on the eventual effects of the war. A study found that there exists a negative relation between the secondary school enrolment and the risk of a civil war (Collier and Hoeffler, 2004). This means that the risk of a state to get involved in a civil war is lower when enrolment is higher in secondary schools. The following evidence is not directly applicable to this relation, but the effect it has on the impact of the war is too important to leave unnoticed.

Likewise, violence was more severe in areas with poor public services, possibly due to more severe political grievances in those areas (Richards, 2003), or possibly fewer youth employment opportunities (Bellows and Miguel, 2009; Collier and Hoeffler, 2004). This implies that apparent small changes might make a big difference, because education not only prevents a region from an outbreak of a civil conflict, but also influences the effects of the war.

The most probable reason for the decrease in school enrolment rates during a civil war are due to the destruction of school buildings, school closure in the interest of safety, displacement of refugees, deaths of students and educators and tactics used by rebellions. Lai and Clayton (2007) found that states in a civil war experience a 1.6% to 3.2% decrease in enrolment rates, subject to the level of enrolment. They emphasize that it may seems like a small percentage, but the actual number of students is most important.

Lai and Clayton (2007), using UNESCO education data, found in their research about the effects of civil war on education that the school enrollment in the effected countries is only low during and shortly after the civil war. Opposite to the enduring costs of a civil war, the lowest point in the enrollment rate curve tends to be at the end of a conflict. Once the war has ended, most of the students will have more access possibilities to initiate schooling, rather than less. Additionally, for the ones that did attend school during the civil war, it is unlikely that they face new costs that would prevent them from continuing their education (Lai and Clayton 2007).

Aside from that they found that the severity of a civil war influences also enrollment. An increase of about 1,000 killed per year during a civil war causes a reduction of about 1.4% (primary), 1.4-2% (secondary), 2.7-3.4% (tertiary) of the enrollment rates. Lai and Clayton argue this is an effect of displacement of students and their families, the transfer of children into conflict, the physical destruction of facilities and to lesser extent the death of students (Lai and Clayton, 2007). This outcome suggests that higher education suffers more from the shock of a civil war.

In Rwanda, children exposed to the 1994 genocide experience a decline in schooling attendance of close to half a year. That is equal to an 18.3 percent drop relative to average educational achievement in that country. This is a high number, but that is because of the low level of schooling level in Rwanda. (Akresh and De Walque 2008). In a diagram (Figure 7) that is used in Lopez and Wodon (2005), it is shown that the primary schooling enrolment rate in Rwanda recovered until it even exceeded the predicted trend. These results combined may imply that the drop in educational achievement is due to a drop in all but primary school levels.

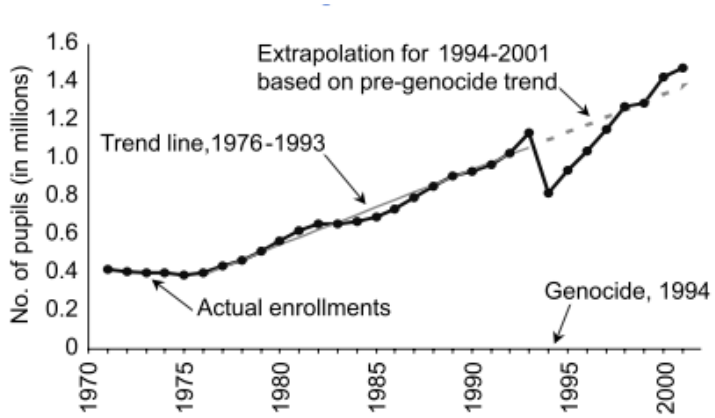

Figure 7: Impact of the genocide on primary school enrolment in Rwanda. Source: World Bank (2003) in Lopez and Wodon (2005).

