

# Remittances to the Kathmandu Valley and their economical impacts



## **Master Thesis**

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## Table of Contents

1. Remittances in general .....	2
1.1. Causes for migration: Push & Pull Factors .....	2
1.2. Poverty and migration.....	2
1.3. Total remitted amounts worldwide .....	2
1.3.1. Reasons for the recent large increases in remittances.....	2
1.3.2. Country rankings .....	2
1.4. Different ways of transmitting remittances .....	2
1.5. Remittances transaction costs .....	2
1.6. How remittances are invested .....	2
2. Theories about remittances.....	2
2.1. Remittances and their impact on poverty.....	2
2.1.1. Methodology.....	2
2.1.2. Results .....	2
2.2. Are remittances countercyclical? .....	2
2.2.1. Methodology.....	2
2.2.2. Results .....	2
2.3. Economic growth.....	2
2.3.1. Methodology.....	2
2.3.2. Results .....	2
3. General facts about Nepal and the Kathmandu Valley.....	2
3.1. Population .....	2
3.2. Poverty and inequality .....	2
3.3. Economical overview .....	2
3.3.1. GDP growth .....	2
3.4. Nepalese migration.....	2
3.4.1. Remittances to Nepal.....	2
3.4.2. Preferred migration destination .....	2
3.4.3. Duration of migration .....	2
3.4.4. Outlook: Remittances during worldwide economic crises .....	2
4. Survey.....	2
4.1. Methodology .....	2

4.2.	General Results.....	2
4.2.1.	Descriptive statistics.....	2
4.2.2.	Education.....	2
4.2.3.	Received remittances per household.....	2
4.2.4.	Countries of origin.....	2
4.2.5.	Transfer channel of remittances .....	2
4.3.	Reasons for sending remittances .....	2
4.4.	How remittances are invested .....	2
4.5.	Relationship between GDP and remitted amounts .....	2
4.6.	Poverty reduction.....	2
4.7.	Are remittances countercyclical? .....	2
4.8.	Less economic activities due to remittances .....	2
4.9.	Taxes on remittances.....	2
4.10.	Putting remittances partly into an investment fund .....	2
4.11.	Running an own business with the help of remittances .....	2
5.	Growth and remittances models .....	2
5.1.	The general Solow growth model.....	2
5.2.	Growth model including remittances .....	2
5.3.	Own remittances model.....	2
5.3.1.	Methodology.....	2
5.3.2.	Gross National Product .....	2
5.3.3.	Gross National Income .....	2
5.3.4.	Solow growth model .....	2
5.3.5.	Technology .....	2
5.3.6.	Capital.....	2
5.3.7.	Savings.....	2
5.3.8.	Consumption.....	2
5.3.9.	Labor .....	2
5.3.10.	Remittances .....	2
5.3.11.	Population abroad.....	2
5.3.12.	Net migration .....	2
5.3.13.	Poverty .....	2
5.3.14.	Graphical representation of the model.....	2

5.3.15. Variable list .....	2
6. Results of the remittances model .....	2
6.1. Scenario 1: Base case .....	2
6.1.1. Results .....	2
6.2. Scenario 2: No migration.....	2
6.2.1. Results .....	2
6.3. Scenario 3: Optimized saving rate.....	2
6.3.1. Results .....	2
6.4. Conclusion .....	2
7. How to boost the impacts of remittances .....	2
7.1. Nepal Remittances Fund.....	2
7.1.1. Investment opportunities .....	2
7.1.2. NRF in the remittances model.....	2
7.1.3. Conclusion.....	2
8. Final thoughts .....	2
8.1. Positive aspects of remittances .....	2
8.2. Negative aspects of remittances .....	2
9. Conclusion.....	2
10. References .....	2
11. Appendix .....	2

## Abbreviations

ADB	Asian Development Bank
CGD	Center for Global Development
CIA	Central Intelligence Agency
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GEP	Global Economic Prospect
GNP	Gross National Product
LDC	Least Developed Countries
IPO	Initial Public Offering
IMF	International Monetary Fund
IOM	International Organization for Migration
LOG	Natural Logarithm
OECD	Organization for Economic Co-operation and Development
p.a.	Per annum
p.c.	Per capita
PKR	Pakistan Rupee
PPP	Purchasing Power Parity
PRS	Political Risk Services
MIF	Multinational Investment Fund
MTO	Money Transfer Operator
NPR	Nepalese Rupees
SWIFT	Society for Worldwide Interbank Financial Telecommunication
UAE	United Arab Emirates
UN	United Nations
UNDP	United Nations Development Program
USD	United States Dollars
WDI	World Development Indicator by World Bank
WWF	World Wide Fund for Nature

## **Abstract**

This paper gives an overview about remittances in general and takes a deeper look at remittances and their impacts to the Kathmandu Valley in Nepal.

It is shown in a multi-regression worldwide country panel that a 10% increase in remittances can reduce poverty by 2.3%.

Based on a survey conducted in the Kathmandu Valley, it is presented how much remittances people receive, through which channels and from which countries they receive it. The average amount per recipient household and month shows to be NPR 23'355 (USD 336). 88% of the remittances are either transferred by bank wiring or by an MTO. The countries where the most people receive remittances from are: USA (22.4%), UAE (16.7%), Qatar (14.0%). Survey and UNDP data further show that an increase of 1% in GDP p.c. in the sender country, increases remittances by 0.59%. The survey results show that remittances are mainly sent due to altruistic reasons and are not based on countercyclical behavior in order to streamline income of the recipients. The survey also showed that 46% of the recipients would work more in case they did not receive any remittances. With the help of a remittances model, which is based on the Solow growth model, some impacts of remittances are estimated and suggests that without remittances, annual Nepalese GDP p.c. growth could be around 0.16% points lower.

With the same model it is also shown that if 10% of received remittances in Nepal are placed in an investment fund that invests in the Nepalese economy, GDP p.c. growth could increase from 1.75% to 1.90% p.a.

## 1. Remittances in general

The International Organization for Migration (IOM, 2006) defines remittances as follows: “Migrant remittances are defined broadly as monetary transfers that a migrant makes to the country of origin. In other words, financial flows associated with migration. “

### *1.1. Causes for migration: Push & Pull Factors*

A precondition for remittances is that people emigrate from their home country. The Center for Global Development (CGD, 2006) estimates that around 200 million people do not live in the same country they were born in. What are the underlying drivers for migration and therefore remittances? Oglethorpe et al (2007) write that one can distinguish between “push” factors that are related to the place of origin and “pull” factors that are related to the place of destination.

Push Factors: (i) Scarcity of or inadequate access to land and resources, (ii) Lack of employment opportunities, (iii) Poverty, (iv) High population pressure, (v) Environmental degradation, including loss of soil productivity, (vi) Natural disasters, (vii) Civil unrest and conflict, (viii) Rites of passage when young people leave home to make their way in the world.

Although not all of the push factors have an economic background, this list underlines the importance of economic reasons for people to leave their country.

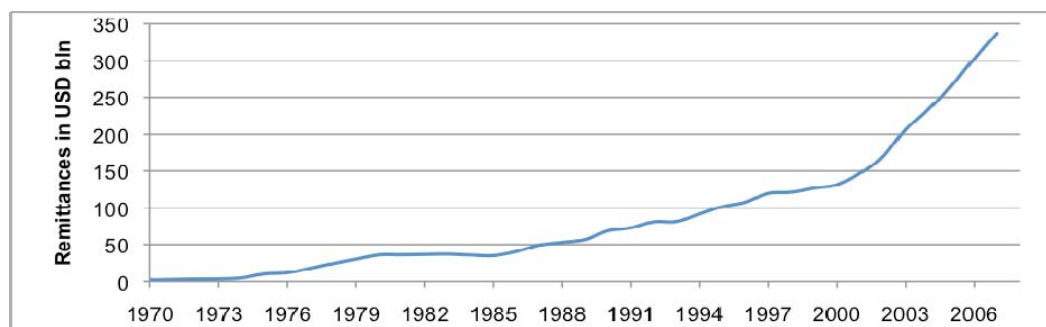
All of these factors pointed out are typical for developing countries. But, of course there is not only migration from developing countries to developed countries, but also migration between developing countries (as we will see later, many people migrate from Nepal to India, both countries belonging to the least developed countries) or between developed countries. An example of the latter is the migration of thousands of Germans to Switzerland in recent years. This phenomenon is explained by the pull factors. Oglethorpe et al (2007) state: “While push factors stimulate people to leave areas of origin, pull factors define where migrants go, seeking to satisfy their needs”. The authors list the following points: (i) Access to land and natural resources, (ii) Employment opportunities, (iii) Access to markets, (iv) Access to facilities and amenities, such as social services and transport, (v) Safety and security, (vi) Family reunification and networks.

## 1.2. *Poverty and migration*

Oglethorpe et al state that poverty is an important factor for migration. The largest migration streams are from poor to rich(er) countries. The relation between poverty and migration is however more complicated than just a linear regression line, stating that the higher poverty the higher migration. Adams and Page (2005) found that there is an inverted U-shaped curve existing between the level of income and international migration. Thus, plotting GDP per capita as independent variable and migration as dependent variable, the latter increases up to a certain point, after which income increases further while migration decreases. Adams and Page found that turning point to be at a GDP per capita of USD 1'630 (in 1995 prices). Hatton and Williamson (2003) further show in a country panel regression for 80 less developed countries with data from 1970 – 2000 that the elasticity between income (poverty) and migration is 1.49. In other words: If poverty is reduced by 1%, migration will increase by 1.49%, as Hatton and Williamson only looked at developing countries, they did not find the “turning point” suggested by Adams and Page.

## 1.3. *Total remitted amounts worldwide*

The World Development Indicator (WDI) by World Bank shows that total worldwide remittances grew steadily from nominal USD 2.05bln in 1970 to USD 337bln in 2007, paid by the estimated 200 million migrants all over the globe. Thus on average a migrant remitted USD 1'650 in 2007. Remittances are the second largest contributor to global financial transactions after foreign direct investments (FDI) and are estimated to be more than twice as large as official aid-related transfers to the developing world (Global Economic Prospect, 2006). The received worldwide remittances p.c. grew from nominal USD 0.56 in 1970 to USD 50.95, which is an annual growth rate of 12.9%. (WDI, 2008)



Graph 1: Remittances from 1970 to 2007

Data: WDI

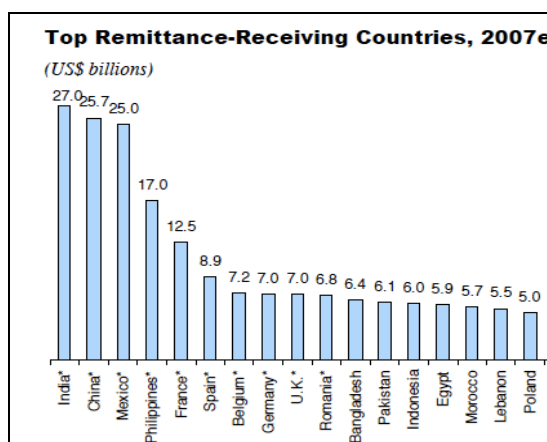


### 1.3.1. Reasons for the recent large increases in remittances

Looking at graph 1, a sharp increase of remittances in the first seven years of the new millennium can be observed. In 2000 worldwide remittances accounted to USD 131.52bln, in 2007 total remittances were already USD 336.85bln, an increase of USD 205.33bln. Several possible reasons for this increase are mentioned by GEP: “(a) The increased scrutiny of flows since the terrorist attacks of September 2001, (b) changes in the MTO industry that are favorable to remittances (lower costs, expanding MTO networks), (c) improvements in data recording, (d) depreciation of the dollar (which raises the dollar value of remittances denominated in other currencies), and (e) increase in the number of migrants and their incomes.” The World Bank further assumes that the real number of total remittances could be more than 50% higher due to the big share of remittances that flows through informal channels. Therefore, one must keep in mind that data on remittances are usually biased downwards.

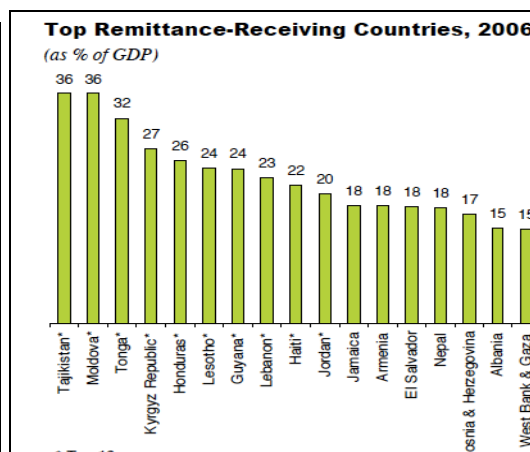
### 1.3.2. Country rankings

As shown in graph 2, India has received USD 27.0bln of remittances, which is the highest absolute amount, followed by China with USD 25.7bln. Looking at per capita figures, India received about USD 25 p.c. in 2007 or 3.6% of the GDP p.c. (WDI, 2008). Looking at countries with a very high “remittances-to-GDP” ratio, we see countries like Tajikistan or Moldova where remittances are larger than one third of their GDP. Graph 3 shows that for almost all countries among the top 20 remittances account for a two-digit-percentage of GDP, which clearly shows the importance of remittances to these countries.



Graph 2: Top remittance receiving countries

Source: World Bank



Graph 3: Top remittance receiving countries in % of GDP

Looking at sender countries, the USA is by far the largest one with USD 42.2bln, followed by Saudi Arabia with USD 15.6bln and Switzerland with USD 13.8bln (all in 2006).

#### **1.4. Different ways of transmitting remittances**

Guillebeau (2006) shows the possible transfer channels for remittances and divides them into formal channels (banks and money transfer operators (MTO)) and informal channels (hand-carry and hawala methods).

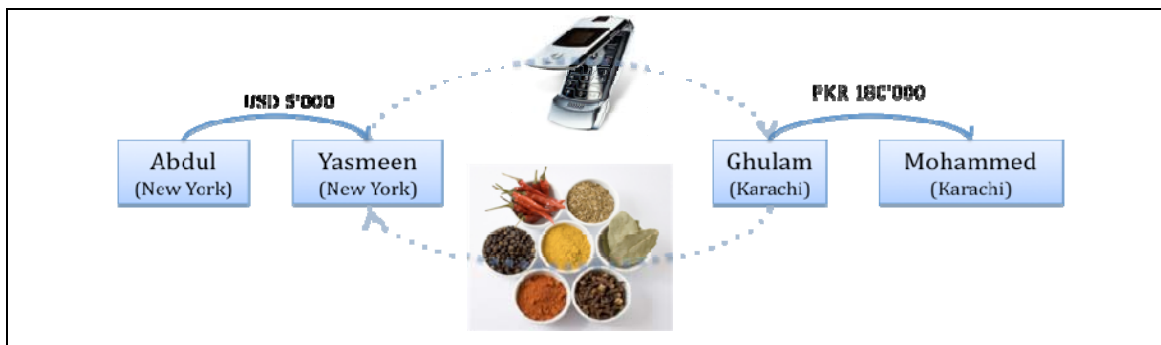
SWIFT-bank-transfers are becoming more and more popular, as an increased number of people in developing countries have their own bank account. The second formal transfer method is the use of an MTO, such as *Western Union* or *Money Gram*. MTOs are very popular in developing countries, as no bank account is needed and the money can be transferred in real time.

On the other side, the cheaper informal methods are not officially recorded and declared at customs or tax offices (and therefore in many cases illegal), one of them is *Hand-carry*: Instead of carrying the money by himself, the sender passes it on to a third person who transports the money for him to his family. Often a group of migrants go abroad together and work in the same area. The other informal method is known as: *Hawala*<sup>1</sup>. Interpol (2000) gives the following definition: "Hawala is an alternative or parallel remittance system. It exists and operates outside of, or parallel to 'traditional' banking or financial channels ... (it is) a money transfer without money movement". Based on an example of Interpol it works as follows: A Pakistani taxi driver in New York (Abdul) wants to send USD 5'000 to his brother (Mohammed) in Karachi. Abdul sees Yasmeen at her shop, where he usually buys things from Pakistan, e.g. spices. Yasmeen also offers hawala services: (i) Abdul gives the USD 5'000 to Yasmeen; (ii) Yasmeen contacts Ghulam in Karachi (he provides Yasmeen with spices), and gives him the address details of Mohammed; (iii) Ghulam arranges to have PKR 180,000 (this is the equivalent of USD 5'000 minus a hawala fee) delivered to Mohammad. As Yasmeen is also delivering American cell phones to Ghulam, they are in

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<sup>1</sup> Hawala is also called *Hundi*: In most of the Asian countries it is called *Hawala*, in India and Nepal people call this system *Hundi*

constant exchange and do therefore not settle their accounts after each transaction, but only twice a year. The whole transaction is based on trust and no receipts are issued on both sides, but this system still is very reliable, as Yasmeen knows if she cheats, she will be out of business immediately. The transaction is shown in graph 4.



Graph 4: Hawala system

### 1.5. Remittances transaction costs

The World Bank operates an Internet page called “Remittance Prices Worldwide<sup>2</sup>” where senders can compare the transfer fees of the biggest remittance corridors. Looking at a random transaction from USA to India (amount to be transferred: USD 200), the differences are astonishing: The cheapest offer is by *HSBC Bank* with zero transaction fees at all and an exchange rate margin of 0.87%. Total costs in this case are therefore USD 1.74 (0.87% of transferred amount), with a transaction time of three to four business days. The most expensive company is *Western Union* with total costs of USD 27.16 (13.58% of transferred amount). Here, the money is immediately transferred. The average total costs for a transaction done by a bank amount to USD 5.12 (2.56% of transferred amount), whereas average total costs using a MTO are USD 12.78 (6.39% of transferred amount). These results show that it is in general less expensive for the remittance sender to use a bank for the money transfers.

### 1.6. How remittances are invested

Deshingkar und Grimm (2005) show the ten most common expenditures the received remittances are used for: (i) daily needs and expenses including food

<sup>2</sup> <http://remittanceprices.worldbank.org/>

(improving food security and nutritional status). (ii) Medical / health care expenses or education (improving the prospects for future generations). (iii) Consumer durables (stereos, bicycles, motorbikes, milling machines, kiosks, televisions; some of which can help to generate income). (iv) Improving or building housing, (v) Buying / leasing land or livestock, (vi) Investment in socio-cultural life (birth, wedding, funeral) (vii) Loan repayments (often loans to pay for cost of migration), (viii) Savings, (ix) Income or employment generating activities, (x) Purchase of cash inputs to agriculture (hired labor, disease control etc.) that are resulting in better cultivation practices and higher yields; Investment in agricultural implements or machinery (water pumps, ploughs etc.). In chapter 4.4 it will be discussed if these ten points also hold for Nepalese consumption behavior.

