

Executive Summary of Doctoral Thesis:  
**Human Welfare in North Korea<sup>1</sup>**

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## **Executive Summary**

Wie geht es? Ça va? 안녕하세요? In virtually every language in the world, you will find such a phrase which in English translates into ‘How are you?’. What at first seems to be an empty phrase is in fact deeply rooted in almost all cultures of the world both linguistically and historically, and therefore seems to be a basic inquiry of mankind. Indeed, asking about the quality of life is an all-encompassing question, as it might touch all the spheres of economic, social and political life which affect individuals.

In this dissertation, what we are basically doing is raising this question. However, what makes our inquiry quite challenging is that the people whom we confront with this universal question - namely the North Koreans - live in one of the most secluded places on earth.

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Philosophical and methodological issues aside, totalitarian North Korea is known to be a 'hermit kingdom' from where little reliable information and, more importantly, hardly any quantitative data has emerged. Unlike other countries under communism, Pyongyang has not released regular statistics for decades. Still today, North Korea seals itself off from the rest of the world while brutally oppressing its people, making it almost impossible to directly ask a North Korean: 'How are you?' without severely endangering the life of the interviewee.

However, even though we cannot interview the people living in one of the most isolated countries in the world directly, we can receive an 'incurruptible' glimpse at their human welfare state by looking at their heights and weights. Specifically, when it comes to typical human welfare indicators like GDP per capita, life expectancy, infant mortality, literacy rates or the human development index of the United Nations, we here argue that they are either statistically unavailable, politically manipulated, full of measurement errors, or fail completely to capture human development as a consequence of communist market distortions in North Korea.

Above all, height outcomes can be considered an excellent proxy for the standard of living in many situations: in a Maslowian sense, stature directly reflects physiological needs - like food, health and the wealth of a nation - which can be supposed to be the primary determinant of human welfare in a developing country such as North Korea. Moreover, unlike GDP per capita which is the most common indicator of the welfare of a nation, height is an output indicator and is thus able to capture the distributional effect of welfare.

In general, the data on North Korea applied here stem from four sources: nutrition surveys, cartographic material, meteorological records, and a demographic dataset released by the North Korean government.

Above all, anthropometric data on about 10,000 North Korean children and 2.800 North Korean women were used for the analysis. This data stem from two surveys conducted in North Korea.

Firstly, in 1997, anthropometric data on 4000 children were collected by the UN. As this dataset contains only anthropometric measurements, it was combined with socioeconomic information that was either published cartographically by researchers in the field or stems from the *DPRK: Population Statistics* of 2002 (end). This dataset was released by the North Korean government in 2003, and we are grateful for getting access to it for our research. It contains demographic information on a large number of North Korean counties. Beyond this, we also made use of meteorological data by linking historical records of weather stations to anthropometric data from 1997.

The second main source used here is a UN survey carried out in 2002. It measured the height and weight of some 6.000 children and the weight of about 2.800 mothers. Fortunately and as distinct from the 1997 survey, additional socioeconomic information was collected from the individuals along with the anthropometric measurements. Access to this data was given by United Nations officials and under the agreement of the North Korean government – an official co-owner of the data.

Concerning South Korea, we make use of anthropometric data stemming from an ergonomic-anthropometrical survey carried out in 2003. As distinct from the two North Korean datasets, the South Korean data do not comprise information on individuals, but only national heights and weights which were classified by sex and age.

Beyond this, worldwide nutritional data were borrowed from the electronically published *Global Database on Child Malnutrition* maintained by the World Health Organization (WHO).

Beyond these primary data sources, a large variety of secondary literature, ranging from field reports over newspaper articles to journal publications was considered here - making our publication by far the most comprehensive study on North Korean living standards to date (as of this writing in 2006).

In chapters 2 and 4, we give a descriptive overview on the state of welfare in the DPRK vis-à-vis countries in the region and the world. At the end of the second millennium, North Korea can reasonably be regarded as a quite hostile place to be brought up in, as chronic child malnutrition rates were found to be the 12<sup>th</sup> highest and acute malnutrition rates the 28<sup>th</sup> highest in the world. What also became quite evident through our investigation of global child malnutrition was that North Korea clearly represents a regional outlier, as we normally find high rates of stunting, underweight and wasting predominantly in Eastern Africa or Southeast Asia. Additionally, in chapter 4, we relate North Korean heights and weights to their South Korean counterparts. As South and North Koreans are genetically and culturally the same people that became politically divided during the Cold War, the historical experiment on the Korean peninsula provides natural evidence on the environment's extreme effects on human development. Whereas North Korea is characterized by lacking economic growth and national famines, South Korea is an OECD member and a high-tech country par excellence. Thus, around the end of the second millennium, we find North Korean pre-school children to lag between 7 and 13 centimeters in height behind their South Korean counterparts. Comparing weight differences, we find that North Korean pre-school children weigh 2 to 7 kilograms, and North Korean women 4 to 9 kilograms, less than South Koreans.