This result matches the outcome of a study of Chen, Loayza et al. (2008). Using data of a cross-section of 41 countries involved in internal wars over the period 1960-2003, they also found that the enrolment rate at primary schools did not show significant declines after a civil war. They do point out that secondary school enrollment rates decrease. They suggest that this had to do with the age at which the children experience war, implying that the war has a more severe impact when a child is old enough to understand what is happening. Another plausible explanation they had is that the basic areas of social development benefit more from educational programs, promoted by international campaigns during and after the war.

Another explanation for the decrease in school enrolment is presented in a case study from Jackson (2000) based on a report by the Ministry of Education in Burundi. It shows a decline in school attendance from 1994 to 1997, in the midst of the civil war. The study shows that during this period, depending on the year, there were between 100,000 and 200,000 less children attaining primary schooling. They were forced to drop out or unable to start school, mainly due to the displacement caused by the civil war. Three years after the conflict, a total of 800,000 Burundians were still displaced within the country and 77,000 of them were school children. This means that approximately 12% of the total population and about an equal percentage of the schoolchildren experienced forced internal migration. After the civil war most of the schools were located in the bigger cities, where housing and other living conditions were far from optimal to create a good learning environment (Jackson, 2000).

Migration as an effect of the civil war was also a cause for the decrease of attendance at higher education levels, universities in Sudan. In combination with lack of investment and conscription of students to the army, a massive flight of refugees caused the disruption of a complete generation. In 1996, six years before the war

would end, all university classes were cancelled except for an all-female school. About 65,000 unmarried males were forced to join the army that year. Younger males had the choice to flee or to risk conscription later on (Lai and Clayton, 2007).

Maclure and Denov (2009) found a different cause for the decline in school enrolment rates. Based on reports of the Sierra Leonean ministry of youth, education and sports, they argue that schools were a particular target of destruction for the rebels (in Sierra Leone). An estimation of 70% of the children in that country had no access to education by the end of 1990s, when the country had been in conflict for nearly a decade. Many students that did attend school, had to do so in temporary school buildings in internally displaced people's camps (MYES 2001).

Other evidence from Sierra Leone points at another more gruesome reason for the decline in school enrolment. Collier (2010) claims that this civil war was characterized by the use of child soldiers in the different armed fighting fractions, directly preventing kids to attain school. This effect is strengthened by the total failure of the state to provide education and generate employment opportunities before the civil war. This created a large pool of alienated youth ready to support the rebellions (Richards, 1996). In 2006, four years after the war ended, thirty-five per cent of the Sierra Leonean citizens aged between 15 and 24 and sixty-three per cent of those between 25 and 35 years old never attended school (World Bank 2007, in Collier and Duponchel 2010). Both the groups now form the core of the countries working force (Collier and Duponchel, 2010), showing that a civil war has long term effects on the productivity level of a country.

In sum the studies show that during a civil the enrolment tends to decrease, most importantly due to the impossibility to access education. This is again mainly caused by migration and the destruction of physical educational infrastructure. Shortly after a war, the enrolment rates tend to increase again, but the level of enrolment will not get back to the initial level in the long term. It seems primary schooling suffers the least from the civil war, possibly because it is the most easy one to rebuild or replace since it requires the least investment in physical and human capital.

4.2 Grade completion

Opposite to school enrollment, grade completion gives an insight in the speed at which students go through their school and if they finish it. These numbers are of more value for the researches in terms of the quality of the schooling systems and the costs and risks that come with the higher grades.

Moyi (2010) states that during the Somali war the distances children had to walk to school also increased. This was because the larger portion of the schools that continued with education was in the towns and urban areas, thus children in rural and pastoral regions were usually excluded from education. Most of these children still attended schooling in the first years, since primary schooling was easiest to provide during the war. But the older they got, and they needed higher education, the more costly it was to travel to school and therefore more dropped out.

A gender gap in the grade completion was found to increase as a result of poor attendance due to civil war. The concern of the parents caused a decrease in attendance of girls. This is because normal circumstances see that the boys who are of school attending age act as protector to the girls by walking them to school and home. During war times in Somalia and Angola the boys often did drop out of school and as a result the parents withdrew their daughters to safeguard their virginity (Bekalo, 2003).

