THE UNIVERSAL CAUSES AND EFFECTS OF WOMEN’S EMPOWERMENT FOR DEVELOPING COUNTRIES

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ABSTRACT

Women’s empowerment has been thoroughly discussed during the last two decades, yet the research on the components of empowerment on the national level is still lacking. This paper aims to fill that gap by investigating which national causes and effects of women’s empowerment that are generally visible across developing countries. Previous studies on meso- and micro level have shown that an increase in women’s education, an increase in women’s economic independence as well as a strong legal framework is positively associated with women’s empowerment. Furthermore, a strengthening of women’s reproductive rights, an increase in children’s health and a better representation of women in parliament have been identified as effects of women’s empowerment. These hypotheses are tested through a structural equation model where women’s empowerment is estimated as a latent factor. The final model, which suffers from bad fit, shows that the quality of education is a strong determinant of women’s empowerment, and that women’s empowerment significantly affects the general level of children’s health. It also indicates that the strength of the legal framework is actually negatively correlated with women’s empowerment - a finding that calls for further research.

KEYWORDS: Structural Equation Modelling; Empowerment; Development Studies; Gender Studies; Women’s Empowerment
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1 Introduction

During the last two decades, there has been an intensive discussion regarding the role of empowerment in the development process. For example, all countries within the United Nations identified women’s empowerment as pivotal for a peaceful and sustainable world (The United Nations 2016). Despite the raging debate, women’s empowerment is still a pressing issue. For instance, women continue to be under-represented in formal education and constitute approximately 67 percent of the world’s illiterate adults. Moreover, women make up an unreasonably large proportion of the working poor (Dutt et al. 2016). There are also other areas in which there is a persistent gap between men and women, such as the excess deaths of girls and women. The World Bank states that "females are more likely to die, relative to males, in many low- and middle-income countries than their counterparts in rich countries" (The World Bank 2011, p. xxi). Additionally, there is a difference in the gender’s voice in society; women’s opinions are not taken into consideration (The World Bank 2011). These are just a couple of examples of different conditions facing men and women. It has been argued that women’s empowerment can effectively decrease these differences. Hence, finding the factors that lead to women’s empowerment needs further attention.

Increasing women’s empowerment is an objective in its own right. Not only does it have intrinsic value, as everyone’s ability to influence one’s world should be equal, but it has also instrumental value - it leads to economic efficiency and other important development results (The World Bank 2011). Furthermore, empowering "women as economic, political, and social actors can change policy choices and make institutions more representative of a range of voices" (The World Bank 2011, p. 6). In their Development Report, The World Bank highlights certain policy actions that are imperative for a solid development. These are, for example, actions to diminish gender differences in household and societal voice and to narrow the gap in earnings between the genders. Both these aims can be fulfilled as a result of women’s empowerment (The World Bank 2011).

Understanding how valuable women’s empowerment can be, it is no surprise that it has attracted thorough research. However, it has mainly been done on the individual or community level (for example, see Bandura 1982; Klein 2014; Kabeer 1997; Pankaj and Tankha 2010). This situation is being increasingly criticized, because empowerment does not only have community- or individual-specific effects (Pratley 2016). Rather, Samman and Santos state that "there seems to be scope for common frameworks across countries and even internationally comparable indicators" (Samman and Santos 2009, p. 9). Since empowerment is a multidimensional concept, it is visible at different domains - for example, the household or the country level - and in different spheres; such as the political or economic spheres (Maiorano et al. 2016). Consequently, the causes of empowerment are different depending on which domain or sphere you investigate. Specifically, improvement in one dimension or domain does not automatically imply improvement in all dimen-
sions (Pratley, 2016). Therefore, one needs to be careful when identifying which dimensions are of interest for the study. The workings of empowerment on all levels, on all domains, in all spheres, is still largely unexplored (Maiorano et al., 2016). "Despite emerging evidence in the literature that women’s empowerment is a process that should also be captured at the community and perhaps also the national level, the majority of empirical studies continue to focus on measures of women’s empowerment at the individual level" (Pratley, 2016, p. 121). It is clear that analysis on women’s empowerment on the national domain is lacking.

While significant process has been made, there are still gaps in the current literature [...]. This has continued to plague research on the measurement of women’s empowerment (Pratley, 2016, p. 121).

For this reason, the current essay intends to fill the gap by investigating the causes and effects of women’s empowerment on the national level. In order to do so, one first needs to define the concept. The initial meaning of empowerment has its roots in the Protestant Reformation as a concept that denoted historic struggles for social justice. However, when movements such as the black power and feminism fought for a more equal development, the concept acquired a strong political meaning. Since then, the word has been used and misused, as the large amount of different definitions have deprived empowerment from its initial meaning (Batliwala, 2007). To illustrate this, Alsop and Heinsohn listed 15 diverse definitions that they could find in research papers (Klein, 2014). One of the reasons for the pool of definitions is that women’s empowerment is a complex concept, which makes it hard to define in a straightforward manner. In general, empowerment can be said to stand for the expansion of freedom of choice and action - which in turn implies an increasing control over one’s resources (Narayan, 2002). Since this study focuses on the national, macro level of women’s empowerment, the definition needs to be chosen accordingly. A definition of empowerment that emphasizes the opportunity structure within a country, and hence what is measurable on the national level, is put forth by Narayan (2005, p. 5). This definition is then modified to suit women’s empowerment, and the result can be seen below.

Women’s empowerment is the expansion of assets and capabilities of women to participate in, negotiate with, influence, control, and hold accountable institutions that affect their lives.

To summarize, the aim of this thesis is to investigate which national mechanisms that lead to, and are caused by, women’s empowerment in developing countries. This is investigated by first identifying which factors that are commonly discussed within the literature. An overview of previous research on women’s empowerment will be given in Section 2. Section 3 presents the data and the treatment of missing data. Thereafter, the method of choice - namely Structural Equation Mod-
elling - is discussed in Section 4. In Section 5, the results are highlighted. Lastly, the essay ends in Section 6 with conclusions.

2 Previous Research on Women’s Empowerment

In order to define a valid model, more than 35 articles and books were analysed to identify the common causes and effects of women’s empowerment in different settings. The main result from the literature review is summarized below. The ambition is to capture as many dimensions of women’s empowerment as possible, while keeping the focus on the national level.

2.1 The Causes of Women’s Empowerment

This section will discuss a part of the social sphere, particularly education. Thereafter, the economic sphere will be addressed, highlighting economic development and access to the labour market. The section will conclude by accounting for the legal sphere, and focusing on the right to own land.

2.1.1 The Educational Sphere

Throughout the development literature, education is considered to be one of the strongest contributing factors of women’s empowerment. Samman and Santos investigate several research papers on this topic, and find that education significantly correlates with women’s empowerment in nearly all studies. For instance, the papers show that an increase in women’s education is associated with women being able to independently spend money, as well as an enhancement in women’s mobility (Samman and Santos, 2009). Another study highlights how education can lead to changes in cognitive ability; changes that positively affect women’s capacity to reflect and act on conditions in their lives (Kabeer, 2005).

Hence, education can increase women’s empowerment by facilitating agency through an increase in women’s ability to independently make decisions. This strengthening of one’s self-worth does not only affect women’s lives within the household - it also affects how they deal with government officials and service providers (Kabeer, 2005).

A factor that might distort the effects of education is the quality of the education. Only having access to education does not automatically imply that the level of quality is sufficient to affect the women’s sense of self-worth. Moreover, social inequalities might penetrate the school system - forcing children from poorer households to attend lower resourced schools, etcetera (Kabeer, 2005). For this reason, one also has to account for the general character of the schools through different quality measurements (more on this topic in Section 3).
2.1.2 The Economic Sphere

There are certain prerequisites that need to be incorporated in order to empower women successfully. One of them is that women must have access to resources - both material and economic ones (Charmes and Wieringa 2003; Pratley 2016). There is a large gap between where women and men work and how much they earn, which is visible across all forms of financial activity (The World Bank 2011). However, it has been shown that these gender inequalities are likely to decline with economic growth (Forsythe et al. 2000).