In chapter 3, we give an overview of anthropometric data sources that are theoretically available for North Korea. Altogether, 23 anthropometric surveys have been carried out; yet from a conceptual point of view, 11 of them were discarded as mere field reports of low statistical quality and a small sample size. We focused on the remaining surveys, which we discussed extensively in terms of sampling design, characteristics and drawbacks. More importantly, we introduced an index to rate this material in a quantitative way. By and large, the surveys fell into three categories: surveys by international organization, surveys by the North Korean government and surveys by private organizations. The methodologically soundest surveys have been carried out by international organization (WFP, UNICEF),

partially in cooperation with North Korean officials. They are large in sample size, representative of many regions in North Korea and, last but not least, relatively random in sampling. Anthropometric surveys by private organizations, mostly surveys based on North Korean escapees living in China or South Korea, display a mediocre technical performance in our index, as they are heavily selection biased. According to our index, surveys conducted by the North Korean government perform worst because of their limited replicability, with sometimes not even the anthropometric specifications of the variables used being given. What also became clear when compiling and rating the data was that in fact, no fully representative survey has been carried out on the DPRK to date. As to the UN surveys, this is because the government declared a number of counties inaccessible. Yet the UN surveys still performed best in methodological terms, so that they seem to be the second best solution for applied research. It is important to note that we rated all surveys irrespective of the fact which material we actually received for this publication. As we actually obtained UN data from 1997 and 2002 for our own research, it was interesting to find that the UN survey of 2002 performed best in our conceptual ranking; and that the 1997 survey carried out by the WFP was the 4<sup>th</sup> best anthropometric survey ever carried out on North Korea. Thus, we were able to base our study on data of excellent quality overall.

In chapters 5 and 6, we used anthropometric measurements as endogenous variables in order to explain a set of socioeconomic and partly biological variables which were assumed to have an effect on North Korean child welfare. We primarily tested a number of historical hypotheses which have accrued in the literature on the North Korean humanitarian disaster of the 1990s. For two reasons, these two chapters have become the core of this publication. First, they aimed at identifying the underlying mechanisms of human welfare in North Korea. As previous studies put emphasis on the gross-nutritional components of child malnutrition, we investigated its socioeconomic determinants for the first time in applied research. Second, from a methodological point of view, a quantitative and joint testing of these historical and

thus rather qualitative determinants of the standard of living in North Korea has not been done before, either.

Particularly, in chapter 5, we focused on the peak of the famine period by considering data collected in 1997. The heights of about 4000 North Korean pre-school children were measured. As no additional variables were collected in the course of the survey, we linked the height outcomes to socioeconomic information published in data maps, a demographic dataset released by the government, and the meteorological records of weather stations located in North Korea. Since most of these data were only available on a county-level, we here opted to run a regional analysis by aggregating height outcomes per county. A drawback of the 1997 survey was that the government selected the institutions where the children were measured. Although selection biases could not be ruled out completely, we assumed them to be rather low since Pyongyang might have selected 'average' institutes as a balancing act between urgently needed food aid and political embarrassment. Interesting features of the 1997 survey were that it was historically the first systematic survey on North Korean child welfare and, more importantly, that it was conducted close to the famine years, peaking in the mid 1990s. Making use of OLS-regression analysis with height outcomes as the dependent variable, we controlled for military installations, flood damage, harvest (proxied by historical weather data), the PDS, dependent persons, industrial and agricultural regions, politically triaged areas, and rural versus urban areas. Of these, the two harvest proxies - the number of rainy days and the amount of frost days in 1996 - turned out to be statistically significant. We argued that local farmers' markets can most likely be assumed to have caused this effect. Astonishingly, we did not see any of the other much debated variables come out statistically significant: the local economy, the population size of the county, military headquarters as a proxy for political elites, and flood-damaged areas did not play a systematic role in determining human well-being in North Korea. In this light, the regional food supply through

semi-legal grey- and black markets seems to have had a dominant impact on people's welfare at the peak of the famine.