Although school enrolment in Rwanda quickly recovered after the civil war, implying a fast improvement of average level of education completed, this is not completely true. Akresh and de Walque (2008) demonstrate that children who are exposed to the genocide experience on average a drop in educational achievement of about half a year of schooling. In addition children who go through this are also 15 per cent less likely to complete the third or fourth grade. This might indicate that it is not harder to initiate schooling persé, but that the opportunity to attend, costs of education or the obstacles to progress through the grades are higher. It is not possible to determine what causes this failure of grade completion. It could be a result of children repeating grades or it could be caused by students dropping out of school after the first few grades (Akresh and de Walque, 2008).

Also, Akresh and de Walque (2008) found that the genocide in Rwanda had a longer lasting negative impact on the educational achievement of children who were of school going age in 1994. Especially the students that were in third, fourth and fifth grade during the genocide completed less number of years of education achieved (De Walque and Verwimp, 2009).

Summarizing, the grade completion suffers from civil war during and after a civil war and the levels recover not as fast as the enrolment rates (with the exception of the very first years of schooling).

4.3 Outflow of human capital and the killing of higher educated

In this section a general description of the decline in the education and trade skills prior to the beginning of a civil war. Human capital in the form of knowledge can be partly eradicated generally speaking in two ways: the emigration or the killing of educated individuals.

Our analysis implies that rates of return on education and other human capital are higher in developed than in undeveloped countries, both absolutely and relative to rates on physical capital. Rates of return on physical capital may be either higher or lower in developed countries, depending on fertility and rates of growth in consumption. Consequently, we can readily explain why the "brain drain" of educated and skilled persons almost invariably occurs from poorer to richer countries (Becker 1990) Better educated individuals also tend to be healthier and find fewer barriers to migrate (Azam *et al.*, 1995).

Although only less than 1 percent of the African citizens moved to Europe in 2008 (UnitedNations, 2009), most educated people moved to safer and more comfortable places in their own regions or countries. One could argue that the migration is a positive effect, because it might cause a money flow through gifts from relatives from more developed to less developed regions. According to Azam Bevan et al. (1995) these repatriations could be a possible contribution to reduce the risk of a return of a conflict. They use an example from Uganda to underpin this. In this case study, private transfers to Uganda were shown to grow on estimated at 35 per cent per year during the periods of 1990-1991 and 1993-1994. Simultaneously, the net emigration fell from enormous numbers to some hundred thousands per year in the late 1980s and to a few hundred per year in the 1990s (Azam Bevan et al.,1995).

But the most important effect of the migration of a highly educated person is that the government –that in most cases provided the educational opportunities- in no way receives a return because the migrant does not pay taxes. So the investments in human capital do not pay off.

For the size of brain drains, the level of riskiness of the domestic environment of a country is highly significant. Countries with a higher political risk experience more capital flight, physical, as well as human(Lensink *et al.*, 2000). (Collier, Hoeffler et al. (2004) uses the durability of a regime and the occurrence of civil war as measurements of risk to test this riskiness. Durable regimes cause less capital flight, since they are more predictable. Civil wars on the other hand are periods of an extraordinarily high risk. At least, this is valid for the African countries. Collier (2010)

shows that civil wars in other parts of the world reduce the human capital flight, while increasing the physical capital flight. He does not have a satisfactory explanation for this result, but in any case it does not apply to Africa.

Another way existing human capital gets destructed is by the killing of higher educated or more experienced individuals. Several scholars found proof for this strategy in Africa (e.g. Bundervoet 2009, De Walque and Verwimp, 2009). A common result from the empirical work of the mentioned authors is that the killing of an individual, even during a massacre or genocide is not a random event. Victims are deliberately targeted, be it for their ethnicity, status, wealth, education, gender, religion or political conviction.