Aside from decreasing gender inequalities, growth and economic resources can also contribute to women’s empowerment in other aspects. For example, Duflo proves that economic development in general positively affects women’s empowerment since it reduces the stress of poverty; richer households are less likely to have to face life and death choices. These choices usually lead to hurtful consequences for women, and therefore an increase in resources could effectively reduce the vulnerability for these individuals (Duflo 2012).

2.1.2.1 Access to Labour Market  One way for women to increase their economic status is to participate in the labour market. It has been shown that "when women earn an income they can gain both financial independence and a greater sense of agency over their lives" (Dutt et al. 2016, p. 365). Thus, the effect of access to the labour market is two-fold; it both increases a woman’s leeway by giving her financial means, and it provides her with a feeling of agency.

This change in status affects the woman’s voice within the household. Her income and assets will increase her bargaining power and thereby increase her influence regarding household choices (The World Bank 2011; Samman and Santos 2009; Kabeer 1997).

However, an increase in salary and labour force participation might not automatically lead to women’s empowerment. For one, women are usually found in work places with a more exploitative nature. Therefore, it is vital to not only look at whether or not the women work, but also where they work. For instance, this can be investigated by ratio between female and male income. The ratio would show how the earnings differ between the groups, which would demonstrate if the women where situated in more exploitative work.

2.1.3 The Legal Sphere

Cueva states that one "of the most important elements enabling female empowerment is an adequate legal and regulatory framework" (Cueva Beteta 2006, p. 234). This element captures whether or not women’s rights are codified in law. It consists of many aspects. To start with, it includes legal protection on violence against women; such as criminalizing rape within marriage (Cueva Beteta 2006). Another factor is women’s ability to inherit or obtain property (Pratley 2016). Yet an
additional aspect is the legal gendering of marriage. Both family-, labour- and social security laws can discriminate against women, which can be extremely disempowering (Al-Sharmani, 2010). Without a supportive legal framework, women’s potential for agency is severely limited.

To clarify, the character of the legal sphere can either enable or disable women from achieving agency. One specific way in which this can operate is through land acquisition - a domain where women usually are discriminated. In order for economic empowerment to be nurtured (see the discussion in Section 2.1.2), one needs to address gender-specific causes such as inequalities in ownership of land (Murthy et al., 2008).

However, even if there is clear and equal laws in place, the practice of those laws might not be equal to all - for example, rich people might get better treatment as a result of corruption. The extent of corruption in a country is a good indicator of how responsive the state is to vulnerable groups. It can manifest itself in different forms. For example, there might be administrative corruption where one can bribe public officials into an advantageous implementation of existing laws (Grootaert, 2005).

In summary, based on the discussion above, the following hypotheses are considered regarding the causes of women’s empowerment:

**H1:** *An increase in the educational sphere will lead to an increase in women’s empowerment.*

**H2:** *An increase in the economic sphere will lead to an increase in women’s empowerment.*

**H3:** *An increase in the legal sphere will lead to an increase in women’s empowerment.*

### 2.2 The Effects of Women’s Empowerment

In this section, the effects of women’s empowerment will be highlighted. In general, focus will be on identifying the areas in which women have had less control or decision-making ability, to see if women’s empowerment has changed the conditions for these women. This will be done by first discussing the effects of women’s empowerment on women’s and children’s health. Thereafter, women’s representation in the political sphere will be addressed.

#### 2.2.1 Women’s Reproductive Health and Children’s Health

This section is divided into two broad sections. The first is devoted to women’s reproductive health, where emphasis is given on women’s right to birth control. The second concerns children’s health, and the effect an increase of women’s decision-making ability has on different health outcomes.
2.2.1.1 Reproductive Health  Reproductive health is a comprehensive concept, which includes the physical, mental and social well-being of individuals (Wang, 2007). Pillai and Gupta neatly defines women’s reproductive health in the following way:

The term "women’s reproductive health" is often associated with a satisfying and safe sex life, capacity to reproduce, and the freedom to decide if, when, and how to do so. Women’s reproductive health is determined by the extent of control one has over decisions such as marriage, when and with whom to engage in sexual relations, regulation of fertility by methods which are free from unpleasant or dangerous side effects of contraception, and access to information on the prevention and treatment of reproductive illness and unsafe childbirth (Pillai and Gupta, 2006, p. 211).

It has been suggested that in order for improvements in women’s reproductive health to be successful, one needs to focus on facilitating women’s empowerment (Pillai and Gupta, 2006). For example, a study in Zimbabwe showed that education and paid work - both identified causes of women’s empowerment - increased the probability of women accessing contraception (Kabeer, 2005). Moreover, the general socio-economic environment is vital (Wang, 2007). In this regard, women’s empowerment is imperative - it focuses on increasing women’s opportunities to live the life they want and to make active choices (Pillai and Gupta, 2006). Therefore, empowering women may lead to a social movement for reproductive rights. In any case, it is clear that there is a positive relationship between gender equality and the level of personal reproductive rights (Pillai and Gupta, 2006). Several researchers have the same line of thought, and they state that empowerment is correlated with the use of birth controls (Samman and Santos, 2009; Schuler and Hashemi, 1994). Despite this, Wang believes that the empirical research on women’s reproductive health in relation to social-structural variables is deficient (Wang, 2007). Thus, this thesis will contribute by further investigating how the contraceptive use is shaped through women’s empowerment.

2.2.1.2 Children’s Health  When women’s decision-making ability strengthens, they tend not only to promote reproductive rights, but they also invest more in children’s well-being, compared to men (Batliwala, 2007). This result holds in a range of different countries; Bangladesh, Mexico and the United Kingdom (among others) (The World Bank, 2011). Moreover, it is evident in both relative and absolute terms; women also spend a larger share of their income on their children. Men on the other hand prefer to spend their income on themselves (Charmes and Wieringa, 2003). The difference is especially evident in children’s health outcomes (Pratley, 2016). Accordingly, one would expect that measures of children’s well-being are good indicators of whether or not women have control over resources, and therefore, in turn, the effects of women’s empowerment.
2.2.2 **Women’s Political Representation**

Only 19.4 percent of the seats in the lower and upper houses of parliament worldwide belongs to women (Duflo 2012). In Africa, women constituted solely 7.8 percent of the cabinet positions in 1998, and the Arab states had only 3.8 percent women (Yoon 2001). Clearly, the labour market is not the only arena in which women are being treated unfairly. This is mostly a result of an unfair opportunity structure, which prevents women from engaging in the political sphere (Samman and Santos 2009). Consequently, women’s political participation should increase if the opportunity structure improves. According to Klein, this change would occur alongside women’s empowerment (Klein 2014).

Yet, women’s political participation might not be a suitable measure of women’s empowerment as the presence of female politicians might only be due to political factors rather than cultural characteristics (Cueva Beteta 2006). Therefore, this essay will contribute to the ongoing debate by investigating this further.

In sum, the hypotheses regarding the effects of women’s empowerment are:

**H4:** Women’s empowerment will lead to an increase in women’s reproductive rights and an increase in children’s health.

**H5:** Women’s empowerment will lead to an increase in women’s political participation.

3 **Data**

This thesis investigates women’s empowerment in all developing countries, as defined by the United Nations. A list of the countries included in this study can be found in the Appendix. These countries were chosen as the main objective is to investigate how women’s empowerment operate during these circumstances. Including developed countries would therefore only distort the results. To clarify, the underlying assumption is that women’s empowerment is affected by different mechanisms and to a diverse extent, depending on what type of countries one looks at. It is of greater importance to understand the workings of empowerment within a developing context, as these countries have more to gain on an increase in women’s empowerment.