## 2. Theories about remittances

In the following subchapters three different aspects of remittances are discussed: (a) their impact on poverty, (b) their impact on economic development, and (c) the possible countercyclical nature of remittances. The survey questions that are presented later in this paper are partly based on these three topics.

### 2.1. *Remittances and their impact on poverty*

In their article, Adams and Page (2005) statistically test whether remittances help reducing poverty. For that, they construct and analyze a data set on remittances, inequality, and poverty from 71 developing countries. Their results show that remittances help reducing the level of poverty in the developing world significantly. The authors close with the theory that on average a 10 percent increase in remittances will lead to a 3.5 percent reduction in the percentage of people living in poverty (defined by percentage of population living with less than two USD (PPP) per day). The paper uses 81 observations ranging from 1980 to 1999.

#### 2.1.1. Methodology

To see whether the theory by Adams and Page still holds with newer and more data, equation (1) that is suggested by Adams and Page is used:

$$\log P_{it} = \alpha + \beta_1 \log(\mu_{it}) + \beta_2 \log(g_{it}) + \beta_3 \log(\chi_{it}) + \varepsilon_{it} \quad (\text{Eq. 1})$$

Adams and Page describe the equation as follows: “ $P$  is the measure of poverty in country  $i$  at time  $t$ ,  $\alpha$  is a fixed effect reflecting time differences between countries,  $\beta_1$  is the “growth elasticity of poverty” with respect to mean per capita income given by  $\mu_{it}$ ,  $\beta_2$  is the elasticity of poverty with respect to income inequality given by the Gini coefficient,  $g_{it}$ ,  $\beta_3$  is the elasticity of poverty with respect to variable  $\chi$  (remittances) and  $\varepsilon_{it}$  is an error term that includes errors in the poverty measure. “

Adams and Page calculate income using two measures: GDP p.c. in USD (PPP) or p.c. survey mean income. Due to the better data availability of GDP p.c. in USD (PPP) numbers, I use this one. Adams and Page quote that these two

measurements do not show exactly the same amount but they do not differ in a systematic way that would render them infeasible to use. Note that by definition, the received remittance payments are not part of the GDP, as in the GDP only domestically generated value is accounted. In contrast, in the Gross National Product (GNP) remittances are accounted for. To measure poverty, Adams and Page use three variables: The poverty headcount, the poverty gap and the squared poverty gap. The poverty headcount shows the share of the population of a country living with less than two dollars (PPP) per day, which is considered *moderate poverty* by World Bank. In this paper I only use the poverty headcount for moderate poverty, as again this is the number with the best availability in the data set. It is also used by Adams and Page as the main poverty measure. The income inequality is measured by the Gini index. The World Bank Database provides all data.

The used data ranges from 1980 to 2004, with 114 observations of the mayor remittances receiving areas, namely Latin America, Middle East (including the three Maghreb countries) and South Asia.

It must be mentioned that from the original data set of 119 observations, 5 observations<sup>3</sup> were taken out due to values that would have changed the whole regression data on a big scale. Another problem that occurred is that for some countries like India (as seen, it is the biggest receiver of remittances) and Mexico have only one data observation, which leads to an underestimation of their impacts.

Adams and Page suggest using instrumental variables (IV) in the estimation of equation 1 in order to diminish the effects of the possibly endogenous relationship between poverty and remittances. For this purpose, variables have to be found that are highly correlated to remittances but not to poverty. Adams and Page take three instruments into consideration: the distance between the remittance-sending areas<sup>4</sup> (Hatton and Williamson (2003) state that the distance between the USA and the remittance receiving country is negatively and

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<sup>3</sup> The data observation that were taken out are: Brazil for the years 1984 and 1987, as well as Venezuela in 1987, 1989 and 1993, in these years remittances were all less than USD 0.3 p.c.

<sup>4</sup> USA, OECD countries, Persian Gulf countries

significantly related to the level of migration and therefore remittances), the second instrument is the education level, which is measured as the percentage of population over 25 years old that have completed a secondary education. Adams and Page explain that the human capital theory states that education is positively related with international migration and therefore probably with remittances. The third instrument Adams and Page take into consideration is the stability of governments, which is measured by the American PRS (Political Risk Services) Group. In this paper however, only the distance is used as an instrument, as for the other two instruments data are not (publicly) available for all the countries and years.

### 2.1.2. Results

#### IV estimates of the effects of official remittances on poverty

Dependent Variable: LOG (POVERTY)				
Method: Two-Stage Least Squares				
Sample: 1 114				
Included observations: 114				
White Heteroskedasticity-Consistent Standard Errors & Covariance				
Instrument list: LOG(DISTANCE)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.254838	1.351226	3.888941	0.0002
LOG (GDP)	-1.515930	0.134312	-11.28664	0.0000
LOG (GINI)	2.641134	0.271244	9.737129	0.0000
LOG (REMIT)	-0.228852	0.105501	-2.169188	0.0322
R-squared	0.527731	Mean dependent var		2.125788
Adjusted R-squared	0.514851	S.D. dependent var		1.015649
S.E. of regression	0.707426	Sum squared resid		55.04974
F-statistic	38.49510	Durbin-Watson stat		1.103308
Prob(F-statistic)	0.000000			

Table 1: IV estimates of remittances on poverty

Using instrumental variables in the estimation, the following results can be obtained: Remittances have a negative elasticity of 0.23 towards poverty. Therefore an increase in remittances by 10 percent will decrease the level of poverty by 2.3 percent. The result holds at the five percent significance level ( $p$ -value: 0.0322) and shows that there is indeed a systematic connection between transferring remittances and reducing poverty.

The results are quite similar to the ones obtained by Adams and Page, which obtain an elasticity of -0.351 of poverty towards remittances.

## **2.2. Are remittances countercyclical?**

Some researches such as Wahba (1991) or Quartey (2006) believe that remittances have a countercyclical character, which means that if the domestic economy (where the remittances are sent to) declines, remittances increase, in order to stabilize the income streams. This argument sounds plausible. In the paper “*Business Cycles and Workers’ Remittances: How Do Migrant Workers Respond to Cyclical Movements of GDP at Home?*” by Sayan (2006), the author however found that there are many other drivers for sending remittances that are more relevant than the GDP volatility in the home country and that there is not necessarily a negative relation between GDP growth in the receiver country and received remittances.

### **2.2.1. Methodology**

Sayan takes a sample of twelve developing countries, including six low-income countries: Bangladesh, India, Ivory Coast, Lesotho, Pakistan and Senegal, and six low-middle-income countries: Algeria, Dominican Republic, Jamaica, Jordan, Morocco and Turkey, with a time frame between 1976 and 2003. In a first step, Sayan takes the whole (weighted) country sample and estimates a cross correlation between real GDP at time  $t$  and real remittances at time  $t+i$ , whereas  $i$  can either be -1, 0 or 1 (to see if there is pre-, synchronous- or lagged relationship). To filter out GDP growth and remittances trends Sayan applies the Hodrick-Prescott-Filter (Hodrick and Prescott, 1997).

### **2.2.2. Results**

**Country panel results:** Looking at the whole sample (group of twelve countries), Sayan shows at a 5% significance level that remittances are countercyclical (-0.3639) with a time lag of  $t+1$ . In other words: if the group GDP increases by one percent, the remittances in the next time period go down by 0.36%, or if GDP decreases by one percent, remittances increase by 0.36% in the following period. So, Sayan shows in the country panel that the results confirm a countercyclical movement between a country’s GDP and the received remittances



(however with a time lag of  $t+1$ ). If we look at each single country, the results differ considerably from the above country panel results: Only for four (Bangladesh, India, Jordan, Morocco) out of the twelve countries the results were statistically significant at a 5% level:

Bangladesh: Remittances are countercyclical with an elasticity of -0.4145 and synchronous. India: Remittances are countercyclical with an elasticity of -0.3798 and a time lag of  $t+1$ . Jordan: Remittances are cyclical and synchronous with an elasticity of 0.8704. Morocco: Remittances are cyclical with an elasticity of 0.3832 and a time lag of  $t+1$ .

Hence, at an individual country level the picture of the statistically significant data is mixed, as we have both countercyclical and cyclical cases.

### **2.3. Economic growth**

In the paper of Chami, Fullenkamp and Jahjah (2005) titled “Are Immigrant Remittance Flows a Source of Capital for Development” it is investigated whether remittances behave similarly to foreign direct investments (FDI) that have a positive correlation with GDP growth. Chami, Fullenkamp and Jahjah and others believe that the main reason for sending remittances to family members is pure altruism. Therefore, remittances cannot be compared to profit-driven flows like FDI.

In addition, the authors mention the possible incentive of remittance receivers towards working less than they would without remittances. If, for example, a person needs two dollars a day to satisfy his needs and is working for this two dollars 8 hours a day, it might be possible that by receiving of remittances of lets say 50 cents per day, he might work less and still consume at the same level compared to the pre-receiving time period. The receiver has not highly increased his total disposable income, but only shifted his working effort towards a lower level. As the authors argue that altruism is the driving motive for remittances, therefore it is unlikely to “punish” the remittance receiver by stopping all payment to the origin country and remittance will continue to flow even if working efforts have decreased. As a consequence, remittances might have a negative effect on the economic output of developing countries.

### 2.3.1. Methodology

To test whether the above hypothesis holds and if one can observe a systematic connection between a change in the economical output and the received remittances, the authors use the following equation:

$$\Delta y_{it} = a_0 + a_1 I_{it} + a_2 \Delta wr_{it} + a_3 ncpf_{it} + e_{it} \quad (\text{Eq. 2})$$

$y$  is the log of real GDP p.c.;  $\Delta y_{it}$  is the change in  $y$ ;  $a_0$  is a constant;  $I_{it}$  is the log of investment to GDP ratio;  $\Delta wr_{it}$  the change in the log of worker remittances to GDP ratio;  $ncpf_{it}$  the net private capital flows to GDP ratio;  $e_{it}$  is the error term;  $a_1$ ,  $a_2$ , and  $a_3$  are the measures for elasticities.

### 2.3.2. Results

After estimating the equation for the period 1970-1998 for 83 countries the results are as follows: The elasticity of the investment to GDP ratio  $a_1 I_{it}$  is 0.0567 (significant at 1 percent); whereas the elasticity of the log of *remittances to GDP ratio*  $ncpf_{it}$  is -0.0050 (significant at 10 percent). The authors show that remittances cannot be compared to FDI flows regarding their impact on GDP growth. As mentioned above, remittances are mainly paid due to altruism and are therefore not profit-driven capital flows like FDI. This is an important result, as for economic development it is essential that profit-driven capital flows enter developing. Also Sorensen (2004) is critical about remittances boosting GDP growth. She writes: „Remittances fail to help the economy and decrease the likelihood of an improved economy in the future.“ But of course, concluding that remittances should be decreased in order to support GDP growth is too simple, since we have seen that remittances have a positive impact on lowering poverty. The paper by Chami, Fullenkamp and Jahjah has also been criticized by some researchers, as for example Fajnzylber and Lopez (2005) found a positive correlation between remittances and GDP growth rates.

### **3. General facts about Nepal and the Kathmandu Valley**

As the remittance theories will be applied to Nepal and specifically the Kathmandu Valley in the second half of this paper, a brief overview about these regions is given. This seems to be necessary in order to understand the reasons behind the migration of Nepalese people as well as their economical situation.

#### **3.1. Population**

WDI indicates for Nepal a population of 28.1 million people at the end of 2007. Annual population growth was around 2.5% in the 1990s and came down to 1.7% by 2007. At the same time, the share of people living in urban areas has increased from 9.7% in 1993 to 16.8% in 2007. The median age is 20.1 years and the share of the population between 15 to 64 years is 57% (EU average: 67.2%). Life expectancy in Nepal is 59.8 years (EU average: 77.3 years).

With about 1.5 million habitants (Government of Nepal, 2002), the Kathmandu Valley is the urban center of Nepal and includes five major cities: Kathmandu (capital), Lalitpur, Bhaktapur, Kirtipur, and Thimi.

#### **3.2. Poverty and inequality**

The latest national poverty survey has been done in 2004. So the data is somewhat outdated, but still shows improvements in the reduction of poverty. In 1996, the percentage of the total population living under the poverty line of USD two (PPP) per day was 41.8% (rural poverty: 43.3% / urban poverty: 21.6%). Eight years later, nationwide poverty came down to 30.9% (rural poverty: 34.6% / urban poverty: 9.6%). Kantipuronline (2005) mentions the “Nepal Poverty Assessment Report” which has given the following four reasons for the poverty reduction: (i) increase in remittance income; (ii) increase in agricultural wage due to tightening up of local labor market; (iii) increased urbanization; and (iv) decline in the proportion of large households.

Inequality, measured by the Gini index grew rapidly from 0.38 in 1996 to 0.47 in 2004. This fact shows that not everybody is profiting from the poverty reduction in the same way. Poverty in urban areas has been reduced by more than half (or 12% points) in just eight years (from 21.6% to 9.6%), whereas poverty in the rural areas has been reduced only by about 20% or 8.7% points (WDI, 2008).

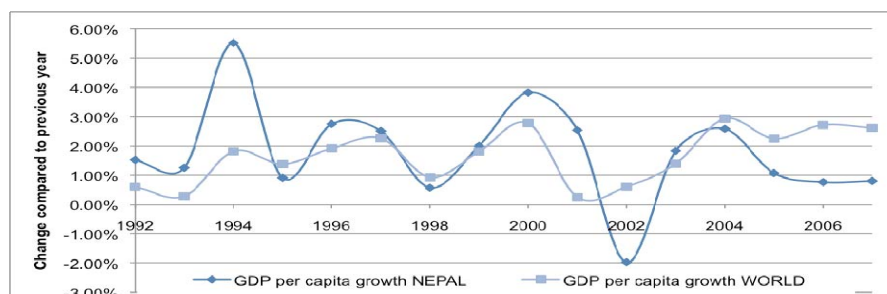
Even though we have seen that remittances can help to reduce poverty, it is likely that very poor people do not have the money to go abroad, and sometimes not even the money to travel to Kathmandu to subscribe at a private migration office.

### 3.3. *Economical overview*

WDI indicates a GDP p.c. of USD (PPP) 1'033 in 2007. In real USD, it is 377. In absolute numbers, the Nepalese GDP in USD (PPP) is 29.045bln. Compared with the rest of the world, Nepal is the 17<sup>th</sup> poorest country in the world (of the 186 countries with data on GDP p.c. reported in the WDI database – 41 countries or national entities did not report). The world average GDP p.c. is USD (PPP) 9'896, which is almost ten times higher than the Nepalese average. Unemployment (underemployment, there is no unemployment in the Western sense) rate is around 47%. The first sector (agriculture) contributes 40% to GDP, whereas the second sector (industry) contributes 20% and the third sector (services) around 40%. It is estimated that still 76% of the total population (85.2% of the female population) is working in the agricultural sector. In this sector, only 16% of all the workers receive a salary indicating that Nepal still has a high level of self-sustaining agriculture (ADB, 2003).

#### 3.3.1. GDP growth

The average annual Nepalese GDP growth rate between 1992 and 2007 was 1.78%. The world GDP grew on average 1.66% per year in the same time period. The correlation coefficient between these two growth rates is 0.3208. This indicates that Nepal is to some extent an isolated economy. There has however also been some changes regarding the correlation between the Nepalese economic growth and World GDP growth rates. For instance, between 1960 and 1992 the correlation coefficient was only 0.0486.



Graph 5: GDP per capita growth of Nepal and World Data: World Bank

### **3.4. Nepalese migration**

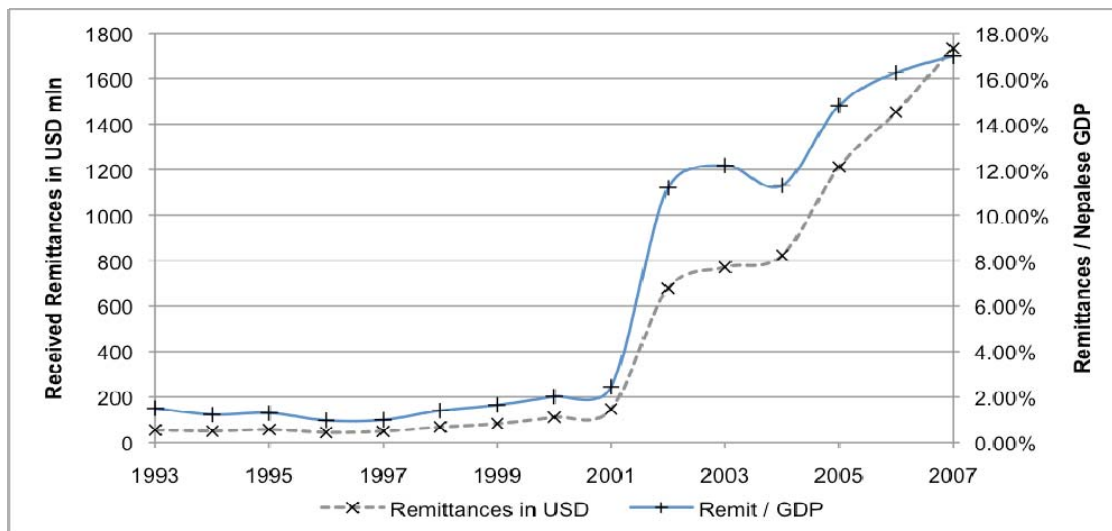
The International Labor Organization (ILO) writes in its paper “An Overview on Overseas Employment in Nepal” that Nepal has a long history of labor migration. “For around 200 years, Nepali men (and to a lesser extent women) have been leaving their homes to seek employment and living abroad. Even before the well-known recruitment to British-Indian armies, poor Nepalese fled excessive taxation, corvee labor and exploitation from state agencies”.

In 1995 2.88% of the total population lived abroad. In absolute numbers, these were 625'000 persons. Five years later this number rose to 2.94% or 718'000 persons. In 2005, these numbers were 3.02%, respectively, 819'000 people. It is, however, estimated that much more Nepalese people live abroad. Thieme (2006) suggests that only in India up to three million Nepali might live (10.6% of the Nepalese population). As the borders between Nepal and India are open, it is almost impossible to collect exact figures on this regard.

Further, ILO criticizes that policy makers and planners neglect the importance of this subject: “In the distant as well as recent past, policy makers have turned a blind eye to this aspect of the economy. And they have looked down upon those who go to do menial work in other countries.”