De Walque and Verwimp found that during the genocide of Rwanda, males were 1.3 percentage points more likely to die, whereas individuals with a rural background are just over 3 percentage points less likely to have died. Their more detailed outcomes show that also the level of education had influenced the probability to die. Compared to those with no education, individuals with at least some primary education are 1.7 percentage point more likely to have died. Those with at least some secondary education are 4.5 percentage point more likely to have died compared to individuals with lower educational achievements. They conclude that each additional year of education increases the probability to have died by 0.3 percentage point (De Walque and Verwimp, 2009). Thus individuals with a more educated and wealthy background are more likely targeted because it is believed that they have more influence, power and knowhow about how to influence and reach people.

In Sudan, the larger part of the promising young males were forced to flee the violence or risk being forced to fight during the war, leaving the universities empty. A group of these refugees have come to be known as the last boy of Sudan, providing an example of the heightened detrimental consequences of civil war on young males (American red cross 2004) (Lai 2007). In 1994 the National University of Rwanda was targeted, and only 19 percent of its staff remained four years later. In all, 153 staff members died, 106 disappeared, and 800 fled the country (Bridgeland *et al.*, 2009).

In Burundi, many teachers were killed or fled during the civil war. Before the civil war, a high amount of Burundi's trained teachers were foreigners, mainly from Zaire and Rwanda. During and after the war, the percentage of foreign teachers active in Burundi dropped from 22% in 1992 to 4% in 1997. The ministry of education was forced to replace them with less educated local teachers. In addition, a movement of teachers towards the cities arose with difference in security between the rural and the urban areas. Because the rural areas were less secure compared to the cities, many

teachers requested a transfer towards the city, causing an abundance of teachers in the city and a shortage in the rural areas during and shortly after the war. (Jackson, 2000)

De Walque and Verwimp (2009) found evidence that citizens of Rwanda who lived in a city or had been educated were more likely to die during the civil war. They are aware of the plausible explanation that the victims of the 1994 genocide were mainly Tutsi, and that this part of the population on average did fit these welfare characteristics. They show this assumption is founded by the 1992 Demographic and health survey, which shows that indeed Tutsi were more likely to be educated and live in urban areas.

In his article on the socio-economic and location characteristics of the victims of the 1993 genocide in Burundi, Bundervoet (2009) found that the older and more wealthy individuals were more likely to get killed. He does not hand a possible explanation for the higher risk of the older people, but he remarked that after the age of 57, the age declined again. To add to this he found that parents who invested relatively more in the education of their children ran a higher risk as well.

Collier confirms the positive relation between civil war and a brain drain by showing the existence of the lack of skills experienced as a result of war. He finds that entrepreneurs' willingness to pay for the training of their staff after the war is significantly higher in those areas of the country most affected by the conflict, indicating a more acute shortage of skilled labor. Thus, conflict appears to cause a scarcity of skills in those chiefdoms where the war was more intense (Collier 2010).

What is striking about the outflow results is that the scholars use different measurements to find the same outcomes. But in the outcomes, there is a weird twist. Collier and Hoeffler (2004) found that the chance on civil conflict is lower in areas where the educational levels are higher. But once a civil war breaks out, these areas are most targeted. Same counts for the higher educated individuals, as they experience a higher risk to get killed than less educated individuals. Verwimp (2005), on the other hand finds that the perpetrators of the civil war in Rwanda are over-represented among the educated. All together this may imply that civil wars are mainly conflicts between the higher educated.

4.4 Evaluation

To be able to compare the literature mentioned above to the theories on the relation between civil war and economic growth, one must distinguish the mechanisms

behind the effects of the civil war. They form the link between the empirical evidence and the theory.

