Master Thesis

Did Socio-economic Changes Affect the Health Status of Children?

Evidence from the Indonesian Family Life Surveys

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Preface

The first time I was asked about the topic for my master thesis, was before the Christmas holiday in 2004. I could not readily answer the question then. Ideas about worthwhile research subject in the field of Demography were somewhat unclear to me at that time. Even though I had previously been involved in a number of research studies, I have only just learned the first half of the overall courses to be delivered for the Master programme in Population Studies. It was therefore quite difficult for me to think about what sorts of aspects to look for in order to arrive at a sound topic for such research in the demographic context.

Around the same time, I met several of my senior acquaintances from the *Vrije Universiteit* in Amsterdam who had previously worked with me on a number of occasions, mostly in conjunction with conducting researches in the field of economic developments. We had quite an extensive discussion on the subject of my chosen field of study, especially, related to the topic for my master degree thesis. Robert Sparrow and Chris Elbers challenged me to incorporate my knowledge and previous work experiences in the field of economic developments with that of demographic contents, which is also inline with Inge's suggestion.

The idea for this thesis was thus started right then. For the purpose of the study, I decided to further explore the results of the Indonesian Family Life Survey (IFLS), which was designed as a longitudinal study, and contains rich sets of household data. Henry Sandee, one of Robert's roommates, provided me with the most recent IFLS reports published by ISEAS. I am therefore very grateful for the supports, sharing of ideas, and encouragements given by all the above brilliant people.

A few months later, after Leo van Wissen was chosen as my supervisor, I asked him for a meeting to discuss my proposed subject for the thesis. It was Wednesday, March 9th 2005, when I came to his room for our first meeting. I was actually a bit worried, since I felt that the topic I had in mind did not clearly linked with demographic contents. Nevertheless, I was surprisingly relieved when Leo allowed me to work on my proposed thesis. Not only did Leo clarify that my chosen topic on health status is still relevant in the Demographics context, i.e. as an indirect indicator for mortality, he had also helped me in making my proposed topic relevantly focused.

Leo has always been helpful and supportive ever since the beginning. Whenever I was stuck during data analysis process, he often gave me fresh ideas on how to best approach the problems at hands, not to mention the warm cup of tea he often provided me during our discussions and meetings. Thank you Leo for the fruitful discussions, your help and guidance, the permission for doing the thesis that I like, and above all, for the excellent supervising.

Working with the IFLS data has not been a walk in the park. Even though I have spent a number of years working on various sets of micro data, I have to admit that dealing with panel data from all the waves of the survey has been a really hard work for me. I missed the times when there are plenty knowledgeable people around me to whom I can ask if I encountered such difficulties. However, everything here is different. I have to do all the tasks purely by myself, with the guidance from the supervisor, of course.

There have been a number of people in the past to whom I owe their help and supports for improving my skills and knowledge in the research disciplines. My seniors, Asep Suryahadi and Sudarno Sumarto of SMERU with whom I closely worked for many years, had been very helpful to me in providing insights and understandings particularly about economics related subjects. There is also Kathleen Beegle of the World Bank, whom I knew in person from the course in the analysis of the economic crisis impact using panel data in Makati City, the Philippines. Gaurav Datt, Jonathan and Dominique Haughton also helped me to learn how to work, construct, and analyse panel data, particularly for analysing the impacts of the economic crisis. My grateful thanks also goes to Paul Glewwe for sending me such great books on the LSMS panel households' survey which, perhaps, could take me another year to finish reading due to its rich and huge contents.

This study would also not be possible without the availability of IFLS data for public access. I am therefore very grateful to the RAND Corporation for making it possible to have access to the raw data for research purpose.

My grateful thanks also goes to Inge, particularly for her continuing supports and encouragements, even before I arrived in the Netherlands. I would also like to thank her for delivering the Population Debate course, in which I can better express myself by writing a paper that is rightly relevant to my interests.

I would also like to express my appreciation to the members of the Population Research Centre (PRC) of the University of Groningen. With them, I am growing and learning a lot every day, especially on the subjects of Demography. I feel very lucky to have such friendly atmosphere in the PRC. Special thanks goes to Nadja for not only being such a good lecture, but also a great friend. Thank you Nadja for giving me a place to stay in Berlin and for sharing your great mother and aunt.

Special thanks also goes to Sudarno Sumarto, Asep Suryahadi, Menno Pradhan, Agus Sutanto, and Chris Elbers, who provided me with reference letters which help to secure my scholarships for further study in my chosen field. Especially for Menno, the person whom I always ask for reference letter, even now that I am here.