#### **3.4.1. Remittances to Nepal**

The Nepal Living Standard Survey (2003) states that 32% (8.992mln Nepalese) of the population receives remittances, compared to 23% in 1995. In 2007, the total amount of remittances was USD 1'734mln, which is equal to 16.7% of the Nepalese GDP or USD 192.8 per remittance receiver and year. Starting with around USD 55mln in 1993 (since then data on remittances are officially reported) the annual growth rate of remittances has been 25.9% (!) on average. As we can see in graph 6, there was a sharp rise in remittances after 2001. According to an employee from the Himalayan Bank, the huge increase is probably due to the facts that in these year the migration trend to the Gulf countries started off and that in general more and more remittances have been transferred through formal channels (banks or MTO) appearing therefore in the statistics. Other reasons could also be the ones mentioned by the World Bank (see chapter 1.4.2.), as this boost after 2000 does not only apply for Nepal, but for worldwide remittances.



Graph 6: Received remittances to Nepal from 1993 to 2007

Data: WDI

### 3.4.2. Preferred migration destination

Kumar (2003) shows that in 1981 93% of the Nepalese migrants went to India. Ten years later this number was still very high with around 89%. In the 1990s, there was however a shift from India to other countries as emigration destinations. The 2001 figures show that the share of Nepalese emigrants going to India decreased to 77% and it is very likely that these numbers have decreased since then (as you can later see in my survey results, India did not play any important role as a migration country for people from the Kathmandu valley). Finally we can also see that mainly men are going abroad. In 2001 only 10.9% of all the absentees were female.

Country	No. of migrants		Remittances per person in NRs annually			Sum of remittances in 1 mil. NRs annually		
		in %	Min	Estimate	Max	Min	Estimate	Max
India	892'312	77.28	5'000	9'000	13'000	4'461	8'030	11'600
Gulf	167'883	14.54	80'000	90'000	120'000	13'431	15'109	20'146
Western	40'796	3.53	300'000	450'000	600'000	12'239	18'358	24'477
Hong Kong	18'179	1.57	30'000	50'000	150'000	545	908	2'727
Malaysia	10'321	0.89	75'000	100'000	200'000	774	1'032	2'064
Korea	4'058	0.35	30'000	40'000	150'000	121	162	609
Other countries	21'027	1.82	15'000	20'000	50'000	315	420	1'051
<b>TOTAL</b>	<b>1'154'576</b>	<b>100.00</b>	<b>27'617</b>	<b>38'128</b>	<b>54'283</b>	<b>31'886</b>	<b>44'019</b>	<b>62'674</b>

Table 2: Remittances from foreign countries p.c. and total

Source: Kollmair et al (2006), p.9

### 3.4.3. Duration of migration

Duration of absence	Nepal			Rural			Urban		
	Total	Males	Females	Total	Males	Females	Total	Males	Females
<b>Total absentees</b>	<b>762,181</b>	<b>679,469</b>	<b>82,712</b>	<b>683,668</b>	<b>613,137</b>	<b>70,531</b>	<b>78,513</b>	<b>66,332</b>	<b>12,181</b>
<1 year	19.2	19.6	16.0	19.4	19.8	16.2	16.7	17.1	14.8
1-2 years	32.8	32.5	35.5	33.2	32.9	36.3	29.2	28.9	30.6
3-5 years	20.4	20.0	23.5	19.7	19.5	22.2	26.0	25.0	31.1
6-10 years	13.9	13.8	14.5	13.7	13.7	14.5	14.9	15.0	14.4
11-15 years	4.8	4.9	4.5	4.8	4.9	4.6	4.9	5.1	3.9
16-20 years	4.3	4.4	3.0	4.3	4.4	3.1	4.1	4.3	2.5
20+ years	4.7	4.9	3.1	4.7	4.9	3.1	4.2	4.5	2.7
<b>Age at departure</b>									
<15 years	10.4	9.4	19.2	10.9	9.7	20.5	6.9	6.0	11.6
15-24 years	53.4	53.5	52.5	53.7	53.8	52.5	50.9	50.6	52.6
25-34 years	23.9	24.4	20.4	23.5	24.0	19.4	27.7	27.9	26.6
35-44 years	8.3	8.7	5.0	8.1	8.5	4.8	10.3	11.1	6.2
44+ years	3.9	4.0	2.8	3.9	4.0	2.8	4.2	4.4	3.1

Table 3: Percentage distribution of absentees by duration

Source: Kumar (2003), p.14

Table 3 shows that almost  $\frac{3}{4}$  of all Nepalese going abroad are not staying longer than five years in the Diaspora. This clearly indicates that for Nepalese migrants it is not about moving abroad forever, but work for a few years, earn money and send it to relatives and friends as remittances.

### 3.4.4. Outlook: Remittances during worldwide economic crises

With the deepening of the worldwide economic crisis, remittance streams to Nepal are decreasing and net migration might even turn negative (The Peninsula, 2009). Many Nepalese workers went to the Gulf region and Malaysia where the ongoing recession is getting more and more severe. In the Gulf region, the construction sector (where almost all the Nepali work in) is hit badly. Projects like the run for the tallest building in the world (Nakheel Tower in Dubai, UAE) have been put on hold due to lower demand for real estate and unclear financing (Neue Zürcher Zeitung, 2009).

At the time when this paper was written, it was very unclear how severe the situation could become for the Nepalese economy in the near future.

## 4. Survey

When I started working on my master thesis in March 2008, I soon found out that data about remittances in Nepal were often outdated, scarce or in some cases even non-existent. Therefore I decided to travel to Nepal to do a survey on remittances. The survey took place between May 7 and 26, 2008. My two Nepalese assistants<sup>5</sup> and myself conducted the interviews.

### 4.1. Methodology

Due to the limited time in Nepal, we only could focus on interviewing people in the capital Kathmandu and its surrounding urban areas, known as *Kathmandu valley*. Therefore all the results are explicitly only representative for the Kathmandu Valley and not for Nepal as a whole.

The goal was to interview 300 people to get an acceptable confidence interval of 5.66% at a confidence level of 95%<sup>6</sup>.

The written questionnaire was both in English and Nepali language (Devanagari writing – see graph 9). However, we always read the questions to the interviewed person, as with a literacy rate of around 50% (WDI, 2008) it must be made sure that people fully understand the questions. It is important to mention that we only interviewed people that actually receive remittances, so in total we asked around 1'000 people and every third or fourth answered, “Yes, I receive remittances” and was willing to give us ten minutes of his or her time. In order to avoid biases we interviewed the participants in 14 different areas of the Kathmandu valley<sup>7</sup>, most of the time asking people on the streets and sometimes in stores. Through some valuable personal connections of my assistants I was introduced to the management of the *Nepal Investment Bank* and the *Himalayan Bank*. They were also very interested in my survey results and offered help. So I could leave about 30 questionnaires at their offices and the bank employees asked their clients the questions on the survey.

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<sup>5</sup> Srildeep Devkota and Prajwal Raj Gyawali, both are Nepalese students

<sup>6</sup> Calculated with “Sample Size Calculator” provided by [www.surveystystem.com](http://www.surveystystem.com)

<sup>7</sup> Interview locations: Khasi Bazaar, Dillibazaar, Baghbazaar, Baneshwor, Tin-Kume, Patan, Durbar Square, Mangalbazaar, Lagankhel, Boudha, Chabahill, Durbar Margh, Maharjgunj, Lazimpat



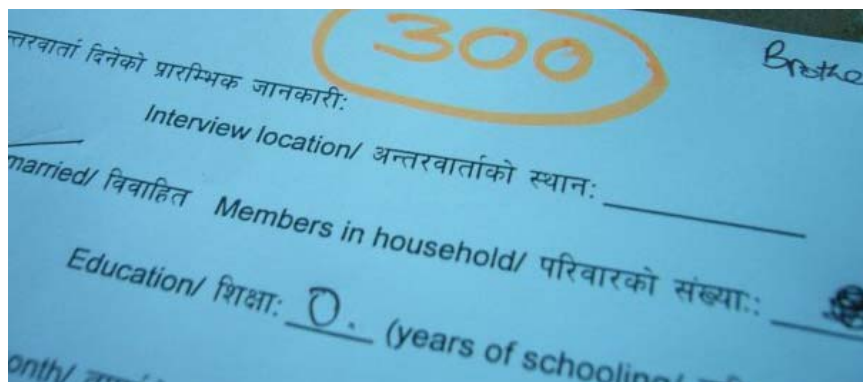
The first questions were more of general nature, such as age or household size (descriptive statistics). Afterwards we asked more specific questions on their income from remittances.



Graph 7: Interviewing some workers outside their small factory



Graph 8: Interviewing remittance receiving policemen



अन्तरवार्ता दिनेको प्रारम्भिक जानकारी:  
Interview location/ अन्तरवार्ताको स्थान: \_\_\_\_\_  
married/ विवाहित Members in household/ परिवारको संख्या: \_\_\_\_\_  
Education/ शिक्षा: 0 (years of schooling) \_\_\_\_\_  
Brother

Graph 9: 300<sup>th</sup> questionnaire form

## 4.2. General Results

### 4.2.1. Descriptive statistics

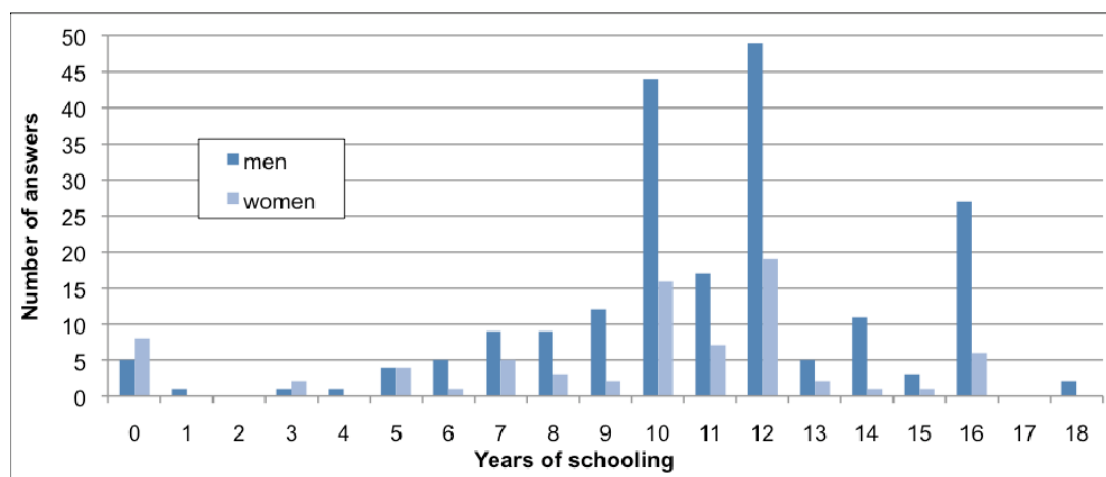
**Age:** The median age of the interviewed person is 29 years, compared to the national median of 20.1 years (World Bank, 2007).

**Sex:** 72.1% of the interviewed persons were male, 27.9% female. This disproportion probably has to do with the fact that women were often a bit shy to answer to our questions (three men and one of them European<sup>8</sup>), nonetheless it should not change the quality of the answers, as the questions were always referred to the whole household (except level of education and age).

**Household size:** The average household size of the remittance receivers is 5.4. According to the National Census 2001 (Nepalese Government, 2002) the Nepalese average household size is 5.44, whereas Kollmair et al (2006) state it is 5.27. This shows that the size of remittance receiving households does hardly differ from the national average household size.

### 4.2.2. Education

The survey results show an average schooling time of 10.7 years of the remittance recipient with an average schooling years for women of 9.5 years and 11.0 years for men.



Graph 10: Histogram of years of schooling divided by sexes

N<sup>o</sup>: 283

<sup>8</sup> This is the interpretation of FMO's Environmental Specialist Hans-Stefan Michelberger who also did some research projects in developing countries and found himself in similar situations with women not willing to answer to his questions.

<sup>9</sup> N indicates the number of answers, not the number of interviewed people

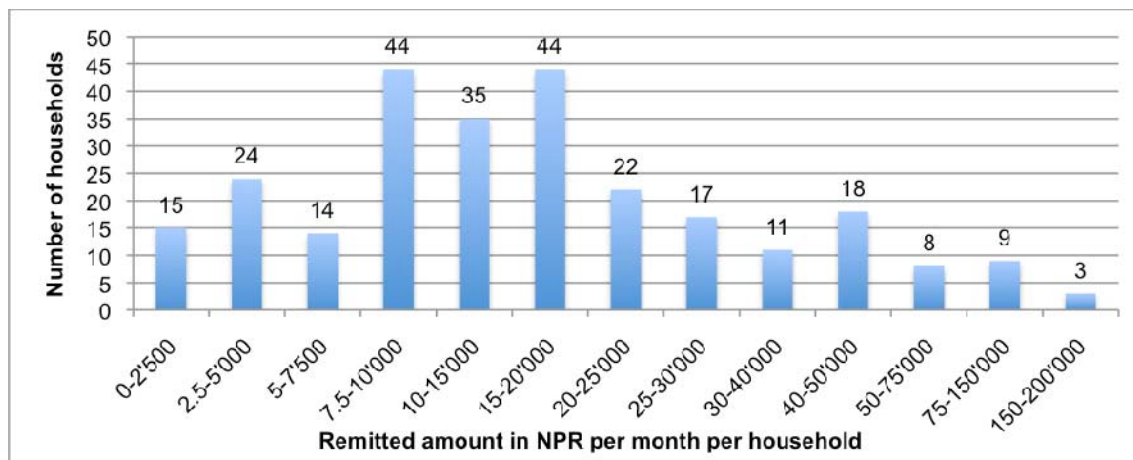
Barro and Jong-Wha (2000) state that the Nepalese average duration of school enrollment is 2.4 years. For men, the national average is 3.4 years of schooling and for women 1.5 years. One important difference between the survey results and the findings of Barro and Jong-Wha is that I only focused on the Kathmandu Valley, where education is assumed to be higher than in the countryside. As I could not find any data about average schooling in the Kathmandu Valley, it is difficult to say whether the interviewed people have higher education because they receive remittances or because they are living in an urban area, where the level of education is generally higher.

### **4.2.3. Received remittances per household**

The survey shows average remittances per household and month are NPR 23'355 (USD 336<sup>10</sup>). If we look at the median, the figure is NPR 15'000 (USD 216). If we take the average household size of 5.4, we get a monthly average per remittance receiving person of USD 62.22, or USD 40.0 in the median. As mentioned, average remittances per receiver are USD 192.8 per annum, or USD 16.07 monthly. We see that the national average is two and a half times smaller as the median from the Kathmandu valley and four times smaller than the Kathmandu valley average. Therefore we can state that people in the Kathmandu valley tend to receive much more remittances than people in rural areas. As we later see in the survey results, people from the Kathmandu valley migrate mainly overseas, where earnings (and therefore remittances) are higher; people from the rural areas tend to move to India. This difference between official figures and the survey results could also be an indicator that the official figures are too low. As mentioned, World Bank estimates that total worldwide remittances could be 50% higher than official figures indicate.

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<sup>10</sup> Exchange rate from May, 28 2008: 1 USD = 69.46 NPR / Source: [www.fx-rates.com](http://www.fx-rates.com)



Graph 11: Histogram of est. remitted amount household per month

N:264

Graph 11 shows the distribution of the received amounts of remittances. In a few cases remittances are very high (over 150'000 NPR) or extremely low (below 2'500 NPR). Nonetheless we can state that 85% of all the amounts are below the level of NPR 37'472. Test on normal distribution: The Jarque-Bera test on normality (taking logs of the remitted amounts) shows a value of 64.0398 with a  $p$ -value of 0.00, thus the null hypothesis on non-normality cannot be rejected, which indicates that the remitted amounts are normally distributed.

**Other findings:** According to Kollmair et al (2006) the average amount received per year and household is NPR 38'128 (NPR 3'177 per month), whereas the survey results indicate an average of NPR 23'355 (median: 15'000) per month. At a first sight this seems to be a huge gap.

However two factors can partly explain that: (i) The remittance sending countries differ strongly (and therefore the amounts being sent). Kollmair et al state that average remittances from the Western countries (incl. USA) are NPR 450'000 per year, which is NPR 37'500 per month, compared to the survey average of NPR 32'736 from the USA (as a proxy for the Western countries). The Gulf countries have according to Kollmair et al an average amount of NPR 90'000 per annum, which is NPR 7'500 per month. By contrast, my results show an average of constantly higher than NPR 15'000 among the Gulf states. This leads to my second point, which is the high annual growth rate of remittances of around 25%. If we now calculate the data of Kollmair et al at a 2008 level (2 years growth of 25%) the NPR 7'500 would be NPR 11'718, which is still far below the average of e.g. Qatar of NPR 15'692, but much closer than the previous NPR 7'500 of 2006.

Kollmair et al also write: “the total sum of remittances from Western and Gulf countries has a share of together 75%. Although the majority of migrants (77%) go to India, they send the lowest share of remittances (less than 20%).”

#### 4.2.4. Countries of origin

**Survey findings:** The top ten countries where the remittances are sent from, are the following (in parenthesis the percentages): 1. USA (22.4%), 2. UAE (16.7%), 3. Qatar (14.0%), 4. Malaysia (11.8%), 5. UK (7.5%), 6. Saudi Arabia (6.6%), 7. Australia (4.4%), 8. Kuwait (3.1%), 9. Germany (3.1%), 10. Japan (2.6%).

**Other findings:** The differences between the country of origin of Kollmair et al (see chapter 3.4.2) and my own survey seem to be very big: they state 77% go to India, 15% to the Middle East and 4% to Western countries. As Kollmair et al did a nationwide research in Nepal, the big share of India is explainable, because most Nepalese people living in Southern provinces migrate to India. In the richer Kathmandu Valley people can more often afford to migrate overseas.

#### 4.2.5. Transfer channel of remittances

In chapter 1.4 different methods of transferring remittances were presented. To see how money is sent to Nepal, we asked this question: “*Through which channel do you mainly receive the remittances?*”

##### Result:

Channel	% of all transfers	Average remit	Median remit
MTO	46.5% (147*)	NPR 20'258	NPR 15'000
Bank	41.5% (131*)	NPR 26'032	NPR 16'667
Hand-carry	6.3% (20*)	NPR 37296	NPR 23'214
Hundi / Hawala	5.7% (18*)	NPR 29'190	NPR 16'667

Table 4: Transfer channels

\*N: 316

Data: Own Survey

Table 4 shows that a vast majority of 88% of all transfers are formal ones. table 5 shows the transfer channels per country. We can see that from developed countries almost all the remittances are transferred through formal channels (e.g. USA 91.9%), whereas in a country like Malaysia that is less developed compared to the USA, only 75.7% of all the transfers are done through a bank or a MTO.