Besides, understanding how a civil war can affect an education system is essential when one wants to implement empirical proof in policies. If these mechanisms are explained well enough, it is easier to recognize them and to implement the right fitting projects. The final goal is to protect future civil war victims as well as possible or to rebuild the education system after the conflict. Therefore I will exemplify some of the possible mechanisms is this section, mainly based on those described by (Akresh and de Walque, 2008)

First, one of the most direct possible mechanisms of decreasing the human capital is the technique of rebels to targeted kill more educated individuals. This mechanism is supported by the results of De Walque and Verwimp (2009), who found a positive relation between the level of education and the likeliness to get killed in the 1994 genocide in Rwanda, as well as the results of Collier, Hoeffler et al.(2004) Lai and clayton (2007), Bundervoet (2009) and De Walque and Verwimp (2009) This mechanism may have numerous causes and effects. A plausible cause is that the power of better-educated individuals threatens the fighting parties (or one of them) since they have more abilities to mentally undermine a military regime. Another technique is to keep the victim-citizens of a civil war unaware of the situation, because their strategies are in many ways based on fear and chaos. As a result this mechanism may differ from the direct destruction of skills to the migration of better-educated victims in the area of turmoil. This can lead to a decrease of investment in education or skill training because of fear or the knowledge of its negative impact.

A second possible mechanism may sound counter intuitive. It is the declining gap of schooling levels between girls and boys from poor families compared to non-poor families. Although one might think that it would be harder to invest in schooling for households that are made less fortunate due to the conflict, especially for girls and poor families, evidence suggests that the opposite proves correct (Akresh and de Walque, 2008). It suggests that the schooling level of non-poor families declined more relative to that of the poor families. Aside from that the boys seem to suffer more from the conflict then the girls, on educational level. Akresh and De Walque do not indicate causes for this effect, but since his evidence is based on data from Rwanda, the rebels recruiting boys might be a valid explanation.

Another potential mechanism, supported by Jackson (2000), Maclure (2009) and Bridgeland (2009), is the destruction of school buildings and the lack of teachers and the effect this had on the schooling of children. It is not likely that the demolition of infrastructure is a main cause for the decline in schooling levels, since they found

almost no impact for grade 1 completion rates. The largest effect is evident at grades 3 and 4 (De Walque and Verwimp, 2009), indicating that the most likely mechanism is grade progression. So entering the school system doesn't seem to be the problem, but the finishing of the grades does. This is supported with the large repetition rates the World Bank (2003) found following the Rwandan genocide.

Collier (2010) describes another probable mechanism in his article about the consequences of a civil war for an economy through the effects firms have to deal with. In this article, he introduces the 'forgetting by not doing' mechanism, which is closely related to the depreciation of human capital. This mechanism claims that the postponement of the production of the private sector causes a long lasting shrinkage in the output and thereby a destruction of skills and experience. Indirectly he claims that skills and education need some form of constant training besides accumulation to conserve the value, which can be seen as a minimum of investment.

A mechanism Akresh and de Walque (2008) suggest, but is not founded by the literature exposed in this thesis is orphanhood. Due to the killing and migration, many children lose their parents during the civil conflict, and are thus in the lacks support, supervision and care. Being an orphan may influence the level of education, as they experience a greater chance of being dependent on their own income. Therefore the attendance rates at schools are lower and so are the schooling outcomes. This mechanism is not supported by a lot of empirical evidence.

The same (not supported by the evidence in this thesis) counts for the optional mechanism that would be applicable on farmers in particular could also be derived from the Schultz Hypothesis. This claims that peasants are efficient when they are restricted to traditional activities. Thus education will only be useful in modernizing settings. According to Azam, Bevan et al.(1995), (civil) wars create a traditional environment, leaving any form of training aside from traditional methods useless. This implies that the inclination to invest in new skills is low.

5 Conclusion and discussion

5.1 Summary

The goal of this thesis is to gain insight on the effects of civil wars on the educational side of human capital. Human capital is one sort of capital (next to social and physical capital) that influences the productivity of an individual and thus does contribute to the productivity of an economy. It includes features of an individual that

cannot be separated from that individual (like knowledge, skills, experience and health).