My grateful thanks go to my classmates in the 2004/2005 MSc program in Population Studies at the University of Groningen, also for my Indonesian friends, for with their presence and friendships, I am not feeling too far away from home. Especially for Ami, who helped me many times to acquire books from the Faculty of Social Science's library, and also for your great friendship.

Special credit goes to STUNED for providing me with the funding to study at the University of Groningen, Netherlands. Without such funding, the opportunity to improve my academic standings would just be too hard to achieve. I would also like to thank the Delta of Rijks*universiteit* Groningen (R*u*G) and the Joint Japan/World Bank Graduate Scholarship Program (JJ/WBGSP), who also offered me such opportunity to have their funding for my further study. However, I could not accept all of those due to the rules of the funding source institution.

I am also very grateful to the audiences at the DIW Berlin during the presentation of this thesis. Particularly for Tilman Brück, for his comments and inputs on the modelling parts of this thesis, as well as the refreshing discussions on econometric modelling thoughts.

My great thanks also goes to my mother, for her best wishes, great love, and care, and also to my brother and sister and their families. My father, if you were still alive, I am pretty sure that you must be very happy to see what I have accomplished so far. Even now, I believe that you are watching me from your great place, for certain.

Last but not least, the extremely grateful thanks goes to Rudy, who always give me supports, encouragements, and love without ending. He has always been a battery for me to become a strong and independent person. I also thank him for helping me in reviewing this thesis, in order to meet the English standard of writing.

Finally, after the long and hard works, I am very glad that I can finish this thesis on time. I hope that this research can be placed in a broader window, and be useful for whomever wants to explore the knowledge related to the topic of this study. As for myself, I hope that I can perform better and greater researches in the future.

Wenefrida D. Widyanti
August 2005

Non-Plagiarism Statement

By this letter, I declare that I have written this thesis completely by myself, and that I have used no other sources or resources than the ones mentioned.

The sources used have been stated in accordance with the rules and regulations that are applied at the Faculty of Spatial Sciences of the University of Groningen. I have indicated all quotes and citations that were literally taken from publications, or that were in close accordance with the meaning of those publications, as such.

Moreover, I have not handed in a thesis with similar content elsewhere. All sources and other sources used are stated in the bibliography.

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Name	**Place**	**Date**
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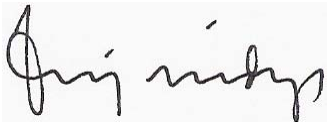
Signature



Did Socio-economic Changes Affect the Health Status of Children? Evidence from the Indonesian Family Life Surveys

Abstract

In the mid of 1997, Indonesia was hit by an economic crisis. Such drastic turn of events resulted in severe consequences being brought upon the livelihood of the majority people in Indonesia. The overall welfare status of the average families was being negatively affected. However, such impacts were later found to be quite diverse among regions, as well as towards different groups of population.

Health status, which serves as an indirect indicator to mortality in demographic context, was perceived to be significantly affected by the worsening of conditions. Being perceived as highly vulnerable groups, woman and children were presumed to be severely hit by the impacts of the economic crisis in this respect. Compared to woman, however, the children seemed to be more likely affected by the shocks.

This study aims to investigate the causal-effect relationships, which could potentially explain the changes in the health status of children as a consequence of the economic crisis. Naturally, indicators for the health status of children are in themselves varied. Such variations would almost certainly lead to differences in the results and conclusions being drawn. Therefore, in order to broaden the perspectives in which to look at these inherent characteristics, two types of outcome indicators representing the health status of children are employed in this study. They include self-reported child morbidity indicator, which is represented by the occurrence of child illness during the time span of the study, and a measured anthropometric indicator related to the prevalence cases of wasting in children. The inclusions of both self-reported and measured health indicators are deliberate, so as to highlight and discuss any differences that might arise due to the issues of reliability and systematic bias involved in the data being utilised

By applying descriptive and causal modelling analyses based on panel data of the Indonesian Family Life Survey (IFLS), the results show that not all aspects of socio-economic changes resulting from the economic crisis in Indonesia, prove to be the causal factors of the changes in the health status of children. Nevertheless, there are some specific determinant factors that are proven to be significantly affecting the health status of children as the outcome of this study.

Keywords: Indonesian Family Life Survey (IFLS), health status of children, morbidity, nutritional status, consumption pattern, economic shocks, economic crisis, Indonesia, macro level, micro level, panel data.