**Result:**

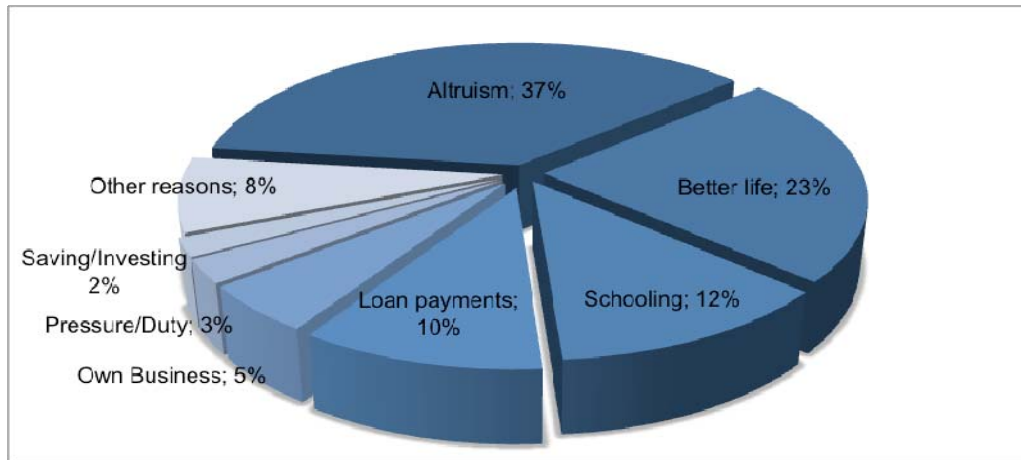
Country	%	Average Remit. Household/month	MTO	Bank	Hand-carry	Hundi
1. USA	22.4%	NPR 32'736	50.0%	41.9%	4.8%	3.2%
2. UAE	16.7%	NPR 22'764	45.1%	49.0%	3.9%	1.9%
3. Qatar	14.0%	NPR 15'692	28.6%	61.9%	4.8%	4.8%
4. Malaysia	11.8%	NPR 17'016	59.5%	16.2%	13.5%	10.8%
5. S. Arabia	7.5%	NPR 15'482	**	**	**	**
6. UK	6.6%	NPR 28'692	**	**	**	**
7. Australia	4.4%	NPR 23'576	**	**	**	**

Table 5: Top sending areas N: 295 Data: Own Survey

\*\* For the results of Malaysia I calculated a confidence interval of 16.8, at a confidence level of 95%, as Saudi Arabia, UK and Australia have even wider confidence intervals, it does not make sense to show them, as these results are statistically not significant anymore.

**4.3. Reasons for sending remittances**

Chami, Fullenkamp and Jahjah (2005) state that remittances are sent due to altruism, to see whether this also holds for the Kathmandu Valley, we asked: “What do you think are the main reasons for the sender to send you remittances?” It would be interesting to compare these answers with the ones the relatives and friends abroad would give. Unfortunately this is nearly impossible, as these senders are spread all over the world.

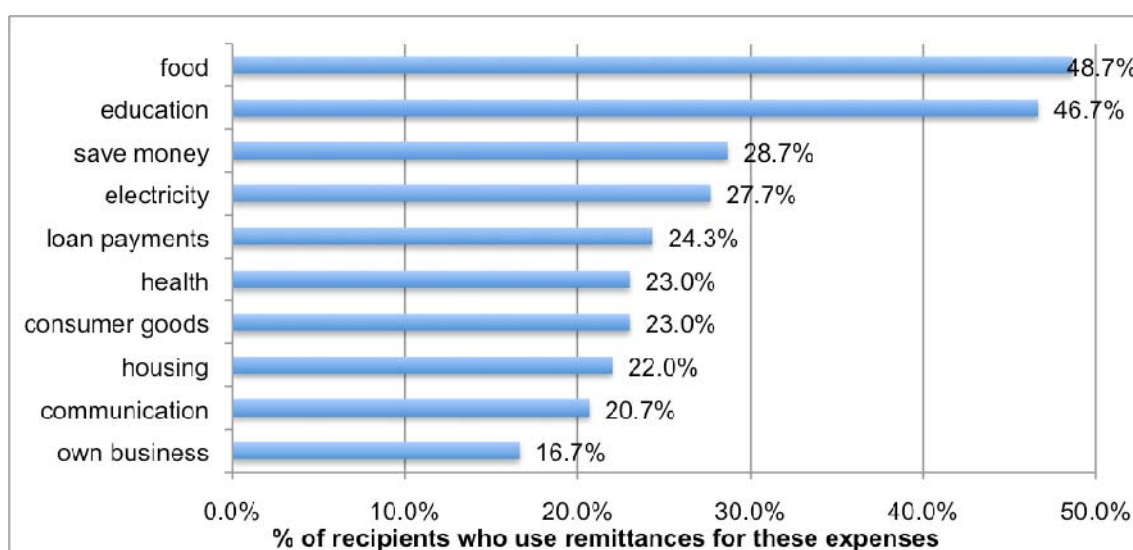


Graph 12: Reasons for sending remittances N:349 Data: Own Survey

Graph 12 shows that 60% of the remittances receiving people believe that they receive the money due to pure altruism (37%) or because the sender wants to have (together with the receivers) a better life in the future (23%). Worth mentioning is also the fact that 10% of the senders are abroad to pay back a loan, which they earlier received back in Nepal.

#### 4.4. How remittances are invested

Chapter 1.7 presented the top-ten list by Deshingkar and Grimm of the expenditures financed with received remittances. To see if these expenditures from chapter 1.7 also apply for the Kathmandu Valley, we asked this question: “What do you use the remittances for?” It would have been too elaborate to ask every interviewed person to indicate how much exactly he or she spends on each expense. This for example means that 48.7% of all receivers use remittances to buy food, but it does not mean that they use 48.7% of their remittances for food. Respondents could give more than one answer. The results are presented in graph 13:



Graph 13: How remittances are invested

N:904

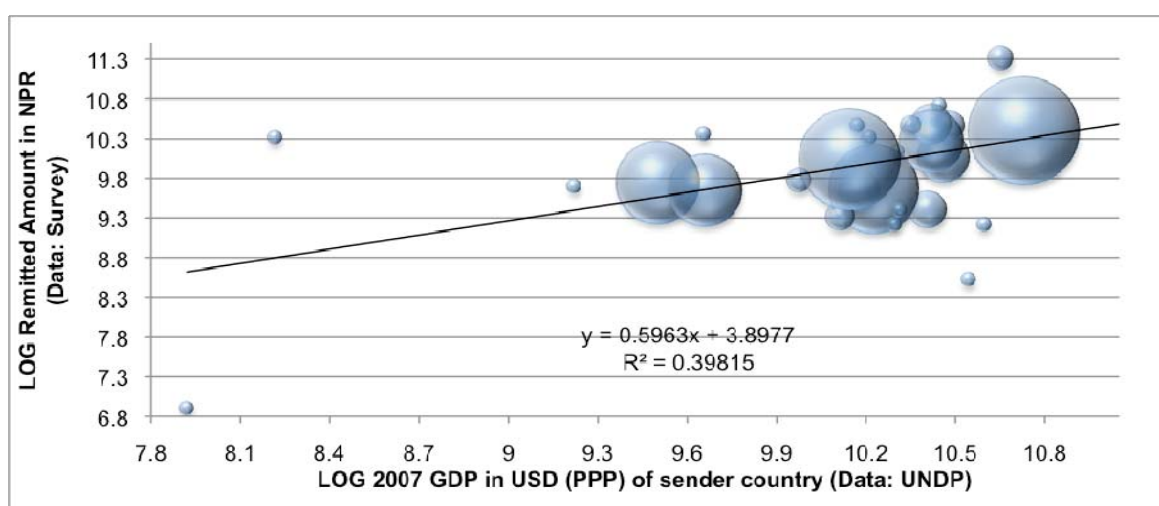
Data: Own Survey

Comparing the above ten expenditures with the ten that Deshingkar and Grimm suggest (see chapter 1.7) we find that most of the points match with the survey results: (i) Food, (ii) Education (and Health Care, Deshingkar and Grimm put these two together, as they consider it is “an improvement in the livelihood prospects of future generations”), (iii) Consumer goods, (iv) Housing, (v) Loan payments, (vi) Savings, (vii) Running a business. The three remaining expenses mentioned by Deshingkar and Grimm are: (i) Land /livestock investments, (ii) Investments in socio-cultural life (weddings, funerals, etc.), (iii) Agricultural investments, whereas in my survey the other points are: (a) telecommunication and (b) electricity. These differences can be explained by the fact that my survey only covers urban areas, therefore investments in agriculture seem to be very

unlikely. On the other hand, telecommunication in developing countries is increasingly becoming important.

#### 4.5. Relationship between GDP and remitted amounts

To find out whether there is a relationship between the GDP of a country and the remitted amount from that country, I applied a single regression of the (log) GDP in USD (PPP) p.c. on the (log) average amount Nepalese people receive remittances from this country. Each bubble represents a country, e.g. the biggest bubble (at the very right) represents USA. The bigger the bubble, the more people send money from this country, so the regression is weighted. Otherwise a single answer from a country could bias the whole regression.



Graph 14: Relationship between GDP per capita and sent remittances      Data GDP: UNDP  
Remittances Data: Own Survey      N:295

We see an elasticity of 0.596 of the (log) GDP p.c. of the sender country to the (log) average remitted amount from the same country. The  $p$ -value is 0.000, and therefore statistical significance is given at the 1%-level.  $R^2$  is with 0.398 not very high (also because there is only one explanatory variable included), but there is still a clear positive relationship visible.

As mentioned in chapter 3.4, around 3% of the Nepalese population lives abroad and sends remittances equal to 16.7% of the total Nepalese GDP. Therefore we can state that the remitted amounts p.c. to Nepal are 5.56 (0.167 / 0.03) times higher than the Nepalese GDP p.c. If we divide World GDP p.c. in USD (PPP) (I



assume that this is equal to the average income of a Nepalese living abroad<sup>11)</sup> by Nepalese GDP p.c. in USD (PPP), the ratio is 9.58.

Comparing this ratio to the remittances per sender of 5.56, we could state that in average a remittance sender transfers 58.04% (5.56 / 9.58) of his or her income to Nepal.

Looking at the elasticity of 0.596 between GDP p.c. of the sender country to the remitted amount, and the above calculated sending rate of 58.04%, we see that these two results are very close to each other, however do not exactly state the same, as one is a fixed proportion and the other one an elasticity.

#### 4.6. Poverty reduction

Chapter 2.1 presented the paper by Adams and Page (2005), which showed that remittances help to reduce poverty. Therefore we asked following question:

*“Would you feel poor without the remittances you receive?”*

Instead of giving a quantitative measure of poverty, the question aims at the perception of people their status of being rich or poor.

##### Result:

Answer	Percentage	Remit. Average	Remit. Median
No	52%	NPR 25'473	NPR 16'667
Yes	37%	NPR 22'665	NPR 15'000
Still poor	2%	NPR 7'500	NPR 5'000
Maybe / Don't know	9%	NPR 20'487	NPR 15'000
All answers	100%	NPR 23'355	NPR 15'000

Table 6: “Poor without remittances?”

N: 295

Here we see a confirmation of the results in chapter 2.1. Interestingly, we can also see a relation between the answers and the remitted amount. Persons that answered: “No, I wouldn't feel poor” receive a higher amount (NPR 25'473) than persons who answered “Yes, I would feel poor without remittances” (NPR 22'665). This shows that it is very likely that the 52% who said “No” probably belong to the upper class in the income distribution, as they are not depending much on remittances.

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<sup>11</sup> This is a strong assumption, but as there is no data available on the average income of Nepalese abroad, World GDP p.c. seems to be a plausible proxy, as Nepalese migrants are also spread all over the globe.

#### 4.7. *Are remittances countercyclical?*

Chapter 2.2 referred to a paper by Sayan (2006) that examines if remittances are countercyclical to GDP growth in the receiver country. The results were very mixed. To see how this is in Nepal on a micro level, we asked following question: „How much did you receive during periods of political instability in the time of civil war<sup>12</sup>?“

The result is that 63% answered they receive the same amount, 19% stated “maybe / I don’t know”. 12% stated that they received less and only 6% answered that they received more than usual. Asking those who answered “less”, many replied that it was sometimes impossible to collect the money from a MTO or a bank due to road blockades or sometimes even due to curfews.

These answers do not support the theory of countercyclical behavior.

#### 4.8. *Less economic activities due to remittances*

Chami, Fullenkamp and Jahjah (2005) stated that remittances lead to less economic activities by the receivers (see chapter 2.3). I also assume that people who receive higher amounts of remittances are more likely to work harder if they did not receive remittances. We asked the following question: “Would you or other family members work more without the remittances?” I formulated the question in a way that people felt comfortable answering “yes”. If I had asked: “Do you work less because of the remittances?” people might have tended to say “no”, as they don’t want to be perceived as being lazy.

##### **Result:**

Answer	Percentage	Remit. Average	Remit. Median
Yes	46%	NPR 21’912	NPR 15’000
No	40%	NPR 26’615	NPR 16’667
Maybe / Don’t know	14%	NPR 19’757	NPR 15’000
All answers	100%	NPR 23’355	NPR 15’000

Table 7: “Work more without remittances?”

N: 295

We see that Chami, Fullenkamp and Jahjah’s theory seems to be confirmed in our survey, as almost half of the interviewed remittance recipients admit that no remittances would lead to a increasing economic activity of theirs. The

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<sup>12</sup> Between 1996 and 2006 Nepal was suffering a civil war between Maoists and the Nepalese Army. The country remained unstable due to the highly unpopular king, who left office in May 2008. On May 28<sup>th</sup> 2008, Nepal changed from a monarchy into a democratic republic.

interesting result here is that people who answered “Yes” tend to receive fewer remittances, compared to those answering “No”. This might be a sign that high-remittance-receiver are wealthy enough to maintain their living standard even with lower remittances.

#### **4.9. Taxes on remittances**

I wanted to find out if there are any remittance receivers that would agree on a tax on remittances. Scoring 2.7 out of 10 points, Nepal is ranked 121<sup>st</sup> of 180 countries in the Corruption Perceptions Index (Transparency International, 2008), therefore my hypothesis was that not many interviewed people would approve such an idea. we asked the following question: “*Are you in favor of imposing a tax on remittances, so that non-remittances receivers can also partly profit from remittances?*”

**Result:**

<b>Answer</b>	<b>Percentage</b>	<b>Remit. Average</b>	<b>Remit. Median</b>	<b>School. Average</b>
Yes	46%	NPR 24’233	NPR 16’467	11.1 years
No	42%	NPR 23’530	NPR 15’000	10.1 years
Don’t know	12%	NPR 19’272	NPR 14’833	9.5 years
All answers	100%	NPR 23’355	NPR 15’000	10.5 years

Table 8: “In favor of taxing remittances?” Data: Own Survey N: 295

Very surprisingly 46% of the remittances receivers are in favor of imposing a tax on remittances, so that other people can benefit from this money flow. We see that people in favor of such a tax receive on average more remittances than its opponents. The second finding is that people in favor of a tax on remittances have on average one year more education and 1.5 years more than people without an opinion about this question. The high number of the “tax-supporters” can partly be explained by the generally altruistic attitude of the Nepali people.

Many respondents who answered “No” said that the introduction of a tax on remittances does not make sense for two reasons. The money would disappear somewhere and people invest the money better than the government would.

#### **4.10. Putting remittances partly into an investment fund**

One idea how remittances could have a higher impact on the Nepalese economy, is the creation of an investment fund, where remittance recipients can invest some of their money. To see if the recipients are interested in this, we asked the following question: “*Would you put a part of your remittances into a fund, where*

*you do not have access for a couple of months or years, but at the end receive a higher amount?”* Not a lot of people in Nepal know what an investment fund is, so we always explained it (see the question) in a way that they understand it better.

**Result:**

Answer	Percentage	Remit. Average	Remit. Median	School. Average
Yes	48%	NPR 28'457	NPR 20'000	11.0 years
No	42%	NPR 18'187	NPR 15'000	9.8 years
Don't know	10%	NPR 20'087	NPR 15'705	11.0 years
All answers	100%	NPR 23'355	NPR 15'000	10.5 years

Table 9: “Putting remittances in an investment fund?” N: 295

The results clearly show that the 48% willing to invest, receive almost NPR 10'000 more remittances per month than the 42% of the interviewed people who are not willing to invest. Further the education level of these 42% is also slightly lower.

**4.11. Running an own business with the help of remittances**

Chapter 4.4 showed the top-10-list of investments with remitted money. 16.7% answered they use the remittances to run their own business. Further we wanted to find out, whether this is related to the amount they receive and what kind of business they operate. So one question was: *“Do you run an own business with the remittances you receive? If yes, what kind of business? If no: Imagine you received more remittances, would you open an own business?”*

**Result:**

Answer	Percentage	Remit. Average	Remit. Median	School. Average
Yes	19.5%	NPR 28'860	NPR 20'000	11.9 years
No, but..	53.2%	NPR 22'662	NPR 15'000	10.2 years
No	27.3%	NPR 21'189	NPR 16'667	9.9 years
All answers	100%	NPR 23'355	NPR 15'000	10.5 years

Table 10: “Running on business” N: 293

In table 10 we see that business-owners receive on average more remittances and also have a slightly higher educational level. Of those who answered that they use the remittances to run their own business, 58.6% answered that they run a shop, where they e.g. sell fruits, clothes, electronics, furniture, kitchenware, sweets or painting tools. Some of the mentioned non-shop-businesses were: advertisement agency, bus services, photo studio, restaurant, wall painting, travel agency, watch- and mobile phone repair center and a disco.

## 5. Growth and remittances models

Growth models can help to explain the effects of remittances on economic growth over time. One of the most popular growth model in this regard is the Solow model (Solow, 1956). Many researchers use this model in order to better explain and calculate the impacts of remittances on economic growth. In this chapter I show how the Solow model works, later an example of a paper by Garcia-Fuentes and Kennedy (2009) is presented, with the purpose of showing how the Solow model can be modified. In the third part, an own model is presented, which is also based on the Solow model.

### 5.1. *The general Solow growth model*

The main idea of the Solow model, is to explain how economic output is created and can develop over time. In THE<sup>13</sup> general Solow model, the combination of labor, capital and technology generates the total economic output.