According to the Solow model, there exists a diminishing positive relation between the amount of capital per capita and the income per capita, implying that the accumulation of capital increases the income of an individual. Accumulation of human capital is different to that of other capitals since the transfer costs of human capital are higher and the characteristic of this sort of capital that it does not pay off directly after the accumulation. This makes it more risky to invest in human capital than in other capitals, causing a more volatile relation to external events like a civil war.

The three possible theoretical models of the effects of civil war on income per capita presented include the catching up effect, the poverty trap model and the single shock theory. According to the catching-up effect, the human capital stock per capita lowers, causing the savings rate to exceed the investment break-even rate and thus an increase in investments. This will cause a rise of the capital stock per capita, until the old steady state is reached and g will function as the growth rate. The conflict trap model assumes that the investment rate of human capital at lowest level of capital stock per capita is lower than the break-even rate. Thus when to much human capital is destroyed, investments after a war will decrease and so will the national income. The one-time shock theory predicts that a civil war decreases the steady state, but remains on the same growth rate.

Summarizing the literature, the studies on the enrollment rate show that during a civil the enrolment tends to decrease, most importantly due to the impossibility to access education. This is again mainly caused by migration and the destruction of physical educational infrastructure. Shortly after a war, the enrolment rates tend to increase again, but the level of enrolment will not get back to the initial level in the long term.

The civil wars tend to affect the completion rate more than the enrolment rates. Although both enrolment rates and grade completion rates decline during the war, grade completion does not seem to recover as fast as the enrolment rates does. The first years of schooling seem to be the least affected by the war since both enrolment rates and grade completion seems to recover relatively fast compared to the higher grades.

The most outstanding result came from the empirical evidence on the outflow of human capital ant the killing of higher educated. Although the chance on civil conflict is lower in areas where the educational levels are higher, once a civil war breaks out,

these areas are most targeted. The same counts for the killing of higher educated individuals, because they experience a higher risk to get killed during a war.

5.2 Conclusion and discussion

Although it is tough to find hard evidence, the results may mean that one could make a distinction between the effects of civil war on human capital. There exists a difference between the destruction of existing human capital and decreasing the possibility to accumulate it. The effects of the destruction (like the migration and killing of the higher educated) seem to have a longer lasting impact on the economic growth of a country.

These effects can also be shown in the Solow model. A decrease of the possibility to accumulate capital would imply a lower rate of investment in education and training and thus a lower saving per capita. According to the same model, the income per capita in positively related to the amount of per capita. Assuming that this counts for human capital as well, one could claim that the killing of individuals does not influence the income per capita (because the H/L rate stays the same). But if higher educated individuals are targeted killed this rate will fall, because then more capital is killed then individuals.

Focussing on the empirical evidence, I would suggest three possible explanations, the first is that it is more costly and it takes more time to rebuild human capital compared to physical capital. This combined with the high rates of return on physical capital and the high risks of investing during the period directly after a civil war leads to a slow recovery or even a decrease in the investments in human capital. Compared to other types of war, civil wars create more uncertainty and less safety and mostly instable regimes. Since human capital accumulation is for an important part provided or stimulated by a government, this may be an extra slowing factor.

Next, the destruction of knowledge and experience also decreases the possibilities of accumulation. This destruction will probably cause an increase of the transaction costs of investments in human capital. An example is the killing of the higher educated and teachers causing a decline of the provision of education. The costs to attain schooling become higher and the returns will stay low, since the private investors will not invest in new technologies as long as there is no sufficient supply of skilled labour.

The third would be that the recovery of human capital is more dependent on the presence of physical capital than the other way around. Before individuals invest in

human capital, they need to be secured of a certain level of available physical capital. Some sorts of physical resources are almost always available (e.g. sun, wind and soil), but human capital resources come and go with people and thus can be killed or migrate along with people.

6 Literature

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