This section will walk through the data at hand. It will begin with describing the different variables in the data set, and motivate why they are chosen. Thereafter it will conclude by discussing the extent and treatment of missing data.
3.1 Descriptive Statistics

Table 1 shows the description of each variable used in the analysis, as well as the data source and year of publication. The majority of the variables are from either 2009, 2011 or 2012. In general, the aim was to get data so that the variables come from a time point as close as possible, but at the same time keeping consistency. Another aspect that had to be considered was choosing time periods where the missing values were at a minimum. The intention was to collect data on the effects of women’s empowerment from a later time point (compared to the causes of women’s empowerment), in order to avoid simultaneously problems. More on this is discussed in Section 4.3.1. Generally, the missing values requirement was given the largest weight, as missing values is a big problem in this data set. These four concerns resulted in the variables with corresponding years visible in Table 1.

All variables come from international, well-known data bases; from the UN family, from OECD and the World Bank. These data bases are continually reviewed in order to assure both reliability and validity. The validity of the data varies between countries, to which extent is not known - but it is reasonable to believe that some definitions of variables or manner in which data is gathered differ between countries. This might distort the results. Nevertheless, these indicators are suitable for detecting broad trends (Pillai and Gupta 2006). After all, variables from international data bases are more reliably comparable between countries, compared to national data (Charmes and Wieringa 2003). Hence, the variables from these data sets might suffer from some reliability concerns, but are probably most appropriate for an analysis across countries.

Before proceeding with the analysis, each observed variable will be discussed and motivated in the sections below.

3.1.1 Defining the Educational Sphere

To capture the level of education in a country, several indicators are used. First, SchoolGDP measures the percentage of a country’s GDP that is being spent on education. This is used as an indicator of how prioritized education is on the national agenda.

Second, the percentage of female students in secondary education is explained in EducFem. The reason why secondary education, and not a lower level of education, is being used is mainly because the difference between the genders is still persistent at this level (Dutt et al. 2016). Moreover, using the tertiary level would create class bias as mostly rich people attend universities.

Third, the overall quality of the education is accounted for by measuring the literacy rate of young women (Reading) as well as the pupil-teacher ratio in secondary education (RatioTeacher). The higher the literacy rate is and the lower the pupil-teacher ratio is, the better quality the educa-
tional system has.

### 3.1.2 Defining the Economic Sphere

For the economic sphere, the aim is to see how access to the labour market and economic possibilities affect women’s empowerment. An appropriate variable to use would be percentage of women in the labour market. Even though it might miss an important aspect of earning, namely whether or not the woman has control over her money, it still shows if the woman has independent earnings (Pankaj and Tankha [2010]). However, every such variable found suffers from a large extent of missing values and is therefore not considered. Instead, this essay will focus on another aspect of earnings, specifically on women’s control over her earnings on country level. As a result, one variable of interest is the percentage of women with a financial account - *FinAccount*. The idea is that this variable is an indicator of whether or not women have decision-making power regarding the economic choices in the household. Clearly, there is no one-to-one relationship between having an account and having economic control; there are probably instances where women without their own financial accounts have decision-making power, and vice versa. Nevertheless, if the woman has an account in her name it is reasonable to believe that she, in general, has more power compared to other females without any account. Furthermore, the sheer knowledge that a woman has money in her name that can support her in case of a divorce will increase her bargaining power within the household (Duflo [2012]).

Another aspect identified in Section 2.1.2.1 is that women are generally found in a very exposed climate. For example, they have a more exploitative work, compared to men and they pose a disproportionally large percentage of the long-term unemployed. Initially, the aim was to include the percentage of long-term unemployment amongst female unemployment, unfortunately it too consisted of too many missing values. A different way of modelling this uncertainty is by measuring the income ratio between women and men, hereafter called *RatioIncome*. If the income ratio is 1, then men and women have equal pay. The higher the value, the more the women are falling behind. This is a sign that the women are generally found in low paid work with worse working conditions.

Lastly, *GDP per capita* will be measured, since previous literature has shown it was correlated with the level of women’s empowerment within a country.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Latent Variable</th>
<th>Description</th>
<th>Source</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>SchoolGDP</td>
<td>Education</td>
<td>Government expenditure on education as share of GDP</td>
<td>UIS Data Center</td>
<td>2010</td>
</tr>
<tr>
<td>EducFem</td>
<td>Education</td>
<td>Percentage of female students in secondary education</td>
<td>UIS Data Center</td>
<td>2011</td>
</tr>
<tr>
<td>Reading</td>
<td>Education</td>
<td>Youth literacy rate of 15-24 years</td>
<td>UIS Data Center</td>
<td>2015</td>
</tr>
<tr>
<td>RatioTeacher</td>
<td>Education</td>
<td>Pupil-teacher ratio in primary education</td>
<td>UIS Data Center</td>
<td>2007</td>
</tr>
<tr>
<td>GDPPerCapita</td>
<td>Economic</td>
<td>GDP per capita</td>
<td>UNData</td>
<td>2011</td>
</tr>
<tr>
<td>FinAccount</td>
<td>Economic</td>
<td>Account at financial institutions, share of females age 15 +</td>
<td>WDI</td>
<td>2014</td>
</tr>
<tr>
<td>RatioIncome</td>
<td>Economic</td>
<td>Estimated ratio female to male earned income</td>
<td>OECD Stat</td>
<td>2009</td>
</tr>
<tr>
<td>ChildMarriage</td>
<td>Legal</td>
<td>Law prohibits child/early marriage (2 = yes, 1 = no)</td>
<td>WDI</td>
<td>2015</td>
</tr>
<tr>
<td>Corruption</td>
<td>Legal</td>
<td>Corruption index, ranging from 0 to 10 (10 = no corruption)</td>
<td>Transparency International</td>
<td>2011</td>
</tr>
<tr>
<td>LegalRights</td>
<td>Legal</td>
<td>Strength of legal rights index (0 = weak to 12 = strong)</td>
<td>WDI</td>
<td>2015</td>
</tr>
<tr>
<td>HIV</td>
<td>Women’s Empowerment</td>
<td>Prevalence of HIV, female (share ages 15-24)</td>
<td>WDI</td>
<td>2015</td>
</tr>
<tr>
<td>Fertility</td>
<td>Women’s Empowerment</td>
<td>Birth per woman</td>
<td>WDI</td>
<td>2012</td>
</tr>
<tr>
<td>LifeExpect</td>
<td>Women’s Empowerment</td>
<td>Life expectancy at birth, female (years)</td>
<td>WDI</td>
<td>2012</td>
</tr>
<tr>
<td>InfantMort</td>
<td>Women’s Empowerment</td>
<td>Mortality rate, infant (per 1000 live births)</td>
<td>WDI</td>
<td>2012</td>
</tr>
<tr>
<td>Parliament</td>
<td>Women’s Empowerment</td>
<td>Proportion of seats held by women in national parliaments</td>
<td>WDI</td>
<td>2016</td>
</tr>
</tbody>
</table>
3.1.3 Defining the Legal Sphere

The variables measuring the legal sphere are all either indices or ordinal variables. First off, Legal-Rights measures the strength of the legal rights in a country. It ranges from values of 0, indicating weak legal rights, to values of 12, for strong legal rights. These are legal rights for all individuals in a country, men and women alike. Second, AccessLand is an index of how the legal framework works in regards to women’s access to land. The value 0 represents that women have the same legal rights to land as men, while value 1 gives that women have few or no legal rights to land. This variable would have been ideal to use, however it suffers from too much missing data and is therefore excluded from the analysis. Moreover, the variable Violence, which is an equally-weighted average of three different mechanisms; if there is existing laws against domestic violence, against sexual assault or rape and against sexual harassment, cannot be used either due to the same reason. Instead, we estimate ChildMarriage, which is a categorical variable indicating whether or not the country has laws that prohibits child marriage. A value of 1 shows that there are laws in place. Hopefully, this variable is an indicator of how women’s and girl’s rights are handled by the state.