*Technology* is the labor productivity variable. It indicates how much a workforce unit can produce with the help of any kind of technology. *Capital* is the physical capital stock, such as machines. *Labor* is the total workforce, in THE model it is assumed that everybody is employed. In their book, Sorensen and Whitta-Jacobsen (2005) present the following production function, which is the fundamental equation of THE Solow model:

$$Y_t = K_t^\alpha (A_t L_t)^{1-\alpha} \quad 0 < \alpha < 1 \quad (\text{Eq. 3})$$

$Y$  is the total (domestic) output of an economy, which is equal to GDP. We can see that the output  $Y$  depends on capital  $K$ , technology  $A$  and labor  $L$ .  $\alpha$  is the capital to labor ratio, where  $t$  are time indices.

To find out GDP p.c. ( $y_t \equiv \frac{Y_t}{L_t}$ ), we simply divide equation 3 by  $L$ :

$$\frac{Y_t}{L_t} = \frac{K_t^\alpha (A_t L_t)^{1-\alpha}}{L_t} \quad (\text{Eq. 4})$$

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<sup>13</sup> In order to avoid confusion between the general Solow model and the models presented later, it is always mentioned in capital letter when mentioning THE general Solow model.

As capital p.c.  $k$  is defined as follows:  $k_t \equiv \frac{K_t}{L_t}$ , we get the GDP p.c. equation:

$$y_t = k_t^\alpha A_t^{1-\alpha} \quad (\text{Eq. 5})$$

According to equation 5 we see that higher economic growth p.c. can be generated by more capital p.c. or by better technology.

But how are the three GDP-variables  $A$ ,  $K$  and  $L$  changing over time? Sorensen and Whitta-Jacobsen give the following equations to show these changes:

**Technology:** Equation 6 shows that  $A$  is increasing over time with the growth rate  $g$ . This rate is exogenous, thus assuming that technology is getting better every period.

$$A_{t+1} = (1 + g)A_t \quad g > -1 \quad (\text{Eq. 6})$$

**Capital:** Equation 7 is the so called “capital accumulation equation”. On the left side of the equation we see the change in capital from period  $t$  to period  $t+1$ . This change is the difference between the savings  $S$  and the depreciated amount of capital  $K$  by depreciation rate  $\delta$  (both in period  $t$ ).

$$K_{t+1} - K_t = S_t - \delta K_t \quad (\text{Eq. 7})$$

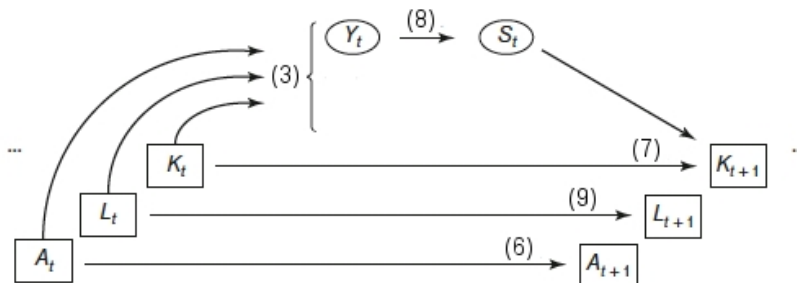
**Savings:** Equation 8 shows that savings are a share of total economic output  $Y$ . This share is  $s$  and remains constant over time.

$$S_t = sY_t \quad (\text{Eq. 8})$$

**Labor:** Labor can be compared to the population, which also increases steadily over time. This growth rate is indicated by  $n$ .

$$L_{t+1} = (1 + n)L_t \quad (\text{Eq. 9})$$

Graph 15 shows the dynamic of THE general Solow model, the numbers in brackets are the corresponding equation:



Graph 15: The dynamic of the general Solow model

Source: Sorensen and Whitta-Jacobsen (2005) p. 106

Note: Predetermined endogenous variables in squares, endogenous variables than can adjust during the period in circles.

## 5.2. Growth model including remittances

Garcia-Fuentes and Kennedy (2009) explain in the article “Remittances and Economic Growth in Latin America and the Caribbean: The impact of Human Capital Development” the effects of remittances on economic growth.

The authors show the growth impact of remittances through an increasing human capital  $H$ . This output factor is also added to the their model and the following factor productivity equation, that is similar to the previous eq. 3.

$$Y = AK^\alpha H^\beta L^{1-\alpha-\beta} \quad (\text{Eq. 10})$$

Hence, the per capita output is denoted as follows:

$$y = Ak^\alpha h^\beta \quad (\text{Eq. 11})$$

whereas  $h \equiv \frac{H}{L}$

The Solow model allows “growth accounting”, thus one can see what contributed to GDP growth. Therefore the authors take the logs of equation 14, resulting in:

$$\Delta \ln(y_{it}) = \Delta(A_{it}) + \alpha \Delta \ln(k_{it}) + \beta \Delta \ln(h_{it}) \quad (\text{Eq. 12})$$

$\Delta$  indicates changes over time. In the next step the authors show how remittances influence GDP growth:

$$\Delta \ln(A_{it}) = \gamma_{A0} + \gamma_{A1} \ln(h_{it}) + \gamma_{A2} (\ln h_{it}) * (\ln RE_{it}) \quad (\text{Eq. 13})$$

$h_{it}$  is the ratio of human capital to labor in country  $i$  and directly affects growth of  $A_{it}$ .  $RE_{it}$  is remittances as share of GDP in country  $i$  and indirectly affects the growth of  $A_{it}$ .

After equation 13 is substituted into equation 12, Garcia-Fuentes and Kennedy added the following three control variables to the equation: *investment*, *government* and *inflation*.

The authors apply equation 12 in a multi-regression country panel,  $i$  indicates the country and  $t$  the year.

They argue that remittances are partly invested in education (which is also supported by the survey findings in chapter 4), therefore human capital will increase, which leads to an increase in GDP.

After running the country panel regression with 70 observations of 14 Latin American and the Caribbean countries between 1975 and 2000 the result is that “an increase in remittances as a share of GDP of 130% (...) would lead, on average, to a 0.2% increase in the growth rate of output per worker”.

### **5.3. *Own remittances model***

In the previous two subchapters the Solow growth model and a paper using the Solow model were presented. The general Solow model is built in such a way, that one can easily adapt or expand it (as Garcia-Fuentes and Kennedy), which I also do in this model.

Differently to Garcia-Fuentes and Kennedy this model does not look at a country panel, but only focuses on Nepal and does not run any regressions. The other difference is that this model does not try to explain how remittances affected economic growth in the past, but gives a prediction for the years 2008 to 2030, based on historical data.

Further, the aim of this subchapter is to show how economic growth, poverty and total consumption develop over time.

There is also a methodical difference between this model and the one of Garcia-Fuentes and Kennedy: They include the impacts of remittances through an increase in human capital, whereas in this model remittances only increase the capital stock  $K$  (and influence GDP growth) and migration influences labor  $L$ .

#### **5.3.1. Methodology**

As mentioned, this remittances model is based on THE Solow growth model, which states that economic output is generated by labor, capital and technology. Remittances are added to the model in a form such that remittances, which are not used for consumption, help to increase the capital stock. I also added poverty and the World GDP growth as factors that influence migration, which in turn influences the labor stock. The model is applied for the Nepalese economy, so all the ratios and elasticities are based on findings I already presented in the previous chapters or are explained in the appendix. The model was simulated in



Microsoft Excel, predicting each year from 2008 to 2030 the Nepalese GDP growth rates, poverty levels, migration and remittances.

As this model includes remittances, we also have to look at the gross national product (GNP), which in contrast to the GDP does include remittances.

### 5.3.2. Gross National Product

Sorensen and Whitta-Jacobsen (2005) define GNP as follows:  $GNP \equiv Y_t + \bar{r}F_t$ , whereas GDP is defined by:  $Y_t \equiv C_t^{p+g} + I_t + X_t - M_t$ .

For GNP we can therefore write following equation:

$$GNP_t = C_t^{p+g} + I_t + X_t - M_t + rF \quad (\text{Eq. 14})$$

$C^{p+g}$  is the total consumption, both by private households ( $p$ ) and the government ( $g$ ).  $I$  are investments (which are equal to savings  $S$ ),  $X$  are exports,  $M$  imports and  $rF$  is the net asset income from abroad, whereas  $r$  is the return on abroad equities in percentage and  $F$  are the total equities abroad. In this model we ignore imports and exports and, as Nepal has basically no equity abroad, we take remittances  $R$ , instead of  $rF$ .

### 5.3.3. Gross National Income

In order not to confuse the above GNP-equation with the total available income of Nepal, the term is now called: Gross National Income (GNI) and defined as follows:  $GNI_t \equiv Y_t + R_t$ , thus:

$$Y_t + R_t = C_t^{p+g} + S_t \quad (\text{Eq. 15})$$

To see how remittances impact GDP growth of  $Y$ , we go back to THE Solow growth model:

### 5.3.4. Solow growth model

$$Y_t = K_t^\alpha (A_t L_t)^{1-\alpha} \quad 0 < \alpha < 1 \quad (\text{Eq. 3})$$

This is again the main equation of THE Solow model (eq. 3). Compared to THE general model, some adjustments have been made to this model, which are presented in the following equations:

### 5.3.5. Technology

$$A_t = A_{t-1} * (1 + \phi + \sigma_t) \quad (\text{Eq. 16})$$

Equation 16 is comparable to equation 6 in THE Solow model, the only difference is the additional cyclical factor  $\sigma$ .  $A_t$  indicates the level of productivity at time  $t$ .  $\phi$  is the symbol for exogenous growth of productivity, whereas  $\sigma$  is a variable for random cyclical factors, affecting the labor productivity level. This factor is necessary to give “impulses” to the model, which for example cause indirectly cause migration. The average value of  $\bar{\sigma}_t$  is zero, and therefore does not increase  $A$  additionally.

### 5.3.6. Capital

$$K_t = (K_{t-1} * (1 - \delta)) + S_{t-1} \quad (\text{Eq. 17})$$

Equation 17 is equal to equation 7 of THE Solow model, only transformed in a way that capital  $K$  at time  $t$  is immediately applicable.

Capital  $K_t$  is the result of the previous capital stock  $K_{t-1}$ , deducted by the depreciation rate  $\delta$  (stays constant over time) plus adding savings  $S_{t-1}$ .

### 5.3.7. Savings

Equation 8 of THE Solow model states that  $S_t = sY_t$  as remittances are also included in this model.  $\theta$  is the saving rate, which is equal to  $s$  in equation 8 of THE Solow model. the saving equation looks as follows:

$$S_t = \theta * (Y_t + R_t) \quad (\text{Eq. 18})$$

### 5.3.8. Consumption

As we have seen before  $Y_t + R_t = C_t^{p+g} + S_t$  and  $S_t = \theta * (Y_t + R_t)$ , therefore the consumption equation looks as follows:

$$C_t^{p+g} = (1 - \theta) * (Y_t + R_t) \quad (\text{Eq. 19})$$

We see that the savings  $S$  are the result of the total domestic output  $Y$  plus remittances  $R$  minus the consumption by the government ( $C^g$ ) and private households ( $C^p$ ).

### 5.3.9. Labor

$$L_t = L_{t-1} * (1 + g + \mu_{t-1}) \quad (\text{Eq. 20})$$

This equation is similar to the “labor-equation” (eq. 9) of THE Solow model, the only difference is the additional net migration  $\mu$ .

Domestic population (or labor force)  $L$  at time  $t$  depends on the population size of the previous period and grows with the population growth rate  $g$  and is being reduced or increased (depending if the net migration is positive or negative) by the percentage of the population moving abroad or returning home. The net migration equation (eq. 23) shows how  $\mu$  changes over time.

### 5.3.10. Remittances

The next factor in the model are remittances  $R$ . As seen, remittances are included in the saving equation (eq. 18), the consumption equation (eq. 19), and further in the poverty equation (eq. 24). To see how remittances are changing, following equation is applied:

$$R_t = \beta_5 * gdp_t^{World} * LF_t \quad (\text{Eq. 21})$$

This equation is also used by Brambila-Macias (2008) , where the author states that remittances are a fixed portion (here:  $\beta_5$ ) of the migrants income (here:  $gdp_t^{World}$ ) times the number of people abroad (here:  $LF$ ). As it is nearly impossible to calculate the average income of Nepalese people abroad, we take the World GDP p.c. ( $gdp_t^{World}$ ) as a proxy for the income of each sender.

### 5.3.11. Population abroad

$$LF_t = (c + \mu_t) * L_t \quad (\text{Eq. 22})$$

The absolute number of Nepalese abroad is  $LF$ , which is the result of multiplying the constant  $c$  added by the net migration rate  $\mu_t$  by the (domestic) population  $L_t$ .

### 5.3.12. Net migration

$$\mu_t = \frac{LF_{t-1}}{L_{t-1}} * (\beta_1 * \log\left(\frac{\psi_t}{\psi_{t-1}}\right) + \beta_2 * (\rho_t - \rho_{t-1})) \quad (\text{Eq. 23})$$

This equation is a combination of the one of Arelano and Bover (1995), which explains the effects of the ratio of GDP between OECD and developing countries (here:  $\psi$ ) on migration and the one of Hatton and Williamson (2003), which explains the effects of poverty (here:  $\rho$ ) on migration.

Net migration  $\mu$  is the percentage of the domestic population that migrates in a specific period. It depends on the ratio of foreign workers  $LF$  to total domestic population  $L$  (both in absolute numbers). Net migration changes with elasticity  $\beta_1$  if the *World GDP to Nepal GDP ratio*  $\psi$  changes. The second factor for changing net migration is a change in the poverty rate with elasticity  $\beta_2$ .

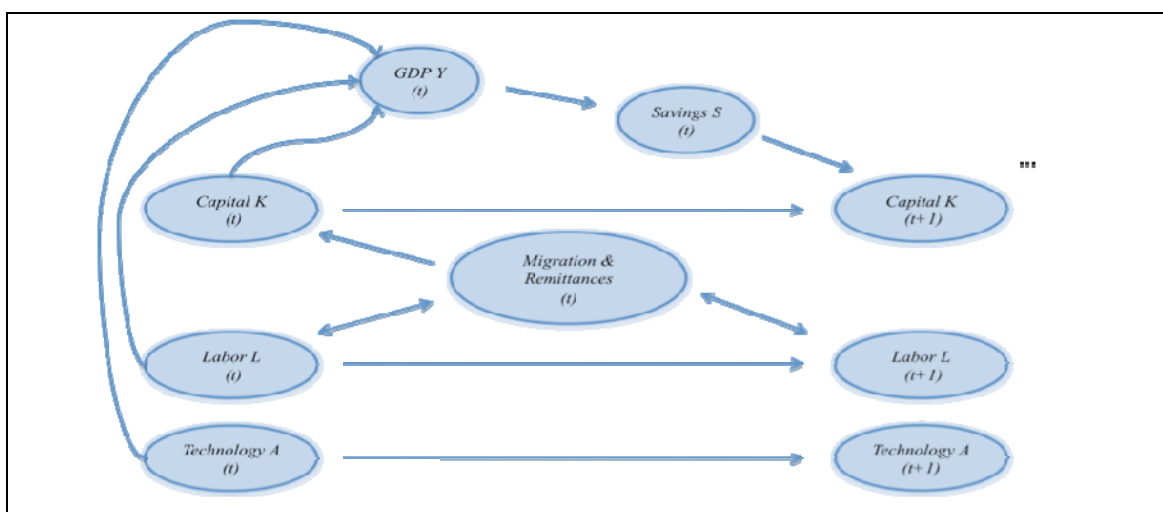
### 5.3.13. Poverty

As presented in chapter 2.1, Adams and Page showed in equation 1 that changes in poverty (as the dependent variable), come from (a) GDP p.c. growth, (b) changes in inequality and (c) changes in received remittances p.c. (independent variables). For simplicity, inequality is left out as a variable. Thus we have following equation:

$$\rho_t = \rho_{t-1} + (\beta_3 * \log\left(\frac{y_{t-1}^{Nepal}}{y_{t-2}^{Nepal}}\right) + \beta_4 * \log\left(\frac{r_{t-1}}{r_{t-2}}\right)) * \theta_t \quad (\text{Eq. 24})$$

The impacts of these two factors on the change of poverty rate decrease over time. Therefore they are multiplied by  $\theta$ , the so-called “poverty diminishing factor, which decreases (non-linear) over time.

### 5.3.14. Graphical representation of the model



Graph 16: Remittances model

### 5.3.15. Variable list

In order to run the presented model, the variables and elasticities need to have certain values. These values are shown in table 11.

For all the explanations for the values of the variables, see the corresponding chapter or appendix.

Variable	Description	Value over time	Value at t=0	Further explanation
$K$	Capital	Changing	1.0000	--
$L$	Labor	Changing	1.0000	--
$A$	Technology	Changing	1.0000	--
$Y^{Nepal}$	Nepalese GDP	Changing	1.0000	--
$S$	Savings	Changing	0.0935	--
$C$	Consumption	Changing	1.0579	--
$F$	People Abroad	Changing	0.0300	Chapter 3.4
$\mu$	Net migration to population ratio	Changing	0.0000	--
$R$	Remittances	Changing	0.1670	Chapter 3.4.1
$Y^{World}$	World GDP	Changing	9.3500	Appendix D
$\rho$	Poverty	Changing	0.3100	Appendix E
$\nu$	Poverty diminishing factor	Changing	1.0000	Appendix F
$\alpha$	Capital to Labor ratio	Constant	0.2700	Appendix G
$c$	Constant share of total population abroad	Constant	0.0300	Appendix H
$\theta$	Saving rate	Constant	<sup>14</sup> 0.0935	Appendix I
$\delta$	depreciation rate of capital	Constant	0.0500	Appendix J
$g$	Labor growth rate	Constant	0.0170	Appendix K
$\phi$	Exogenous growth rate in technology	Constant	0.0173	Appendix L
$\sigma$	Cyclical movements in technology growth rate	Changing	0.0000	Appendix M
$\psi$	World GDP to Nepal GDP-ratio	Changing	9.3500	Appendix N
$\beta_1$	Elasticity: World GDP p.c. to Migration	Constant	2.9700	Appendix O
$\beta_2$	Elasticity: Poverty to Migration	Constant	1.4900	Appendix P
$\beta_3$	Elasticity: Nepal GDP to Poverty	Constant	-1.5160	Appendix Q
$\beta_4$	Elasticity: Remittances to Poverty	Constant	-0.0280	Appendix R
$\beta_5$	Elasticity: World GDP p.c. to Remittances p.c.	Constant	0.5960	Appendix S

Table 11: All model variables and their values

<sup>14</sup> Depending on the scenario: Scenario 1 & 2: 9.35%, Scenario 3: 15.47%, Scenario 4: 9.35% + NRF

## 6. Results of the remittances model

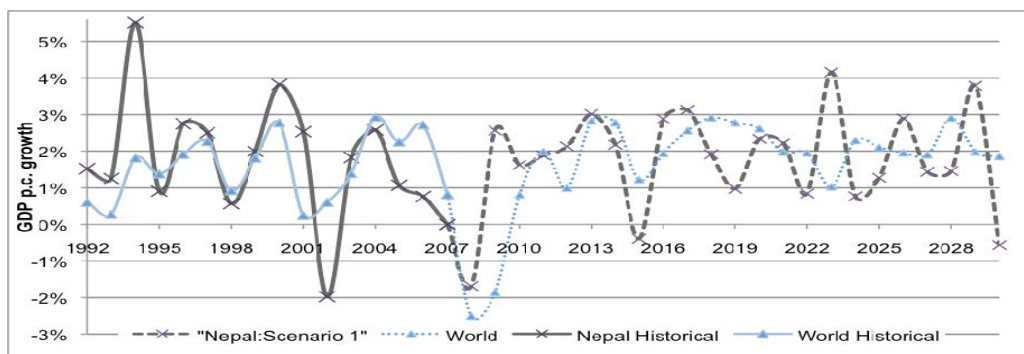
This chapter shows three possible scenarios, all based on the model presented in chapter 5.3. Scenario 1 is the base case, where the model is run with all the elasticities and ratios that were found based on historical data. The goal is to simulate a scenario that is somewhat close to reality. Scenario 2 is based on the base case, however migration is not allowed and therefore no remittances are sent. Comparing this unrealistic scenario with the more realistic scenario 1, we can visualize the impacts of remittances on GDP growth, poverty and consumption. Scenario 3 is also based on scenario 1, however with the difference that we maximize cumulative consumption by changing the saving rate.