As distinct from the foregoing chapter where we focused on the famine years, chapter 6 investigated North Korean well-being in the year 2002, which was already in the post-famine period. Also, in contrast to the 1997 survey, socioeconomic information was gathered through interviews with mothers along with the height and weight data of about 6000 North Korean pre-school children. More importantly, unlike in 1997, children were not pre-selected by the government in 2002. As to the quality of the data, we addressed two technical issues. Firstly, we showed that the presence of North Korean officials during the surveys did not bias the quality of the answers the mothers gave. Secondly, the fact that the government excluded some of the counties from the sampling universe prior to the implementation of the survey will hardly matter when analyzing human welfare in North Korea, as the overwhelming majority of North Korean households is represented in the survey. When regressing height and weight outcomes on a set of biological and, more importantly, socioeconomic variables, we paid particular attention to age, sex, the social status of the family, household dependencies, gross-nutritional intake, or geographical regions. Based on our analysis, we find an expected and statistically significant impact of the age of the child and mother as well as the sex of the child. In contrast, social status and wealth proxies at the individual and household level did not come out statistically significant, which might be the most intriguing result found here, as it is frequently argued that the North Korean elites should be systematically better-off. We found neither a consistent effect for geographic regions nor rural-urban classifications. However, city provinces seem to be roughly better-off. Most importantly, when looking at household dependencies, we found that children living with families who benefit from UN food aid are healthier than those depending on the government, farmers, or their own production. In this context, the further delivery of international food aid can be assumed to mitigate the effects of the ongoing food crisis in North Korea.

In contrast to chapters 5 and 6 where we were primarily interested in the socioeconomic effects on human well-being, chapter 7 focused on human-biological effects by investigating birth seasons as an interesting and rather unexplored determinant of human development. Birth season is a reliable proxy for nutritional and epidemiological circumstances in early life, which in turn systematically influence late-life health outcomes such as stature. We here made use of the two surveys conducted in 1997 and 2002, as individual information on stature and the date of birth is contained in both datasets. Using pooled regression analysis, we could verify a number of studies showing that cohorts born in winter are smaller. We found cohorts born in fall to be taller, suggesting that the harvest period mattered for biological development. Additionally, when we controlled for sex, birth place and birth year, these calendar effects remained robust. We also discussed socioeconomic confounding, i.e. unobserved early-life factors that are closely correlated with birth season. We concluded that socioeconomic differences, a heavy work load, selective survival, and eating rituals are not likely to have caused the anthropometric calendar effects observed. On top of this, as these calendar effects could also be detected separately in the 1997 and the 2002 surveys, we also provide evidence against a unique statistical artifact. From a practical point of view, given the humanitarian dilemma of how to deal with totalitarian North Korea politically, it may be concluded that Pyongyang can easily influence the biological welfare of its people by interfering into the birth calendar in order to reduce the magnitude of a potentially upcoming famine. Summing up chapter 7, the combination of the anthropometric and the birth-month-pattern literature proved to be a quite innovative, powerful and a statistically reliable concept for dealing with the birth aspects of human well-being. Also, our main finding that the harvest *season* matters for North Korea seems to be consistent with chapter 5, where we found that the harvest *region* played a dominant role at the peak of the famine. Therefore, chapters 5 and 7 both provide evidence for the significance of a national harvest during crisis periods.

Summing up chapters 5 to 7, our most important answer to the question of what has determined human welfare in North Korea is that the large set of politically debated variables did not seem to have mattered systematically: neither the reasons given by the North Korean government such as the floods, nor reproaches by the international community such as the military-first hypothesis seemed to have caused the failure of child growth in North Korea. In particular, the argument that the political elites are better-off has been quite debated in the media. Admittedly, we cannot rule out some measurements errors for the 1997 survey as we aggregated height outcomes on a county level, but we would have expected to see a strong and significant effect in the 2002 survey - where we had excellent proxies for the social status of the household – but could not detect this effect in the data. Other much-debated historical determinants like political triage, the PDS and rural vs. urban areas do not seem to be of importance from a statistical point of view. For all these reasons, it may be concluded that the ongoing discussions on North Korean human welfare seem to be rather exaggerated both in the scientific literature and in the media – perhaps due to their huge political, humanitarian and, last but not least, emotional dimension given the context of totalitarianism in North Korea. Instead, we presented rather unspectacular evidence by identifying the local North Korean harvest as a major determinant: human welfare in North Korea seemed largely dependent on the harvest season and harvest region in which a child was born. This is a quite apolitical and sober, yet logical finding. The perhaps most intriguing finding is that international food aid seems to have mattered for the well-being of North Korean children, which provides evidence against many critics in the field who argue that our food aid does not reach the people.