Third, the level of corruption is measured by Corruption, which is an index that ranges from 0 to 10, with 10 indicating no corruption at all. The variable is a composite index of corruption-related data and different polls. It aims at incorporating the corruption in the public sector. It has more than 15 levels and is therefore treated as a continuous variable.

3.1.4 Defining Women’s Reproductive Health and Children’s Health

In the international arena today, there is no consensus as to how one should measure women’s reproductive health (Wang, 2007). In this essay, women’s reproductive health will be looked at through two aspects; the HIV prevalence among women and the average birth number per woman. These are indicators of how much control women have over their own bodies. The ideal variable is contraceptive use, however the missing data is an extensive problem for that variable. Therefore, HIV prevalence and Fertility is seen as another way of measuring the contraceptive use - both the two variables are negatively connected with birth controls.

As for children’s health, it will be investigated by looking at life expectancy at birth for females (LifeExpec), as well as the mortality rate for infants (Mortality). This will give a good picture of the general health level for children in these countries.

3.1.5 Defining Women’s Political Representation

Women’s political representation will be measured by looking at the percentage of seats held by women in national parliaments, Parliament. This will give a good overall depiction of how women can access politics. However, it would also be of interest to investigate women’s representation
in the local government. Maybe women have an active role in the local context, but have not yet advanced to the national level. Albeit, it cannot be done as there is no good variable for this. Nevertheless, Cueva states that - not surprisingly - there is a strong, positive correlation between female representation at the local and national level (Cueva Beteta, 2006). Hence, women’s political representation in the national parliament might be sufficient.

To sum up, Table 2 presents some descriptive statistic for each of the variables discussed above.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>St. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>EducFem</td>
<td>86</td>
<td>81.872</td>
<td>54.273</td>
<td>2</td>
<td>159</td>
</tr>
<tr>
<td>GDPperCapita</td>
<td>120</td>
<td>107.008</td>
<td>63.541</td>
<td>2</td>
<td>212</td>
</tr>
<tr>
<td>FinAccount</td>
<td>86</td>
<td>40.628</td>
<td>23.685</td>
<td>1</td>
<td>82</td>
</tr>
<tr>
<td>ChildMarriage</td>
<td>116</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>LegalRights</td>
<td>117</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>HIV</td>
<td>87</td>
<td>1.205</td>
<td>2.650</td>
<td>0.100</td>
<td>16.700</td>
</tr>
<tr>
<td>Fertility</td>
<td>119</td>
<td>3.422</td>
<td>1.474</td>
<td>1.285</td>
<td>7.642</td>
</tr>
<tr>
<td>HealthExp</td>
<td>117</td>
<td>5.831</td>
<td>2.266</td>
<td>1.008</td>
<td>12.056</td>
</tr>
<tr>
<td>LifeExpect</td>
<td>119</td>
<td>69.428</td>
<td>9.206</td>
<td>48.278</td>
<td>86.400</td>
</tr>
<tr>
<td>InfantMort</td>
<td>118</td>
<td>35.211</td>
<td>24.688</td>
<td>2.200</td>
<td>104.100</td>
</tr>
<tr>
<td>Parliament</td>
<td>118</td>
<td>19.383</td>
<td>12.636</td>
<td>0.000</td>
<td>63.800</td>
</tr>
<tr>
<td>RatioIncome</td>
<td>100</td>
<td>22.130</td>
<td>11.072</td>
<td>1</td>
<td>44</td>
</tr>
<tr>
<td>SchoolGDP</td>
<td>77</td>
<td>4.501</td>
<td>2.159</td>
<td>1.205</td>
<td>12.837</td>
</tr>
<tr>
<td>RatioTeacher</td>
<td>90</td>
<td>30.820</td>
<td>14.251</td>
<td>9.610</td>
<td>78.122</td>
</tr>
<tr>
<td>Reading</td>
<td>110</td>
<td>87.642</td>
<td>15.972</td>
<td>26.559</td>
<td>99.950</td>
</tr>
<tr>
<td>Corruption</td>
<td>105</td>
<td>3.3280</td>
<td>1.482</td>
<td>0.9834</td>
<td>9.1670</td>
</tr>
</tbody>
</table>

### 3.2 Treatment of Missing Data

The data set consists of 120 developing countries (which are all listed in the Appendix). As a general - albeit simplified - rule, the Structural Equation Modelling (hereafter referred to as SEM) estimation requires five observations per observed variable (Bentler and Chou, 1987). According to this rule, the sample size is large enough. However, in order for this rule to continue being fulfilled, all information available needs to be utilized. Therefore, the percentage of missing values needs to
be examined. It can be calculated from the information in Table 2. Several variables with more than 40 percent of missing values were excluded from the analysis in the initial data gathering stages. Nonetheless, the amount of missing data is still problematic and needs to be handled. Seeing as the sample size cannot be reduced without risking estimation problems, imputations methods needs to be consolidated. The dataset consists of both continuous and ordinal variables, which means that different methods of imputation needs to be used depending on the character of the variable. However, before proceeding with the imputations, the mechanisms of the missing values must be examined.

3.2.1 Missing Data Mechanisms

Missing data can belong to one of three categories: missing at random (MAR), missing not at random (MNAR) and missing completely at random (MCAR). The underlying idea is that the data can be divided into two sets, the observed data $Y_{obs}$ and the missing data $Y_{mis}$. If $Y_{mis}$ is not dependent on neither $Y_{obs}$ nor the missing data itself, then the data is MCAR. A test for MCAR was done by Little’s MCAR test in R, which rejected the null hypothesis of MCAR with a p-value of 0.000. In order to determine whether or not the data is MAR, no formal test can be made. Instead, one has to reason around its suitability. If the data is MAR, then the probability of data being missing is only dependent on the observed variables. Therefore, when one controls for $Y_{obs}$, the missing data should not be dependent on $Y_{mis}$ (Dong and Peng, 2013). In this case, it seems like a rather reasonable assumption. One of the most probable causes of missingness is the level of economic development in a country. It is generally acknowledged that poor countries suffer challenges when it comes to gathering data - they lack sufficient institutions. Since the data incorporates GDP per capita, this is accounted for to a certain degree. Although, there might be other factors that affect the likelihood of missingness, such as the infrastructure in a country. The quality of the infrastructure will determine how easily one can access data from remote groups of people. Yet, this variable is connected to the economic development. Hence, we will conclude that the missingness in the dataset is MAR, and will proceed accordingly. Albeit, one needs to be aware that this assumption is not clearly fulfilled and that this will affect the generalizability of the results.

3.2.2 Multiple Imputation

Multiple Imputation (hereafter referred to as MI for simplicity) is suitable when the data is MAR and consists of continuous variables. The method, as all the other well-known methods for treating missing continuous data, requires multivariate normality. However, the Markov Chain Monte Carlo (MCMC) technique, compared to other imputation methods, provide valid test estimates even when this assumption is violated, as it is in this case (Dong and Peng, 2013). The output from data
screening procedure in LISREL showed that almost all continuous variables were non-normal. Therefore, the MCMC method is deemed the lesser evil for this situation.

The basic idea of MI is to estimate a set of plausible values for every single missing data point. Thereafter, the resulting data sets are analysed separately, which obviously results in different parameter estimates. In the end of the analysis, these estimates are pooled together, giving only one final estimate per missing data point.