### 6.1. Scenario 1: Base case

While the average annual GDP p.c. growth between 1992 and 2007 was 1.78%, the model predicts a growth rate of 1.75% between 2008 and 2030. As mentioned, the aim of this base case scenario is to show how GDP p.c., poverty and cumulative consumption could develop and has the intension to be somewhat realistic, due to the fact that it is based on historical data that are projected into the future. As however the World GDP growth rates are randomly chosen (in a way that the average growth remains 1.66% and that the correlation to the Nepalese GDP remains 0.32) the model cannot be used for predicting GDP at a specific year, but more for a general trend how it could develop over a certain period of time.

#### 6.1.1. Results

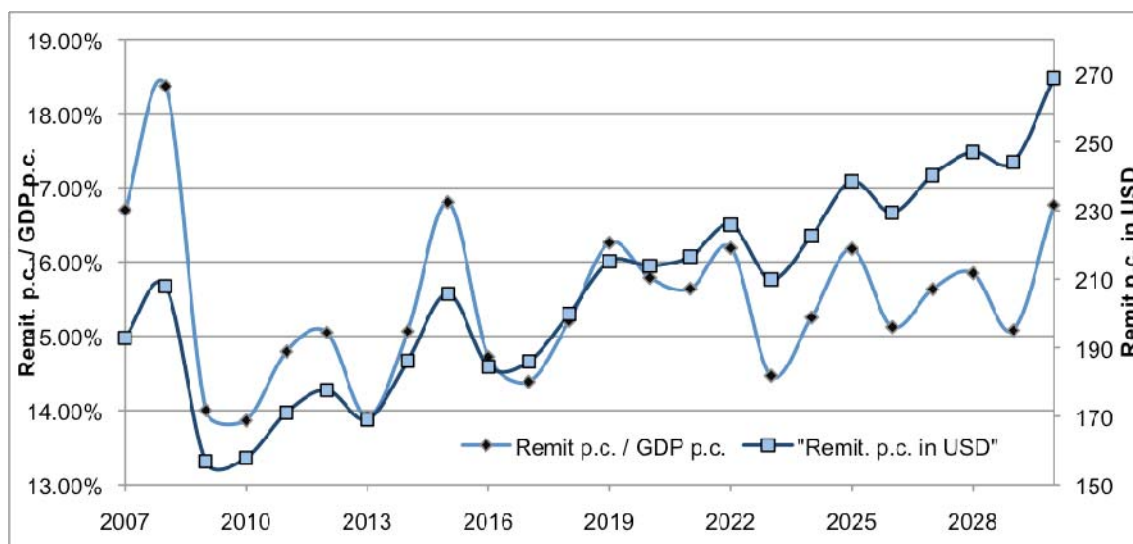
Graph 17 shows historical GDP p.c. growth rates between 1992 and 2007 for both Nepal and the World. The dotted lines indicate the predicted model values.



Graph 17: GDP growth past and predicted values

Data: WDI, Remittances Model

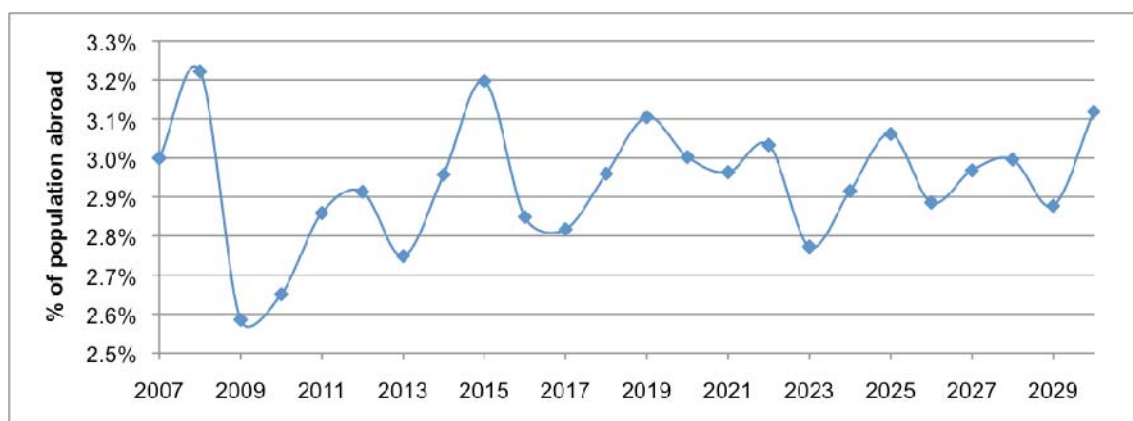
Graph 18 shows the development of the ratio between remittances p.c. to GDP p.c. (with an index on the left Y-axis) starting with 16.7% (as shown in chapter 3.4.1) and remittances p.c. in USD on the right Y-axis, beginning with USD 192.8 in 2007 (also chapter 3.4.1) and steadily going up to USD 268.6 in 2030.



Graph 18: Remittances predictions

Data: Remittances model

Graph 19 shows the predicted part of the population living abroad. We can see that this ratio remains within relatively small boundaries between 2.6% and 3.2% of the total population. Comparing graph 19 with graph 20, we can see the very high correlation between the percentage of the population abroad and the remittances p.c. to GDP p.c. ratio. Of course this makes sense: more people abroad means more received remittances p.c. in relation to GDP p.c.

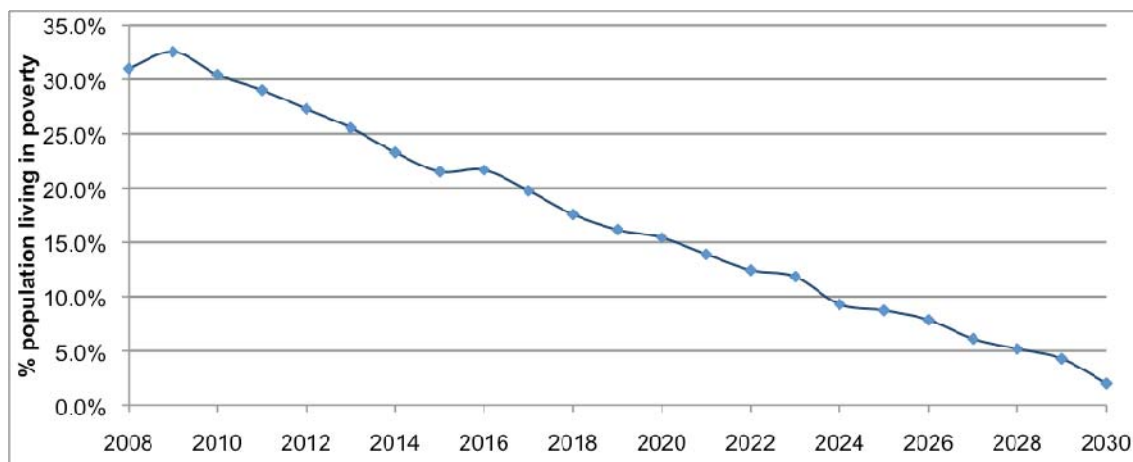


Graph 19: Prediction: Population abroad

Data: Remittances Model

Graph 20 presents the poverty development. We can see an almost linear decrease in the poverty reduction rates, starting from the real value of 31% of the

population living below the poverty line in 2007 to the predicted 2.4% in 2030. This is an annual poverty reduction rate of 1.24%, which is with 1.25% basically as much as it was between 1996 and 2004, when poverty rate dropped from 41% to 31%. We can also see that in times when GDP p.c. growth rates turn negative, poverty increases again. For 2008 I assume a GDP p.c. growth rate of -1.69%, resulting (but keep in mind that Nepalese GDP p.c. growth is not the only variable influencing poverty rate) in an increase in poverty by 1.5% points between 2008 and 2009.



Graph 20: Poverty prediction

Data: Remittances model

## 6.2. Scenario 2: No migration

To see how strong the impacts of remittances and migration are on the Nepalese economy, a scenario has been created where no migration is allowed and thus, no remittances are sent. This scenario can be modeled by setting the population abroad equal to 0% at all time periods from 2008 to 2030. All other variables remain the same as in scenario 1.

### 6.2.1. Results

The average GDP p.c. growth rate between 2008 and 2030 is 1.59%, compared to 1.75% in scenario 1. The percentage of the population living in poverty in 2030 is 5.5%, compared to 2.4% in scenario 1. Cumulative consumption p.c. without migration and remittances is only 25.137, compared to 29.734 in scenario 1.

This shows that remittances contribute around 15% to total consumption, help to increase annual GDP p.c. growth by 0.16% points, and to lower poverty.



### 6.3. Scenario 3: Optimized saving rate

Scenario 3 is again based on the assumptions of scenario 1, where migration is allowed. The difference here is that we want to maximize cumulative consumption between 2008 and 2030. The changing variable here is the saving rate, which is the only parameter we can influence in this model, all other variables are exogenous. As a reminder, the consumption equation looks as follows:

$$C_t^{p+g} = (1 - \theta) * (Y_t + R_t) \quad (\text{Eq. 8})$$

Thus cumulative consumption between 2008 and 2030 is shown in equation 25:

$$\sum_{2008}^{2030} C_t^{p+g} = (1 - \theta) * \left( \sum_{2008}^{2030} (Y_t + R_t) \right) \quad (\text{Eq. 25})$$

#### 6.3.1. Results

If we maximize<sup>15</sup> consumption  $C$  in equation 25, taking  $\theta$  as the endogenous variable, we receive an optimized saving rate of 15.47%, where cumulative consumption p.c. is 30.183, compared to 29.734 in scenario 1 (with a saving rate of 9.35%). What are the effects on GDP p.c. growth and poverty reduction? Due to the higher saving rate,  $K$  is higher too, which in turn increases GDP p.c. growth. It yields a GDP p.c. growth of 2.38%, compared to 1.75% in scenario 1. Of course, the saving rate can even be higher than the one of scenario 3, if we for example take a saving rate of 20%, the GDP per capita growth is 2.72% and at the end of 2030 we have a GDP p.c. of USD (PPP) 1'932. On the other hand in this scenario with a saving rate of 20%, the cumulative consumption is with 30.027 slightly lower than the one in scenario 3 with 30.183. Therefore there is after a certain point a trade-off between cumulative consumption and GDP p.c. growth.

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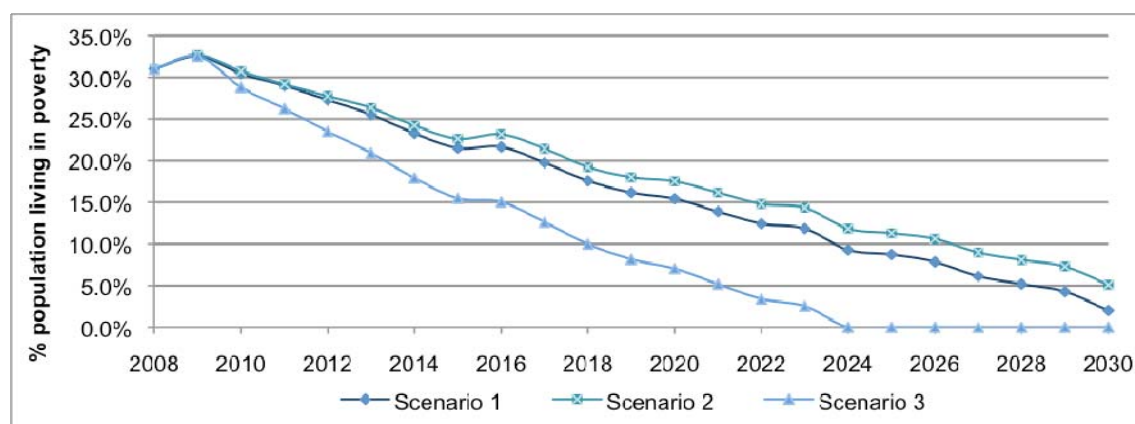
<sup>15</sup> I used the maximization tool in Microsoft Excel, manually one could use the Hamiltonian approach, in order to maximize consumption over a certain time period.

## 6.4. Conclusion

These three scenarios help to better understand the impacts of remittances and what it means if we change the saving rate. The results are brought together in table 12.

Scenario	Reality (1992-2007)	(1) Normal (2008-2030)	(2) No migration (2008-2030)	(3) Saving rate (2008-2030)
Saving rate $\theta$	9.35%	9.35%	9.35%	15.47%
GDP p.c. growth p.a.	1.78%	1.75%	1.59%	2.38%
GDP p.c. 2030 USD (PPP)	1'033 (2007)	1'546	1'489	1'786
Poverty reduction p.a.	1.25% (1996-2004)	1.24%	1.11%	1.94%
Poverty in 2030	31.0% (2007)	2.4%	5.5%	0%
Cumulated consumption p.c.	--	29.734	25.137	30.183

Table 12: Remittances model output with 3 scenarios



Graph 21: Poverty reduction prediction 2008-2030

Data: Remittances model

With help of the model results, we can assume that (i) Remittances contribute 0.16% to annual Nepalese GDP p.c. growth, (ii) consumption is considerably higher than if there were no remittances, (iii) the poverty reduction rate is slightly higher than without remittances, (iv) a maximized (higher) saving rate leads to more consumption in the long run, (v) a maximized saving rate increases GDP p.c. growth and therefore (vi) reduces poverty with a faster pace.

## **7. How to boost the impacts of remittances**

We have seen in the previous chapter the scenario results of the model that if we have a higher saving rate, GDP growth will be higher as well. I argued that the saving rate is the only variable that people have direct influence on. In order to give incentives for a higher saving rate, people must have a possibility to invest their money in a profitable way. If they keep the money at home, the economy cannot accumulate the savings and intermediate them in investments and money loses its value due to inflation.

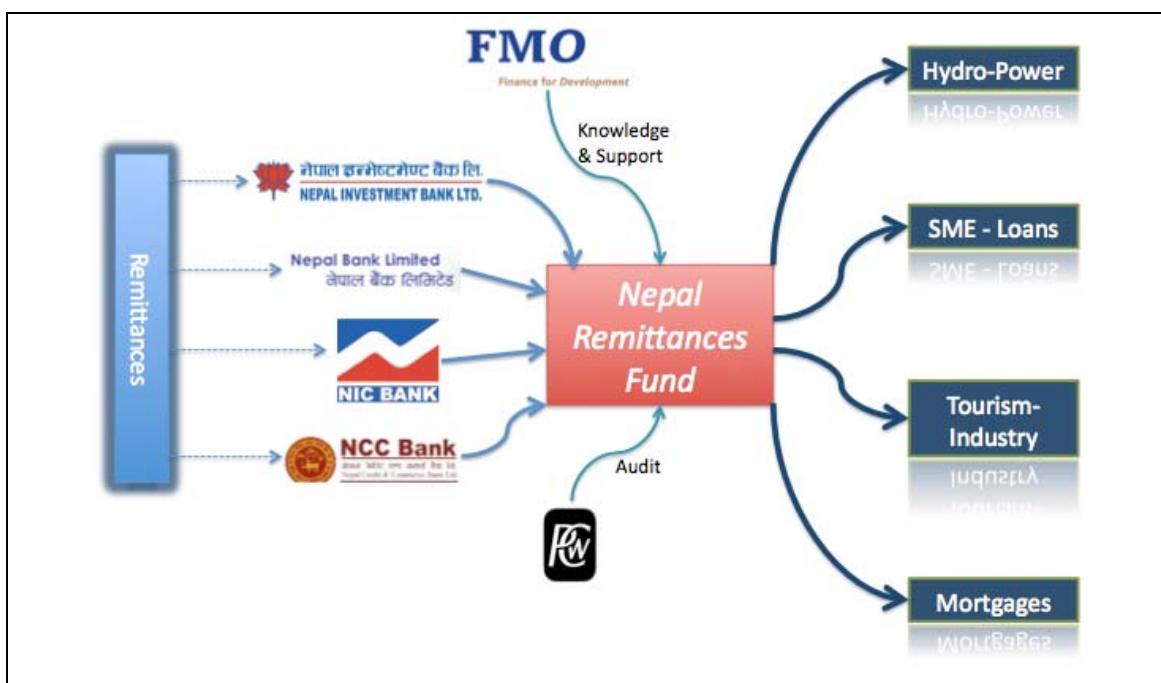
Another problem is that in most cases savings are not big enough that they could be used for bigger investment purposes. So the solution should include to bundle the savings and use them for business investments, thus, turning saved remittances into a form of FDI. The solution could be a Nepal Remittances Fund, as explained in the subsequent sections:

### **7.1. *Nepal Remittances Fund***

When recipients receive money from abroad they can either spend it, save it in cash form, or leave it on their bank accounts. The so-called *Nepal Remittances Fund* (NRF) actively manages the money that remittance receiver does not use for consumption. As mentioned, it is important to bundle the money. Therefore it would be better if not every single bank has its own remittances fund, but that they also work together, to make sure that the fund has a size, which allows them to invest in bigger projects. The fund works as follows: The deposited money remains in the fund two years and cannot be disbursed; afterwards the entire amount is disbursed. The interest rates for fund owners are paid out on a more frequent (e.g. semi-annual) rate.

The investment fund could either be a legal independent organization owned by several Nepalese banks or completely independent (giving banks a provision for offering this service to their clients). Obviously, it is essential that this fund is managed professionally. Therefore I suggest institutions such as the Dutch Development Bank (FMO) to be in the advisory board and have some investment officers, doing due diligence. Further, an international audit company such as Price Waterhouse Coopers (PWC) has to make sure that the financials are

managed correctly. Graph 22 gives an overview about the structure of a potential NRF.



Graph 22: Nepal Remittances Fund

On the left side, we see the money inflow, originating from the remittance recipients that park their money on a participating bank. In the middle we see FMO and PwC as the supervision and audit bodies. On the right side we see where the money will be invested (namely in the four pillars presented in the next subchapter).

### 7.1.1. Investment opportunities

In order to get a high multiplier effect, I suggest the following four investment pillars of the NRF:

**Hydro-Power:** ADB (2003) states: “Nepal’s estimated potential for hydropower generation is 83’000 megawatts (MW), of which about 42’000 MW are technically and economically viable. Only about 527 MW (public sector 412.5 MW, private sector 115 MW), or 1.25%, however, have been developed so far. The national electrification ratio remains low at only 20% of the population, with most service and sales concentrated in urban areas.” This shows that there is a very big potential that has hardly been touched so far. New power stations could cover the exceeding domestic energy demand and export the excessive energy to India,

which would decrease the trade deficit between India and Nepal, stabilize the exchange rate and bring new money into the country.

**SME loans:** As seen in the survey 19.5% of the remittance receiver already run an own business and 53.2% say that if they had more money available they would like to open an own business. The survey also showed that 58.6% of the remittance receiving business owners run a shop, which unfortunately does not create a lot of value for the Nepalese economy (very often these shops mainly sell imported goods). Therefore a shift to more sophisticated business models with higher added value should be supported.

**Tourism:** According to ADB, tourism is the largest industry and plays a crucial rule in bringing in foreign currencies (also to stabilize the local currency NPR). Nepal has a lot to offer in respect of tourism: eight of the ten highest mountains in the world are located in Nepal, among them the famous Mount Everest. There are several UNESCO cultural heritage sites, such as Kathmandu Valley or Lumbini (birthplace of Buddha). Due to the bad condition of the infrastructure (both touristic and public) and sometimes very bad air quality in Kathmandu, it is hard to attract more tourists. If these issues are tackled and Nepal sells itself better (increasing marketing activities), there is a very good possibility to boost this economic sector and provide many Nepalese with relatively well-paid jobs. Investment possibilities could be new hotel facilities, the renovation of cultural sights or higher investments in marketing activities.

**Mortgages:** Due to higher population numbers and also due to remittances, the housing market is booming. The problem is, however, that the construction of a house usually takes several years, as people do not have enough money to build it in one “move”. The construction quality is very poor and according to Geo Hazards (2007) Kathmandu is located in a high-risk earthquake area. Geo Hazard emphasizes how important it is to build houses in a more stable way. So, the NRF money could be used to finance the construction of houses that are earthquake safe and consistent with proper sanitation and waste management.

### 7.1.2. NRF in the remittances model

After having presented the four investment pillars, it would be interesting to see if the NRF helps to boost the Nepalese economy. Therefore the NRF is added to the previously presented remittances model of chapter 5.3.

The money that flows into the NRF (net inflow per period denoted by  $\Delta$ ) is additional saving, thus not used for consumption and leading to an increase of capital  $K$ .

The consumption equation (eq. 19) looks now as follows:

$$C_t^{p+g} = (1 - \theta) * (Y_t + R_t - \Delta NRF_t) \quad (\text{Eq. 26})$$

Further the NRF has the same specifications as FDI. Xiaoying and Xiaming (2005) found that an increase of 1% in the FDI-to-GDP-ratio leads to a GDP growth of 0.41%, this elasticity is denoted as  $\beta_6$ . The ratio between the NRF and Nepalese GDP in period  $t$ , is:  $\frac{NRF_t}{Y_t^{Nepal}}$  and is comparable to the FDI-to-GDP-ratio.

Therefore I argue that we have to change the technology-equation in a way that the NRF's influence on the technology level  $A$  is taken into account<sup>16</sup>.

As a reminder, that is the original equation for technology level  $A$ :

$$A_t = A_{t-1} * (1 + \phi + \sigma_t) \quad (\text{Eq. 16})$$

Now  $NRF$  is added to equation 16 such that we receive the following equation:

$$A_t = A_{t-1} * \left( 1 + \phi + \sigma_t + \beta_6 * \left( \frac{NRF_t}{Y_t^{Nepal}} - \frac{NRF_{t-1}}{Y_{t-1}^{Nepal}} \right) \right) \quad (\text{Eq. 27})$$

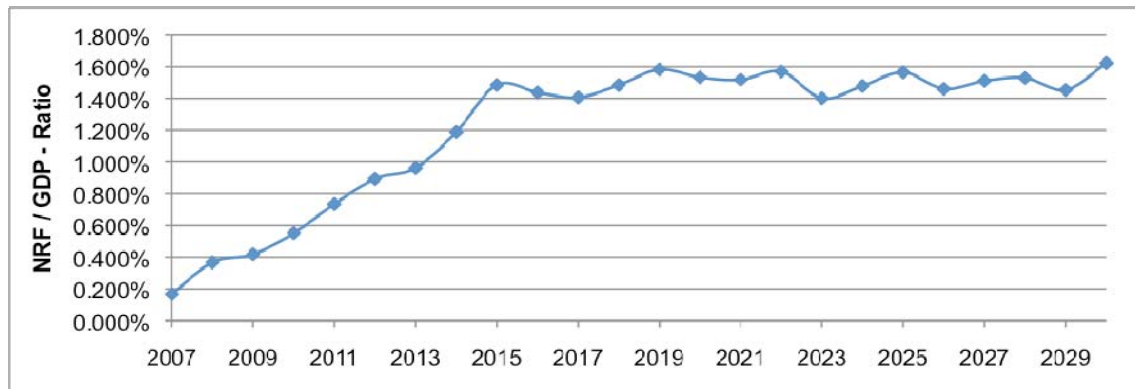
#### Result:

Scenario	Reality (1992-2007)	(1) Normal (2008-2030)	(4) NRF (2008-2030)
Saving rate $\theta$	9.35%	9.35%	9.35% + $NRF$
GDP p.c. growth p.a.	1.78%	1.75%	1.90%
GDP p.c. 2030 USD (PPP)	1'033 (2007)	1'546	1'598
Poverty reduction p.a.	1.25% (1996-2004)	1.24%	1.35%
Poverty in 2030	31.0% (2007)	2.4%	0.0%
Cumulated consumption p.c.	--	29.734	29.865

Table 13: NRF scenario in the remittances model

<sup>16</sup> This is plausible, as for example one of the pillars of the NRF is investing in hydro-power, which leads to higher productivity rates due to less energy shortages.

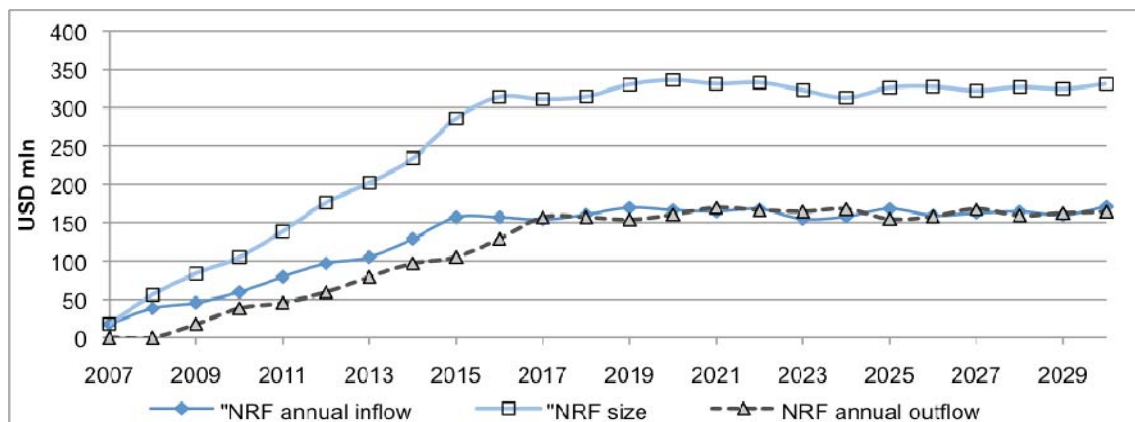
In graph 24 we can see the ratio between the NRF and the GDP. To keep it somewhat realistic, we assume that the size of the NRF is gradually increasing. NRF starts in 2007 with a size of 1% of all the remittances (USD 17.3mln) and annually increases by 1% of total remittances, until it reaches a level of 10% of total remittances.



Graph 23: NRF / GDP – Ratio

Data: Remittances model

Graph 24 shows the size of the fund and the in- and outflows per annum:



Graph 24: NRF Size and annual cash flows

Data: Remittances model

### **7.1.3. Conclusion**

As seen in table 13, the NRF could (i) increase annual GDP p.c. by 0.15% points, (ii) having a slightly higher cumulative consumption and (iii) also a slightly higher poverty reduction rate, compared to scenario 1.

The survey gives regarding an investment fund following results: 42% of the remittances receivers would invest a part of their money in an NRF. People that are willing to invest receive 56% more remittances than the one's who would not invest. On average, they also have a higher education level, and are much more likely to run an own business. Further, the survey shows that 28% of the remittance receivers already save a part of their money. 97% of the people that are willing to invest a part of their remittances in an NRF receive their money either via bank transfer or an MTO, therefore a re-allocation of the money in a fund would be easy, as the money is already circulating in the financial system.



## 8. Final thoughts

### 8.1. *Positive aspects of remittances*

As seen throughout the whole paper, there are several positive aspects about remittances:

**(i) Poverty reduction:** The results from Adams and Page (2005), my own calculation in chapter 2.1 and the survey results showed that remittances help to reduce poverty.

**(ii) Economic growth:** Even though some researchers do not fully agree that remittances are good for economic growth (see chapter 2.3), newer paper and data (such as Garcia-Fuentes and Kennedy, presented in chapter 5.2) suggest that remittances are indeed good for GDP growth. According to the remittances model in chapter 5.3, due to capital accumulation, the GDP p.c. growth rate with remittances estimates to be 0.16% points higher than without remittances.

**(iii) Higher (cumulative) consumption:** The survey clearly showed that remittance recipients consume goods that they would not consume if they did not receive any remittances. The remittances model of chapter 5.3, also suggests that remittances allows more consumption.

**(iv) Gained experience of returnees:** Many migrants return back to Nepal with new ideas, more knowledge and a higher self confidence: (Jolly and Reeves, 2005) give the example of Sushila Rai, a Nepalese migrant domestic worker who describes her migration experience in the following way: “While working in Hong Kong I experienced many things – the way people treat a dependent or independent woman. I have gained much experience and my confidence has grown. Now, I have a say in decision-making at home. My husband does not shout at me. I have bought a piece of land and four rickshaws and I am creating a means of livelihood for four other families...”

## **8.2. Negative aspects of remittances**

Unfortunately there are not only positive aspects about remittances, the “side effects” I mentioned in the previous chapters are:

**(i) Rising inequality:** As shown, the society is more and more split into two groups of remittances receivers and non-receivers. Sorensen (2004) states: „It is likely that remittances are unevenly distributed, since poorer households do not have the resources needed to send members to places (mainly Western countries) where earnings or welfare provisions are sufficient to allow the sending of money home.“ A similar statement comes from Skeldon (1987): “Migration may help to reduce absolute poverty among some while simultaneously acting to increase feelings of relative deprivation among others. Overall, people may be better fed as a result of migration but the feelings of deprivation may generate resentment“.

**(ii) Recipients tend to work less:** As we have seen both in the survey results and the paper by Chami, Fullenkamp, Jahjah (2005), remittance receiver tend to work less. In one way this is good, as it tends to lower unemployment. On the other hand it creates a feudalistic system, where work and income are not linked any longer.

**(iii) Land Speculation:** During the interviews some remittance recipients said that they use the money also partly for land speculation, in the hope that land prices go up. With this speculation no real value has been generated, but e.g. farmers have to pay more for their land and inflation increases.

**(iv) Dependency on other states:** As mentioned Nepal is also affected by the current (2008-2009) economic crisis, due to lower remittances payments and more migrates forced to move back to Nepal, thus causing rising tensions and poverty. Therefore it is important for Nepal to build an economic system that is robust and rather independent from foreign remittances in order to reduce poverty and increase consumption level.

## **9. Conclusion**

Remittances could be an essential key for the economical lift off in a country like Nepal. It is, however, crucial that remittances are invested in a smart way and that rising inequality can be stopped. Otherwise social tensions may arise. With the use of the NRF I showed a possible solution how remittances can have a deeper impact on future economic development. In the long run, Nepal should have the goal that people are not forced to leave their country any more. Many of them cannot see their family and friends for a couple of years, suffer from bad working conditions and receive very low wages. Unfortunately, the governments in developing countries such as Nepal are too weak and do not have a powerful position in negotiations with other governments to improve these conditions for their citizens abroad.

## **Acknowledgments**

Without the help of Srildeep Devkota and Prajwal Gyawali it would have been impossible to conduct the survey within just 20 days. I thank them both for their commitment and enthusiasm. Through the talks with my two assistants and the people we interviewed on the streets of the Kathmandu Valley, I got a much better feeling about the Nepalese people, their concerns and their goals.

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# 11. Appendix

## A) Chapter 2.1: Multi-regression on poverty

Year	Country Name	Distance (miles)	GDP	Poverty rate (1\$/day/person)	Gini-Index	Remittances p.c. in USD
1988	Algeria	900	5430	2	40.14	15.77
1995	Algeria	900	4920	2	35.3	39.62
1986	Argentina	4800	10274	2	44.51	1.04
2004	Argentina	4800	11755	6.585	51.32	7.51
1984	Bangladesh	2500	1108	26.16	25.88	5.53
1989	Bangladesh	2500	1155	33.75	28.85	7.45
1992	Bangladesh	2500	1241	35.86	28.27	8.37
1996	Bangladesh	2500	1358	28.61	33	11.31
2000	Bangladesh	2500	1543	41.3	33.4	15.27
1986	Bolivia	4000	1965	20.08	51.68	1.31
1991	Bolivia	4000	2116	5.68	42.04	0.44
1997	Bolivia	4000	2350	20.43	58.46	10.88
1999	Bolivia	4000	2378	26.18	57.79	11.78
2002	Bolivia	4000	2389	23.2	60.05	13.05
1981	Brazil	3200	6377	11.8	57.57	1.00
1990	Brazil	3200	6480	14.04	60.68	3.84
1993	Brazil	3200	6537	8.27	59.82	7.96
2001	Brazil	3200	7145	8.17	59.25	10.06
2003	Brazil	3200	7213	7.41	58.12	15.56
2004	Brazil	3200	7521	7.536	56.99	19.44
1980	Colombia	2400	4819	7.85	59.13	3.74
1988	Colombia	2400	5282	4.48	53.11	13.66
1989	Colombia	2400	5357	2.45	53.59	13.65
1991	Colombia	2400	5590	2.82	51.32	24.78
1995	Colombia	2400	6218	3.12	57.22	21.30
1996	Colombia	2400	6234	5.28	56.96	19.34
1998	Colombia	2400	6263	8.26	58.21	19.99
1999	Colombia	2400	5900	8.18	57.92	32.00
2003	Colombia	2400	6124	7.03	58.622	70.43
1981	Costa Rica	2200	6092	14.81	47.49	0.83
1986	Costa Rica	2200	5744	7.32	34.48	2.89
1990	Costa Rica	2200	6268	5.24	45.66	3.90
1993	Costa Rica	2200	7007	4.11	46.28	4.84
1996	Costa Rica	2200	7144	3.57	47.08	36.76
1998	Costa Rica	2200	7774	2	48.13	34.15
1986	Dominican Republic	2100	4185	8.61	47.78	33.36
1989	Dominican Republic	2100	4632	3.85	50.46	42.07
1992	Dominican Republic	2100	4507	2	51.36	45.78
1996	Dominican Republic	2100	5044	2	48.71	118.03
2003	Dominican Republic	2100	6469	2	51.88	253.38
2004	Dominican Republic	2100	6493	2.78	51.64	268.21
1994	Ecuador	2900	3332	16.78	52	24.67
1998	Ecuador	2900	3452	17.67	53.55	66.84
1991	Egypt, Arab Rep.	600	2773	3.97	32	71.36
1995	Egypt, Arab Rep.	600	3004	2.58	32.6	52.69
2000	Egypt, Arab Rep.	600	3527	3.08	34.41	42.39
1989	El Salvador	1700	3495	21.35	48.96	47.38
1995	El Salvador	1700	4381	20.8	49.86	187.70
1996	El Salvador	1700	4363	25.26	52.25	187.22
1998	El Salvador	1700	4527	21.39	52.17	222.03