In more formal terms, this means that first, the MCMC method draw random samples from $P(\theta, Y_{\text{mis}}|Y_{\text{obs}})$, where $\theta$ represents the unknown parameter of the data. This is done through two steps where draws are taken from both $P(Y_{\text{mis}}|Y_{\text{obs}}, \theta)$ and $P(\theta|Y_{\text{obs}}, Y_{\text{mis}})$ and then constructed into a Markov Chain of the following nature:

$$(Y_{\text{mis}}^{(1)}, \theta^{(1)}), (Y_{\text{mis}}^{(2)}, \theta^{(2)}), \ldots, (Y_{\text{mis}}^{(t)}, \theta^{(t)})$$

where $t$ corresponds to the number of iterations. In turn, this Markov Chain will converge in distribution to the initial distribution of interest. Second, when pooling the result, the method simply calculates the mean of the respective parameters (Dong and Peng, 2013).

The MCMC method can be easily implemented in LISREL. The procedure converged after 22 iterations and effectively imputed values for all missing data points for the continuous variables.

### 3.2.3 Imputation by Matching

The two ordinal variables in the data set, ChildMarriage and LegalRights, only consisted of a total of seven missing values. Nevertheless, all observations are needed for the analysis, and therefore imputation needs to be made. When imputing values for ordinal variables, one can impute by matching. This means that one imputes real values for the variables based on the observations’ responses on other matching variables. In other words, the response pattern for the matching variables is investigated, and if there is a match, the value of the matching observation will be imputed to the other variable (Jöreskog, 2002).

One needs to practice caution when choosing appropriate matching variables. The variable must, to some extent, be a determinant of the missing values. There is no point picking a matching variable that is not associated with the variable of interest. In this case, the two ordinal variables are both a part of the legal sphere. Consequently, one has to select variables that influence that sphere. For that reason, both Corruption and Parliament are chosen. It is hypothesized that the level of corruption in a country more or less corresponds to a country’s legal rights - if a country has a low degree of corruption then it should display high levels of legal rights. Additionally, if there is a higher percentage of seats in the parliament belonging to women, then that should increase the probability that that country has laws against child marriage.
The Imputation by Matching method in LISREL was done, and found matches for all missing values. In the end, the data set consisted of no missing values.

4 Structural Equation Modelling

In this section, Structural Equation Modelling will be presented. First, the general idea of SEM will be discussed. Second, the specific treatment of the ordinal variables will be mentioned. Third, the estimation method will be motivated, before proceeding with model specification and assumptions.

Since women’s empowerment is a latent factor - a variable that cannot be measured directly - researchers have struggled to find appropriate methods to estimate its effects. Many studies have used an index approach, constructing arbitrary weights for the different index indicators. Other studies only use a specific indicator, such as the percentage of women in parliament, and equate that with women’s empowerment. These mentioned methods clearly leads to information loss and bias in parameter estimates, as one misses important dimensions of empowerment. SEM on the other hand is the optimal method to use when attempting to estimate latent variables.

The SEM estimation emphasizes covariance structures, and the covariances of the observed variables are considered to be a function of a collection of variables. If the model is correctly specified and all relevant variables are known, then the model implied covariance matrix would equal the population covariance matrix (Bollen, 1989, p. 1). In other words, the fundamental hypothesis is:

$$H_0: \Sigma = \Sigma(\theta)$$

Where $\Sigma$ is the population covariance matrix, $\theta$ is the vector of parameters, and $\Sigma(\theta)$ is the model implied covariance matrix. The form of the models can differ, but they usually consist of a measurement model and a structural model. The initial proposed model for this essay is seen in the path diagram in Figure [1]. The measurement model consists of the observed, indicator variables (the variables within squares) and their corresponding relationship with the latent variables (the variables within ellipses). The structural model is made up of the relationship between the latent variables. The arrows indicate the direction of the relationships.
For example, if one looks at the left-hand side, one can see the indicators and their respective relationship with the three latent cause-variables *Education*, *Economic* and *Legal*. These relationships make up the x-model, shown in Equation 1. The $\mathbf{x}$ is the vector of indicator variables, whilst the $\mathbf{\Lambda}_x$ gives the factor loadings, i.e. how much the specific latent variable is estimated to influence the indicator variable. The latent factors are represented by $\boldsymbol{\xi}$. On the other, right-hand side of the path diagram, one can see the y-model (seen also in Equation 2). It shows the relationships between the main latent variable of interest, namely *Women’s Empowerment* (WomEmp or $\eta$) and its indicator variables. Lastly, the middle part gives the structural model, which is the relationship between the latent variables. An algebraic version of this relationship can be seen in Equation 3. The $\Gamma$ vector shows the factor loadings, which will be used to assess whether or not the hypotheses are true. That is to say, whether or not the educational, economic and legal sphere lead to women’s empowerment. How these general equations below relate to the model at hand can be seen in Section 4.3.

$$\mathbf{x} = \mathbf{\Lambda}_x \boldsymbol{\xi} + \boldsymbol{\delta}$$  \hspace{1cm} (1)

$$\mathbf{y} = \mathbf{\Lambda}_y \eta + \boldsymbol{\varepsilon}$$  \hspace{1cm} (2)

$$\eta = \Gamma \boldsymbol{\xi} + \boldsymbol{\zeta}$$  \hspace{1cm} (3)

### 4.1 Treatment of Ordinal Variables

Ordinal variables do not have the same properties as continuous variables, and should therefore not be treated as such. They lack units of measurements, and consequently the covariance structures...
have no meaning. As previously stated, some of the variables in this analysis are of an ordinal kind. Therefore, this needs to be accounted for.

To do this, it is assumed that each ordinal variable \( z \) follows an underlying continuous variable \( z^* \), which ranges from \(-\infty\) to \(+\infty\). In this case, it seems like a reasonable assumption. For example, a country’s level of legal rights is in reality clearly not an ordinal variable - it cannot take any distinct values, and one cannot define how much "legal rights" is the maximum or minimum amount. This means that the values of \( z \) can be seen as threshold parameters for \( z^* \) as shown below.

\[
z = i \iff \tau_{i-1} < z^* < \tau_i, i = 1, 2, ..., m
\]  

(4)

where

\[-\infty = \tau_0 < \tau_1 < \ldots < \tau_{m-1} < \tau_m = +\infty\]

and \( m \) is the number of categories for the ordinal variable.

In turn, this means that the underlying continuous distribution of \( z^* \) is not known, and has to be determined. The only information known is that \( z^* \) is a monotonic function. For simplicity, \( z^* \) is considered to be a normal distribution with density function \( \phi(u) \) and distribution function \( \Phi(u) \).

The probability of a response in category \( i \) is seen below. Note that since \( z \) is an ordinal variable, the only aspect that one can investigate is the frequencies within each category.

\[
\pi_i = Pr[z = i] = Pr[\tau_{i-1} < z^* < \tau_i] = \int_{\tau_{i-1}}^{\tau_i} \phi(u)du = \Phi(\tau_i) - \Phi(\tau_{i-1}),
\]  

(5)

and

\[
\tau_i = \Phi^{-1}(\pi_1 + \pi_2 + \ldots + \pi_i), i = 1, 2, ..., m-1
\]

where \( \pi_i \) is the probability of a response in category \( i \) for the population. This parameter can be estimated with \( p_i \), the corresponding percentage of responses in the sample.

As previously mentioned, the SEM analysis uses covariance structures to estimate the models. Hence, some version of the covariance structures for the ordinal variables needs to be estimated. Therefore, the polyserial correlations will be computed, which is the default method for handling ordinal variables in LISREL. The polyserial correlations measures the correlations of the underlying continuous variables, which are considered to be normal distributed with zero mean and unit variances. Consequently, one can assume that they are standard bivariate normal. The polyserial correlations are then estimated by maximizing the log-likelihood of the multinomial function, which is equivalent to minimizing the fit function:

\[
F(\theta) = \sum_{i=1}^{m_1} \sum_{j=1}^{m_2} p_{ij}[lnp_{ij} - ln\pi_{ij}(\theta)] = \sum_{ij} p_{ij}ln[p_{ij}/\pi_{ij}(\theta)]
\]  

(6)
where \( p_{ij} = n_{ij}/N \), which is the sample proportions, and

\[
\theta = (\tau_1^{(1)}, \tau_2^{(1)}, ..., \tau_{m_1-1}^{(1)}, \tau_1^{(2)}, ..., \tau_{m_2-1}^{(2)}, \rho)
\]

\( \tau_1^{(1)} \) and \( \tau_1^{(2)} \) are the threshold values for \( z_1^* \) and \( z_2^* \) respectively, and \( \rho \) is the polyserial correlation (Jöreskog, 2002).

### 4.2 Estimation Method

Since multivariate normality has been rejected for these variables, the estimation method needs to be chosen accordingly. Therefore, the estimation method of choice is the Robust Maximum Likelihood (RML) estimation. It minimizes the following fit function:

\[
F(\theta) = \log ||\Sigma|| + tr(S\Sigma^{-1}) - \log(S) - k - (\bar{z} - \mu)'\Sigma^{-1}(\bar{z} - \mu)
\]  

(7)

As before, \( z \) corresponds to the vector of observed variables, \( \Sigma \) is the population correlation matrix and \( S \) is the related sample correlation matrix (Bali Swain and Yang Wallentin, 2012).

### 4.3 Model Specification

The equations presented in Section 4 shows the matrix form of the general structural equation model. This section will elaborate on the relationships in the initial model on women’s empowerment. For reference, it can be valuable to have the path diagram in Figure in mind. To start with, we define the \( x \)-model as

\[
x = \Lambda_x\xi + \delta
\]

This equation consists of the following parts:

\[
x = \begin{pmatrix} x_1 \\ x_2 \\ \vdots \\ x_{10} \end{pmatrix}, \quad \Lambda_x = \begin{pmatrix} \lambda_1 & 0 & 0 \\ \lambda_2 & 0 & 0 \\ \lambda_3 & 0 & 0 \\ \lambda_4 & 0 & 0 \\ 0 & \lambda_5 & 0 \\ 0 & \lambda_6 & 0 \\ 0 & \lambda_7 & 0 \\ 0 & 0 & \lambda_8 \\ 0 & 0 & \lambda_9 \\ 0 & 0 & \lambda_{10} \end{pmatrix}, \quad \delta = \begin{pmatrix} \delta_1 \\ \delta_2 \\ \vdots \\ \delta_{10} \end{pmatrix}
\]
\[\Theta_\delta = \text{diag}[\text{var}(\delta_1), \text{var}(\delta_2), ..., \text{var}(\delta_{10})], \quad \xi = \begin{pmatrix} \xi_1 \\ \xi_2 \\ \xi_3 \end{pmatrix} = \begin{pmatrix} \text{Education} \\ \text{Economic} \\ \text{Legal} \end{pmatrix} \]

The y-model is defined as follows:

\[y = \Lambda_y \eta + \varepsilon\]

where

\[y = \begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_5 \end{pmatrix}, \quad \Lambda_y = \begin{pmatrix} \lambda_{11} \\ \lambda_{12} \\ \vdots \\ \lambda_{15} \end{pmatrix}, \quad \varepsilon = \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_5 \end{pmatrix}, \quad \eta = (\eta_1) = \text{WomEmp}\]

\[\Theta_\varepsilon = \text{diag}[\text{var}(\varepsilon_1), \text{var}(\varepsilon_2), ..., \text{var}(\varepsilon_5)]\]

Lastly, the structural model is:

\[\eta = \Gamma \xi + \zeta\]

\[\Gamma = \begin{pmatrix} \gamma_1 \\ \gamma_2 \\ \gamma_3 \end{pmatrix}, \quad \zeta = (\zeta_1), \quad \Phi = \text{cov}(\xi) = \begin{pmatrix} \phi_{11} & \phi_{12} \\ \phi_{21} & \phi_{22} \\ \phi_{31} & \phi_{32} & \phi_{33} \end{pmatrix}, \quad \Psi = \text{cov}(\zeta) = (\psi_{11})\]

To summarize, the free parameters in the model are:

\[\theta' = (\Gamma, \Phi, \Psi, \Lambda_y, \Lambda_x, \Theta_\delta, \Theta_\varepsilon)\]

### 4.3.1 Identification

Before proceeding with estimation, one needs to make sure that the model in question is identified. This is done by proving that each unknown parameter is a function of the known parameters. Furthermore, every function should have unique solutions (Bollen, 1989). Therefore, the model-implied covariance matrix has to be specified, in order to establish the unknown parameters. The model-implied covariance matrix is:

\[
\Sigma(\theta) = \begin{bmatrix} \Sigma_{yy}(\theta) & \Sigma_{yx}(\theta) \\ \Sigma_{yx}(\theta) & \Sigma_{xx}(\theta) \end{bmatrix} = \\
\Lambda_y (I - B)^{-1} (\Gamma \Phi \Gamma' + \Psi) [(I - B)^{-1}]' \Lambda_y' + \Theta \quad \Lambda_y (I - B)^{-1} \Gamma \Phi \Lambda_x' + \Theta
\]

\[
\Lambda_x \Phi \Gamma' [(I - B)^{-1}]' \Lambda_y' \quad \Lambda_x \Phi \Lambda_x' + \Theta
\]

22
To show that the model is identified, the $t$-Rule will be used. It is necessary but not sufficient. Consequently, if the rule is not fulfilled, the model is not identified. The rule states that the number of free elements in $\theta$ should be less than the non-redundant elements in the covariance matrix. In other words:

$$t < \frac{1}{2}(p+q)(p+q+1)$$

where $t$ is the number of unconstrained elements, $p+q$ is the number of observed variables [Bollen, 1989]. In this model, $p+q = 15$ and $t$ is 36. Hence, it fulfils this requirement, which indicates that the model is identified.

### 4.4 Assumptions

In order for the model to successfully be able to estimate these parameters, certain assumptions need to be assumed. These are the following:

**For the structural model:**

$$E(\eta) = 0, \quad E(\xi) = 0, \quad E(\zeta) = 0, \quad \text{corr}(\zeta, \xi) = 0$$

**For the measurement model:**

$$E(\eta) = 0, \quad E(\xi) = 0, \quad E(\epsilon) = 0, \quad E(\delta) = 0, \quad \text{corr}(\epsilon, \eta) = 0,$$

$$\text{corr}(\epsilon, \xi) = 0, \quad \text{corr}(\epsilon, \delta) = 0; \quad \text{corr}(\delta, \xi) = 0, \quad \text{corr}(\delta, \eta) = 0$$

Some of these assumptions need to be discussed. First, there is the assumptions regarding directionality, as discussed extensively by [Klein, 2012]. The measurement model proposed in Figure 1 consists of so-called reflective measurements. This means that the measurements are considered to reflect certain aspects of the latent variables. For example, a country’s general view on women’s participation in the educational sphere can be reflected in the percentage of women who attend secondary school. This seems like a reasonable assumption. Nevertheless, the relationship might go in the other direction as well, in which case this will produce biased results. Hence, this assumption is vital when analysing the structural model and trying to make causal inference. That is why a lot of care has been put into identifying the relevant indicators through previous studies on the subject.

Second, one has to guarantee temporal precedence. This means that the causes must appear before the effects. In order to fulfil this assumption, data was generally gathered from different time points, with earlier time points for the x-variables and later time points for the y-variables. Although, consideration is also taken to the extent of missing values, which results in somewhat
inconsistent time points.