2000	El Salvador	1700	4597	18.94	51.92	281.03
2002	El Salvador	1700	4607	19.04	52.357	299.38
1989	Guatemala	1600	3369	34.85	59.6	9.78
1998	Guatemala	1600	3940	13.19	55.65	42.85
2000	Guatemala	1600	4048	10.67	54.97	53.37
2002	Guatemala	1600	4039	13.46	55.135	136.62
2001	Haiti	2000	1579	53.89	59.2076	77.48
1986	Honduras	1800	2673	33.74	55.09	0.46
1990	Honduras	1800	2744	37.83	57.36	12.95
1992	Honduras	1800	2821	28.33	54.51	21.70
1994	Honduras	1800	2792	23.66	55.22	16.27
1996	Honduras	1800	2846	24.96	53.72	27.15
1998	Honduras	1800	2913	23.84	56.3	36.86
1999	Honduras	1800	2785	20.74	56.24	52.35
2003	Honduras	1800	2919	14.9	53.841	125.78
2004	India	1200	2851	34.33045	36.8	17.37
1988	Jamaica	2100	2920	5.02	43.16	65.35
1990	Jamaica	2100	3215	2	42.2	95.82
1993	Jamaica	2100	3682	4.92	35.67	97.91
1996	Jamaica	2100	3711	2.3	40.47	284.47
1999	Jamaica	2100	3596	2	44.22	306.88
2000	Jamaica	2100	3597	2	43.06	344.48
2004	Jamaica	2100	3769	2	45.508	614.35
1987	Jordan	600	4956	2	36.06	329.59
1992	Jordan	600	3916	2	43.36	226.09
1997	Jordan	600	4033	2	36.42	407.93
2003	Jordan	600	4485	2	38.838	426.22
1984	Mexico	700	7829	13.95	46.26	21.12
1985	Morocco	1100	2986	2.04	39.19	44.68
1991	Morocco	1100	3502	2	39.2	80.78
1999	Morocco	1100	3551	2	39.5	69.01
1996	Nepal	1800	1213	34.42	37.67	1.98
2004	Nepal	1800	1371	24.1	47.17	30.94
1993	Nicaragua	1900	2581	47.88	50.41	5.86
1998	Nicaragua	1900	2910	44.68	45.24	42.09
2001	Nicaragua	1900	3178	45.12	43.11	67.31
1999	Pakistan	700	1848	13.46	33.02	7.39
2002	Pakistan	700	1887	16.984	30.5647	24.53
1989	Panama	2400	4264	11.81	56.57	43.18
1991	Panama	2400	4842	11.81	56.82	43.89
1995	Panama	2400	5328	7.38	57.06	41.94
1996	Panama	2400	5368	7.92	56.31	31.56
1990	Paraguay	4700	4425	4.93	39.74	8.06
1995	Paraguay	4700	4686	19.36	59.13	59.80
1998	Paraguay	4700	4561	15.88	56.52	55.78
1999	Paraguay	4700	4400	14.86	56.85	51.18
2002	Paraguay	4700	4081	16.37	57.98	36.29
2003	Paraguay	4700	4155	13.56	58.36	39.28
1990	Peru	3100	3817	2	43.87	4.00
1994	Peru	3100	4262	9.4	44.87	20.20
1996	Peru	3100	4582	8.88	46.24	24.61
2000	Peru	3100	4724	18.07	49.82	27.67
2002	Peru	3100	4827	12.83	54.65	26.34
2003	Peru	3100	4942	10.53	52.02	31.66
1985	Sri Lanka	2200	2137	9.39	32.47	18.43
1990	Sri Lanka	2200	2356	3.82	30.1	23.56

1996	Sri Lanka	2200	2952	6.56	34.36	46.47
2002	Sri Lanka	2200	3590	5.552	40.17	68.87
1985	Tunisia	900	4504	2	43.43	37.33
1990	Tunisia	900	4635	2	40.24	67.57
1995	Tunisia	900	5100	2	41.66	75.91
2000	Tunisia	900	6279	2	39.8	83.23
1998	Venezuela, RB	2500	6133	14.31	49.53	0.73
2003	Venezuela, RB	2500	4740	18.51	48.2	0.82

Data: All data except *distances* are taken from WDI.

The distance is measured with the method of Adams and Page. It is stated in miles from the main remittance sending area to the border of the remittance receiving country. For the Latin American and the Caribbean countries it is the distance to the geographical middle of the United States (48 continental states) which is Lebanon, Kansas. For Morocco, Tunisia and Algeria it is the distance to Viroinval, Belgium (as the geographical center of the EU-15 as it has been calculated by the French *Institut Géographique National*. For Egypt, Jordan and the South Asian countries it is the distance to Riyadh, Saudi Arabia. All distances are rounded to a 100-miles-scale. To measure the distances, *Google Earth* provided the required data.

### B) Chapter 3.3.1: Nepalese and World GDP p.c. growth rates

YEAR	NEPAL GDP	WORLD GDP
1992	1.52%	0.60%
1993	1.25%	0.28%
1994	5.51%	1.81%
1995	0.91%	1.38%
1996	2.75%	1.91%
1997	2.51%	2.26%
1998	0.57%	0.92%
1999	2.00%	1.81%
2000	3.82%	2.78%
2001	2.54%	0.24%
2002	-1.97%	0.60%
2003	1.83%	1.39%
2004	2.58%	2.93%
2005	1.07%	2.25%
2006	0.76%	2.72%
2007	0.80%	0.81%
Average	1.78%	1.66%

Data: WDI

### C) Chapter 4.5: Relationship between GDP and received remittances

COUNTRY	Number	GDP p.c. (USD)	GDP LOG	Average Remittances (NPR)	LOG Remittances
AUSTRALIA	13	34882	10.45972622	23576	10.06798452
BAHRAIN	3	21482	9.974970654	17500	9.76995616

BELGIUM	1	34459	10.44752549	45000	10.71441777
CANADA	4	35729	10.48371796	35000	10.46310334
CYPRUS	1	27185	10.21042063	30000	10.30895266
GERMANY	7	33154	10.40891865	12119	9.402529748
HONGKONG	3	42322	10.65306232	81667	11.31040528
INDIA	1	2753	7.920446505	1000	6.907755279
IRAQ	1	3700	8.216088099	30000	10.30895266
ITALY	1	29935	10.30678364	25000	10.1266311
JAPAN	8	33525	10.42004671	35445	10.47573748
KUWAIT	8	26321	10.17812238	15249	9.632269206
LEBANON	1	10112	9.221478116	16266	9.696832319
MALAYSIA	34	13380	9.501516334	17016	9.741909357
NEW ZEALAND	1	26108	10.16999706	35000	10.46310334
OMAN	1	15602	9.65515439	31503	10.35783806
QATAR	39	27664	10.22788721	15692	9.660906307
SAUDI ARABIA	26	15711	9.662116383	15482	9.647433338
SINGAPORE	1	29663	10.29765576	10000	9.210340372
SOUTH KOREA	4	24712	10.11504423	11084	9.313257906
SPAIN	2	31312	10.35175669	35000	10.46310334
SWITZERLAND	1	39962	10.59568428	10052	9.215526899
TAIWAN	1	30100	10.31228045	12000	9.392661929
THE NETHERLANDS	1	37960	10.54428825	5000	8.517193191
UAE	50	25514	10.1469826	22764	10.03293562
UK	20	33535	10.42034495	28692	10.26437362
USA	59	45790	10.73182101	32736	10.39623067
GDP Data: UNDP		Remittances Data: Own survey			

## Chapter 5.3: Remittances model

### D) $y^{World}$ : World GDP p.c. random growth

Random generated growth prediction of World GDP p.c. 2008 – 2030

Year	World GDP p.c. growth
2008	-2.51%
2009	-1.86%
2010	0.81%
2011	1.99%
2012	0.99%
2013	2.83%
2014	2.78%
2015	1.22%
2016	1.94%
2017	2.56%
2018	2.91%
2019	2.78%
2020	2.61%
2021	1.98%
2022	1.95%
2023	1.03%
2024	2.29%
2025	2.10%
2026	1.96%
2027	1.90%

2028	2.91%
2029	1.98%
2030	1.86%
Average	1.66%

These World GDP p.c. growth rates are fully randomly generated, the only two conditions were: (i) to receive an annual GDP p.c. growth average of 1.66%, which is equal to the period of 1992<sup>17</sup>-2007 and (ii) to have a correlation between the Nepalese GDP p.c. growth predictions in scenario 1 and these World GDP growth rates that is 0.32, which is also the same value of 1992-2007.

**E)  $\rho$ : Poverty rate:** The second influence on migration is the change in the level of poverty (push factor, see chapter 1.1) with elasticity  $\beta_2$ .

Poverty rate  $\rho$  shows the percentage of the Nepalese population living below the poverty line. As presented in chapter 2.1 an increase (decrease) in GDP p.c. reduces (increases) the poverty rate. The second independent variable that changes the poverty rate is a change in remittances p.c. The impacts of these two factors on the change of poverty rate decrease over time. Therefore they are multiplied by  $\theta$ , the so-called “poverty diminishing factor. The poverty rate  $\rho$  has an initial value ( $t=0$ ) of 0.31 (population below poverty line: 31% - see chapter 3.2).

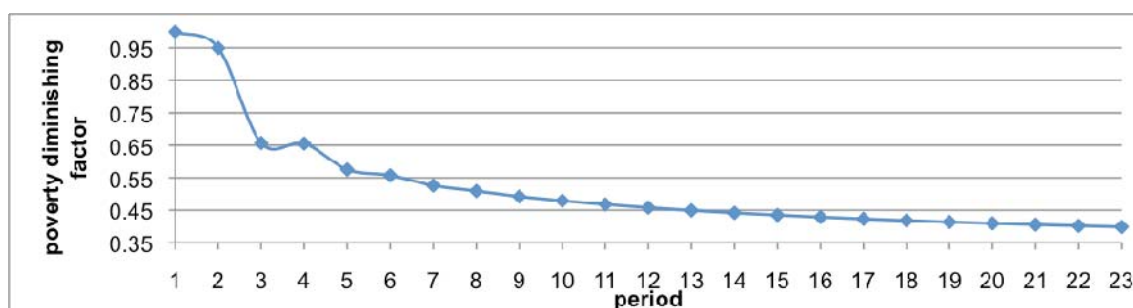
**F)  $\theta$ : Poverty diminishing factor:** I assume in this model that poverty reduction is a non-linear function. In chapter 3.4 it is mentioned that poverty has not everywhere been reduced with the same pace. In rural areas, the poverty rate decreased between 1996 and 2004 by 20%, whereas in the urban areas poverty decreased by 55.5% in the same period. This leads to the conclusion that not that many people living in rural areas profit from remittances and economic growth (the two poverty reduction factors in the model). Therefore I had to find a function where the countrywide poverty reduction rate is diminishing over time. This sounds straightforward. It took me however some time to find a function with a reduction rate that is not too high, but also not too low (and does not allow negative poverty rates). If we do not take a constant value, the poverty reduction

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<sup>17</sup> From 1992 on, remittances to Nepal have been officially reported

rate could come very close to 0, as  $\theta$  would be close to 0. The value for constant  $cp$  is 0.36, as this is the elasticity between the reduction rate in the urban and rural areas, thus: if poverty decreases in the urban areas by 1%, rural poverty decreases by 0.36%. This is reasonable, as urban poverty is soon to disappear and then only rural poverty reduction rates should be applied.

$$g_t = \frac{\left(\frac{t}{t-1} - 1\right)^{\frac{t}{r-1}} * \left(\frac{t}{t-1}\right)^{1+\frac{t}{r-1}}}{g_{t-1}} + cp \quad (\text{Eq. 28})$$



Graph 25: Poverty diminishing factor

**G)  $\alpha$ : Capital to Labor ratio:** For the capital to labor ratio  $\alpha$  a value of 0.27 was taken, as this is the calculated average ratio for Nepal between 1980 and 2000 (Khatiwada and Sharma, 2008). Sorensen and Whitta-Jacobsen (2005) quote „ a reasonable value for the  $\alpha$  appearing (...), namely a number around 1/3.“ Therefore the value of 0.27 seems realistic.

**H)  $c$ : Constant population part abroad:** In 2005 3.02% of the population lived abroad, in 2000 it was 2.94%. (WDI, 2008), therefore the value of 3% is used.

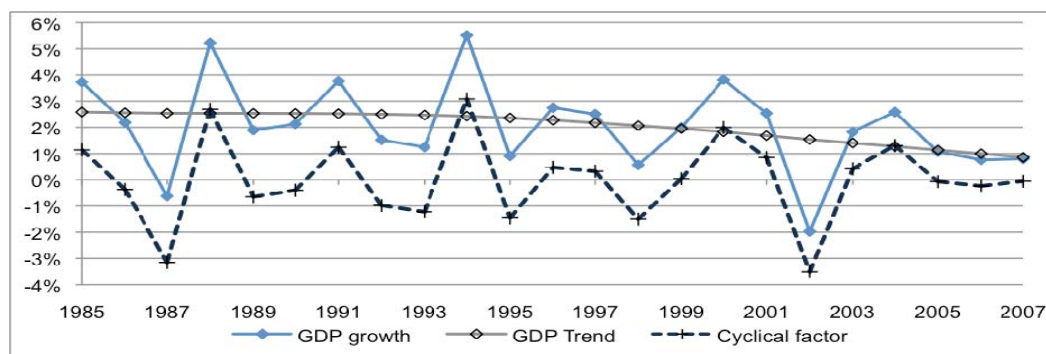
**I)  $\theta$  Saving quota:** According to the Nepalese Central Bureau of Statistics the Nepalese saving rate was 9.35% in 2007. Therefore this value has been used in the case case scenario and scenario 2.

**J)  $\delta$ : Annual depreciation rate of capital:** Sorensen and Whitta-Jacobsen (2005) write that “an annual depreciation rate of “around 5% is considered most plausible for aggregate capital.“ Therefore this value has been used.

**K)  $g$ : Annual population growth rate:** According to WDI (2008) the annual Nepalese population growth rate between 2006 and 2007 was 1.7%. This value has been used in the model and remained constant.

**L)  $\phi$ : Growth rate of labor productivity:** Sorensen and Whitta-Jacobsen (2005) calculated with data from OECD Economic Outlook Database an annual exogenous productivity growth rate through technological progress for the USA between 1995 and 2000 of 1.7%, as no such information is available for Nepal, this value is used.

**M)  $\sigma$ : Cyclical factors:** In the last two decades, Nepal has had politically unstable times, that certainly caused slowdowns in the economy (e.g. through constant road blockades, general strikes etc.). But also natural disasters like a heavy monsoon season can decrease labor productivity. Further it is also very likely that there will be an earthquake in the next decades, which will definitely impact the productivity. On the other hand, new infrastructure projects like a major road or a new power plant meeting higher electricity demand will boost labor productivity rates (which is not already calculated in the endogenous productivity growth rate  $\phi$ ). As we hardly can predict when and why productivity will change, a random cyclical productivity growth factor  $\sigma$  has been added. In order to have realistic values for  $\sigma$ , a Hedrick-Prescott-filter on Nepalese GDP p.c. growth from 1985-2007 (23 data years) has been applied (as recommended with  $\lambda = 100$  (for annual dates)). Thus the random cyclical factor  $\sigma$  is equal to the dark blue line “cyclical factor” in graph 25.



Graph 26: HP filter applied on Nepalese GDP per capita growth Data: WDI

Year	HP Cycilus	HP Trend	Nepal GDP p.c. growth
2007	-0.06%	0.86%	0.80%

2006	-0.24%	1.00%	0.76%
2005	-0.07%	1.14%	1.07%
2004	1.31%	1.28%	2.58%
2003	0.42%	1.41%	1.83%
2002	-3.51%	1.54%	-1.97%
2001	0.85%	1.69%	2.54%
2000	2.00%	1.83%	3.82%
1999	0.04%	1.95%	2.00%
1998	-1.50%	2.07%	0.57%
1997	0.33%	2.18%	2.51%
1996	0.47%	2.28%	2.75%
1995	-1.45%	2.36%	0.91%
1994	3.08%	2.43%	5.51%
1993	-1.22%	2.47%	1.25%
1992	-0.98%	2.50%	1.52%
1991	1.25%	2.52%	3.77%
1990	-0.40%	2.53%	2.13%
1989	-0.64%	2.54%	1.89%
1988	2.69%	2.54%	5.23%
1987	-3.16%	2.54%	-0.62%
1986	-0.37%	2.56%	2.19%
1985	1.14%	2.59%	3.73%

In order to have a value for  $\sigma_t$ , I take the value of the cyclical factors as a mirror. For example: For the model value of  $\sigma_t$  (t=2008), the cyclical factor value of 2007 is taken (-0.06), for t=2009 the 2006 values were taken (-0.24), and so on, until 2030 with the 1985 values. Taking the average of all cyclical factors,  $\bar{\sigma}_t$  is by definition 0, therefore the cyclical moves do not directly change the GDP growth rates in the long run average, but give impulses to the whole model, as they boost or slow down GDP growth and like that, as shown later, have impacts on poverty or migration, which in turn has impacts on the received remittances.

#### N) $\psi$ : Ratio of World GDP to Nepal GDP p.c.:

Mathematically: 
$$\psi_t = \frac{y_t^{World}}{y_t^{Nepal}}$$

As a proxy for the income of Nepalese migrants abroad, I take the World GDP p.c. (In reality one should look at the GDP of the countries where most Nepali go). As long as the ratio between the World GDP p.c. ( $y_t^{World}$ ) and the Nepalese GDP p.c. ( $y_t^{Nepal}$ ) is below 1, Nepalese people will move abroad (in the long run average). If (all other factors remain constant) the Nepalese economy is growing faster than the World GDP in period  $t$ , net migration turns negative. The model starts with a value of  $\psi_{t=0}$  of 9.58, as the World GDP p.c. in 2007 was USD (PPP)

9'896, compared to the Nepalese GDP p.c. USD (PPP) 1'033 p.c. (WDI, 2008). One might also argue that we should not look at the change in the ratio, but simply at the ratio value, as we could argue that as long as the ratio is higher than 1, Nepali move abroad, no matter if the GDP growth abroad is smaller than the one of Nepal. We can however see that migration in 2008 to countries like Qatar went dramatically down and net migration turned negative: The Peninsula (2009) writes: "more young Nepalese are arriving at Kathmandu International Airport than ones that are leaving the country".

**O)  $\beta_1$ : Elasticity:** Arrelano and Bover (1995) explain net migration (in relation to the total workforce) by a change in the ratio between the GDP p.c. of poor countries to GDP p.c. of rich (OECD) countries. This is comparable to the above explained variable  $\psi$ . Ziesemer (2008) applied Arrelano and Bover's equation with data of 46 observations (20 countries, time period: 1990 to 2005) and found an elasticity of 2.97. Therefore this value for  $\beta_1$  has been used.

**P)  $\beta_2$ : Elasticity:** As shown in chapter 1.2.3 Hatton and Williamson (2003) found an elasticity between poverty and migration of 1.49, thus if poverty is reduced by 1%, migration goes up by 1.49%.

**Q)  $\beta_3$ : Elasticity:** As seen in chapter 2.1, there is a negative correlation with an elasticity of 1.516 between GDP growth and the level of poverty.

**R)  $\beta_4$ : Elasticity:** Also in chapter 2.1 it is shown that an increase in remittances lead to a decrease in the level of poverty, with an elasticity of 0.228.

**S)  $\beta_5$ : Elasticity:** In chapter 5.6 it is shown that an increase in World GDP p.c. by 1%, leads to an increase of remitted amounts by 0.596%, which is also the used value of  $\beta_5$ . Brambila-Macias uses a value of 0.5 for Mexico, therefore this value of  $\beta_5$  seems to be plausible.