Third, there is the aspect of isolation - that one has captured all relevant factors, so that no other plausible explanations are left. In other words, there cannot be any confounding factors that are not accounted for. Unfortunately, this assumption is not fulfilled. As previously discussed, there are several indicator variables that would have been suitable to use, but where the quality of the data was too low or the variable of interest simply did not exist. This means that there are factors that should be included but are omitted, which implies that the model suffers from endogeneity problems. This will be discussed more thoroughly in Section 5.

With these aspects in mind, the likelihood of attaining a good model fit is rather low. Yet, considering the potential impact a reasonable model could have, the choice to continue with the estimation is still motivated.

5 Results

This section presents the results from the different models estimated. First, Model 1 is discussed and the estimated parameters are presented. Second, a modified model is displayed where adjustments have been made to improve model fit.

5.1 The Initial Model on Women’s Empowerment

The initial model on women’s empowerment, Model 1 presented in Figure 1, is estimated in LISREL. The estimated parameters can be seen in Table 3 and Table 4 below. Table 3 shows the loadings in the measurement model. It can be seen that all observed variables for the latent variable Education are significant, on five percent significance level. Hence, these variables can be said to be fairly valid indicators of the latent factor Education. It is interesting to note that the direction of the estimated coefficient of RatioTeacher - it is negative. However, this is in line with the hypotheses as an increase in the pupil-teacher ratio corresponds to more pupils per teacher, which would negatively affect the school quality.
Although, no observed variable shows a significant effect on either the Economic factor or the Legal factor. Moreover, some estimated parameters exhibit questionable directions of their relationships to the latent variable. For example, this model states that an increase in the percentage of women who have a financial account would lead to a rather large decrease in the Economic sphere - which clearly contradicts previous theory. This could be a result of multicollinearity, which is a problem in this data set. For more information on this, see Section 5.2.

Lastly, one can see that three indicator variables for Women’s Empowerment demonstrate significant relationships with the latent variable. These variables are women’s fertility (Fertility), female life expectancy at birth (LifeExpect) and the infant mortality rate (InfantMort). All variables show relationships in the opposite direction of what was expected, which means that this latent variable actually measures the extent of low levels of women’s empowerment, probably due to the coding of the variables.

As for the structural model, which is used to evaluate the hypotheses put forth in Section 2, the result can be seen in Table 4. It is clear that the standard errors for each parameter is extremely large;
no estimated coefficient is even close to significant. This is accompanied by a $R^2$ value of above 1 and negative error variance, which conveys that this model is far from optimal. Analysing this model would be superfluous as it clearly violates statistical assumptions. A look at the Goodness of Fit-indices in Table 5 confirms this suspicion. It shows bad fit for all indices. Therefore, some modifications are in order.

Table 4: Estimated Parameters of the Structural Model for Women’s Empowerment (Model 1)

<table>
<thead>
<tr>
<th>Latent Factor</th>
<th>Coefficients (Standard Errors)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>1.524 (1194.335)</td>
</tr>
<tr>
<td>Economic</td>
<td>-0.184 (162.941)</td>
</tr>
<tr>
<td>Legal</td>
<td>2.979 (1507.013)</td>
</tr>
</tbody>
</table>

Table 5: Goodness of Fit-indices

<table>
<thead>
<tr>
<th>Index</th>
<th>Cut-off Value</th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satorra-Bentler Scaled $\chi^2$</td>
<td>Minimal</td>
<td>343.881</td>
<td>127.212</td>
</tr>
<tr>
<td>RMSEA</td>
<td>&lt; 0.08</td>
<td>0.190</td>
<td>0.153</td>
</tr>
<tr>
<td>GFI</td>
<td>&gt; 0.90</td>
<td>0.653</td>
<td>0.8001</td>
</tr>
<tr>
<td>CFI</td>
<td>&gt; 0.90</td>
<td>0.622</td>
<td>0.846</td>
</tr>
</tbody>
</table>

5.2 The Modified Model on Women’s Empowerment

The LISREL output from the initial model suggests a couple of changes in the model in order to approve model fit. First off however, another factor for the bad model fit has to be examined, namely multicollinearity. The output shows that there is indications of severe multicollinearity in the data. With the intention of decreasing the multicollinearity, the variance-covariance matrix is examined (see Table 8 in Appendix). The matrix, in combination with the minimum amount of observed variables required for each latent variables and their respective t-values in Model 1, lay the foundation for the decision regarding which variables to exclude. The variables that are dropped from the analysis are HIV, Parliament, SchoolGDP and ChildMarriage. Thereafter, the modification index in the output is consulted. It suggests adding error variances between a couple of variables whose errors are unlikely to be correlated, such as FinAccount and HealthExp. Since this cannot be motivated by theory, it will not be followed. Nevertheless, two suggestions will be
adhered to; adding a path from the educational sphere to *RatioIncome* and another from the legal sphere to *EducFem*. It is reasonable to believe that more educated women will lead to women earning more, thereby affecting the income ratio of between women and men. Additionally, when the legal sphere improves for women, when women get more legal rights, they might feel more entitled to attend school, which will affect the percentage of girls who go to secondary education. The path diagram of this new, modified model of women’s empowerment (Model 2) can be seen in Figure 2 below.

![Path Diagram for the Modified Model for Women’s Empowerment (Model 2)](image)

Figure 2: Path Diagram for the Modified Model for Women’s Empowerment (Model 2)

The Goodness of Fit-Indices of Model 2 can also be seen in Table 5. The indices show a considerably better fit, although the fit is still not ideal. Nonetheless, it is not too bad to be directly dismissed. Moreover, the negative error variance present in Model 1 and the unreasonable $R^2$ value are not issues any more, which further shows that Model 2 is preferable. Therefore, the estimated parameters for Model 2 will be presented and discussed. The results from Model 2 can be seen in Table 6 and 7.
Table 6: Estimated Parameters of the Measurement Model for Women’s Empowerment (Model 2)

<table>
<thead>
<tr>
<th>Observed Variable</th>
<th>Education</th>
<th>Economic</th>
<th>Legal</th>
<th>Women’s Empowerment</th>
</tr>
</thead>
<tbody>
<tr>
<td>EducFem</td>
<td>-19.066***</td>
<td>-12.091</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Reading</td>
<td>-12.596***</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>RatioTeacher</td>
<td>10.556***</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>GDPPerCapita</td>
<td>-</td>
<td>-1.508</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>FinAccount</td>
<td>-</td>
<td>14.630***</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>RatioIncome</td>
<td>3.142</td>
<td>0.866</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Corruption</td>
<td>-</td>
<td>-</td>
<td>-0.554**</td>
<td>-</td>
</tr>
<tr>
<td>LegalRights</td>
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<td>Fertility</td>
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<td>LifeExpect</td>
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<td>-</td>
<td>-</td>
<td>-8.079***</td>
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<tr>
<td>InfantMort</td>
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<td>-</td>
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<td>22.688***</td>
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</table>

*** Significant on 1 percent level
** Significant on 5 percent level

Table 7: Estimated Parameters of the Structural Model for Women’s Empowerment (Model 2)

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<th>Latent Factor</th>
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<td>Legal</td>
<td>-0.934***</td>
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</table>

*** Significant on 1 percent level

One can see that the modified model show more interesting results. To start with, all observed variables for the educational sphere are still significant, except for RatioIncome which was added to this model. However, note the direction of the estimated relationships; they are all in contrast to previous theory. This implies that this latent variable does not measure how "good" the educational sphere is, rather it indicates how bad the quality is. Therefore, the direction of the estimated parameter of the educational sphere on women’s empowerment in the structural model (in Table 7) is unexpected - it shows a positive relationship between how bad the quality of the education is, and
the level of women’s empowerment. However, when observing the estimated coefficients of the indicator variables of women’s empowerment, this finding is less surprising. Women’s empowerment is measured through Fertility, LifeExpect, and InfantMort, where the last two are significant. Table 6 shows that an increase in the level of women’s empowerment in a country is estimated to decrease women’s life expectancy. Additionally, it states that it will also result in a dramatic increase in the infant mortality rate. Hence, this implies that the higher the value of the latent variable of women’s empowerment in the country, the lower the actual empowerment is. Thus, it shows that an increase in the educational sphere will lead to an increase in women’s empowerment.

Looking at the observed variables for the economic sphere, we see that only the percentage of women with financial account has a significant relationship to the latent variable. The other two show small and insignificant coefficient estimates. It is difficult to tell whether or not this latent variable measures the negative or positive aspect of the economic sphere, since FinAccount shows a positive relationship, indicating that an increase in the economic sphere will lead to an increase in the percentage of women with a bank account. The relationships of the other two observed variables however exhibit the opposite - an increase in the economic sphere would according to this model imply a decrease in GDP per capita as well as an increase in the income ratio between women and men (i.e. the income gap would increase). These aspects contradict each other. As FinAccount is the only variable that is significant and has a large estimated coefficient, this paper will assume that it measures the positive aspect of this sphere. The economic sphere in the structural model has a positive, although insignificant, effect on the latent variable women’s empowerment. As women’s empowerment is defined in negative terms, this means that the educational aspects has no, or a small negative, impact on women’s empowerment.

Regarding the legal sphere, it consists of three indicator variables where only one is significant; Corruption. The same directionality is visible here - the lower the level of the legal sphere in a country is, the lower the estimated level of corruption is that country (for clarification, see how Corruption is defined in Section 3.1.3). This can also be seen in the relationship between EducFem and the legal sphere, where a increase in the level of the legal sphere implies a decrease in the percentage of girls who attend secondary school. Hence, this sphere, as well as the educational sphere, seems to measure the negative aspects of the spheres rather than the positive ones. Yet, on the contrary to the educational sphere, the legal sphere shows a negative relationship to women’s empowerment. This suggests that a decrease in the legal sphere (in terms of a decrease in the amount of legal rights for individuals and an increase in the level of corruption) would actually lead to an increase in the general level of women’s empowerment within that country.

As previously stated in Table 5, the fit of this model is not optimal. This is due to a couple of different reasons. First, the initial data set consisted of many missing values. The small sample size in combination with the nature of missingness required that the missing values had to be imputed.
Since such a large extent of the data was imputed, it could increase the multicollinearity in the data. It would be interesting to see if multicollinearity is a big issue in a more complete data set. Albeit, this cannot be done until the overall quality of the international data sets improve considerably. However, country level data is in general difficult to work with, as variables can be somewhat incomparable between countries - many definitions and factors have context-specific meanings, which limits their generalizability. As a result, it could also affect the model fit. Moreover, the MI method assumes that the data is MAR, which in this case is questionable. For example, one reason for missingness could be the nature of institutions in a country. Better governance as well as the quality of infrastructure would facilitate the data gathering process. These aspects are not accounted for in this model. In case this assumption is violated, it will produce biased results. One needs to have this in mind when interpreting these results. Another way of handling missing data could be to treat the missing values as a separate category. Nevertheless, that would required a smaller percentage of missing values than what we have in the data at hand. Yet another method for treating missing data that one could use is Full Information Maximum Likelihood (FIML), where one does not impute any missing values but still use all the available information. This method however demands a larger sample size than what we have. Therefore, these two methods might be a good idea for future research when the data has higher quality.

Second, even though the sample consists of the whole population, the sample size is still, as we have mentioned in previous sections, small. Wolf et al find that for data sets with large amounts of missing values, a sample size of at least 320 is recommended (Wolf et al., 2013). Therefore, a reason for the lack of model fit could be the limited sample size. In order to investigate this, a sample size of 320 with the same data structure as the initial data is simulated in R. Thereafter, the new sample is used to estimate the modified model of women’s empowerment again. The model fit is not improved in any substantial way. Another estimation with a simulated sample size of 500 observations is executed, and the model fit improves only slightly. Consequently, the size of the sample in itself is not an issue here - only the limitations it puts on the methods available for treating missing values.

Third, the model violates some assumptions. The most problematic one is the issue of isolation. It is violated in two main ways. The first being that the indicators that were identified as valuable were more often than not not available to use due to a large extent of missing values. The second is that women’s empowerment as a concept is multidimensional and therefore difficult to measure as it is. To believe that one can capture all relevant aspects is naive. For instance, this study only focuses on the formal sector, which means that there is a class bias in the results. Poorer women working in informal sectors are not included which creates a large problem of omitted variables. Additionally, indicators have been chosen with the aim of capturing some aspect of how women generally are treated within the household, which is considered one important aspect of empowerment. Yet, this
aspect is difficult to measure on the national scale, resulting a whole sphere being almost completely unmeasured. Considering the limitations in the available data sets, the model fit is actually rather good.

Some suggestions for further research has already been purposed. There is yet another one which deserves to be mentioned; the two stage estimation procedure, which is not used in this thesis due to time limitations. This method first estimates factor scores or CFA scores for each individual. Thereafter these factor scores are used as the values of the latent exogenous variables in an ordinary least square estimation. By investigating the $\beta$ coefficients and their respective p-values one can determine if any of the latent variables Education, Economic or Legal has an effect on Women’s Empowerment and consequently evaluate the hypotheses put forth in this thesis.

6 Conclusion

This essay has tried to investigate which national mechanisms that lead to, and are caused by, women’s empowerment in developing countries. Considering the lack of model fit, the conclusions one can draw from this analysis are limited. Nevertheless, what the result from the model indicates regarding the hypotheses will be briefly discussed. Keep in mind that these results suffer from multicollinearity, which means they should be interpreted with care. The first hypothesis stated that an increase in the educational sphere would lead to an increase in women’s empowerment. The result from this paper supports that claim. We have found that the estimated coefficient for education’s effect on women’s empowerment is positive and significant. The second hypothesis, regarding the effect of the economic sphere on women’s empowerment, cannot be validated. The data at hand does not provide clear-cut answers as to how the economic sphere, and its respective observable variables, is related to women’s empowerment. Moreover, the effect of the legal sphere stands out as it clearly contradicts the third hypothesis for this thesis. It was hypothesized that an increase in the legal sphere - as defined by an increase in legal rights and decrease in the level of corruption - would increase women’s empowerment. However, the findings of this paper suggest the opposite.

Concerning which mechanisms that are affected by women’s empowerment, the literature review suggested three broad areas; namely women’s reproductive health, children’s health and women’s political representation. According to the result from the model estimation, we find no proof that women’s empowerment has an effect on women’s reproductive health. In addition, the claim that women’s empowerment leads to a better representation of women finds no strong evidence in our data. On the other hand, it seems like women’s empowerment does indeed lead to an improvement in children’s health.

There are two main contributions of this thesis to the development field. The first contribution
is the proposed model, as it is developed from an extensive literature review. It is the researcher’s firm belief that if the data would have been of better quality, the model would have performed better. The second take home message from this thesis is the choice of method for estimating this latent variable. The use of structural equation modeling is rare within the field of political science and developing studies, and is more suitable than many other commonly used methods to account for unmeasurable variables. If this method is implemented at the local or individual level, it would probably better capture all relevant aspects.
References


## Appendix

Table 8: Variance Covariance Matrix

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<th>EdFe</th>
<th>GDP</th>
<th>FiAc</th>
<th>ChMa</th>
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<th>Fer</th>
<th>HeEx</th>
<th>LiEx</th>
<th>InMo</th>
<th>Par</th>
<th>RaIn</th>
<th>ScGDP</th>
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