1. Introduction

> *"Although the employment and income impact of the crisis has not been disproportionately greater on the poor than on other groups, the poor (and particularly their children) have suffered more from its impact because their low incomes and poor education provided them fewer options to overcome these setbacks. Their ability to augment their incomes by working harder, by economizing on less critical expenditures, or by borrowing or selling their assets to maintain their consumption level are all less than of educated middle-income and upper-income groups. Accordingly, their coping mechanisms are more likely to involve reductions in investments in human capital …"(Knowles, Pernia, and Racelis, p.40-41).*

After several years of notable success in socio-economic developments, Indonesia was struck by an economic crisis, which started in the mid of 1997. It was primarily driven by financial crisis that took over the majority of countries in the Southeast Asia region by storm, as evident from the highly contracted value of the Indonesian currency (Rupiah). There were sharp decline in the key macro economic indicators, such as that of Gross Domestic Product (GDP), as well as steeply increasing of prices (Frankenberg, *et.al.*, 2001).

The economic crisis had led to a number of severe consequences. Not only did it affect the economic livelihood of the general population, it had also worse impacted the overall welfare status of the people, including that of the health sector. It was presumed that the macro economic shocks would immediately cascade down onto the micro level, i.e. at the households level. However, the scale of impact at the micro level, as it turned out to be, varied pretty much on the basis of socio-economic status of the individual household. Such a clue might indicate the sustainability of the households in coping with the shocking turn of events. It is, therefore, interesting to learn how the economic crisis differently affects the households' welfare status, and in particular, with respect to their health status.

It was also believed that the impact of the crisis would vary with respect to different groups of population. Women and children, being perceived as the most vulnerable groups, were presumed to be hit severely by the crisis. Compared to women, however, children health status seemed to be more affected by the impact of the economic crisis. Thus, how the socio-economic changes affect the health status of the children is a very interesting proposition to study.

A number of studies had already questioned and examined the relationship between socio-economic factors and health status, particularly in light of the shocks resulting from the economic crisis (Deaton, 1997; Genel, 2005; Knowles, Pernia, and Racelis, 1999; Mulatu and Schooler, 2002; Paxson and Schady, 2004; Saadah, Pradhan, and Surbakti, 2000; Séguin *et.al.*, 2003). Such studies, however, generally put their emphasises more on the link between the two, instead of having the first factor as an explanatory evident for the latter (Séguin *et.al.*, 2003).

Interestingly, those studies were also varied widely in terms of the indicators being used. Common use of socio-economic status indicators would typically include income level, assets ownership, employment status, and education level of the head of the households. Whereas for the health status indicators, morbidity, utilisation of health care service, and nutritional status, are usually being used. The use of varying combination of indicators would certainly imply different results and conclusions.

Many scholars, in particular psychologists or sociologists, often claimed that health status also relates to the individual lifestyle, and/or the level of stress they are experiencing (Mulatu and Schooler, 2002). In this study, however, such factors are not being considered, since we shall only be focusing on the children health status. The health status of children, as opposed to adults, are usually not so much influenced by their lifestyle or behaviour, but rather, are more likely to be affected by the socio-economic conditions of the household they are living in. Although the mothers' characteristics and lifestyles might partly contribute to their children health status (Séguin *et.al.,* 2003), these latter factors will not be considered in this study due to the time limitation imposed for the completion of the thesis.

This study will not merely be focusing on the relationship between socio-economic conditions and health status, specifically that of children. Indeed, it is also aimed at providing a review as to what extents the economic crisis, which had caused such dramatic socio-economic changes to the majority of families in Indonesia, affected the health status of the children. Several prominent macro economic indicators reflecting the economic crisis phenomenon will be applied onto a set of micro level models in order to arrive at the correct results and conclusions. Such approach is very much inline with the major belief that the economic crisis is the causal factor for any subsequent conditions as illustrated in the generally accepted conceptual framework.

Many sources reported the problem of reliability with respect to self-reported health indicators, such as self-rated health status or self-reported illness. The reliability issues became more apparent, especially if those indicators were to be linked with the socio-economic status, due to their subjective involvement natures (Thomas and Frankenberg, 2000; Lindeboom and van Doorslaer, 2004). Thus, for the purpose of this study, another measure of health status will also be employed. The second health status indicator is that of the nutritional status, which is usually appraised by anthropometric indicators. Using combination of self-reported and measured health indicators, could provide yet another advantage to this study.

Starting with the description of a number of indicators for both socio-economic and children health status, the modelling analysis performed in this study is expected to explain the causal-effect relationships between socio-economic changes - primarily driven by the economic crisis- and the health status of the children. In addition to the socio-economic status of households, information related to the supply side of health care, e.g. availability of health care provider (supply side) should also be accommodated as additional explanatory variables of the model.

Finally, it is the purpose of this study to provide comprehensive information and analysis that will enable a broader approach in figuring out the pathways of events prompted by the economic crisis. Such events lend themselves to the socio-economic consequences that resulted in the outcome indicated by the health status of the children (Block *et.al.*, 2004; Knowles, Pernia, and Racelis, 1999).

1.1. Background

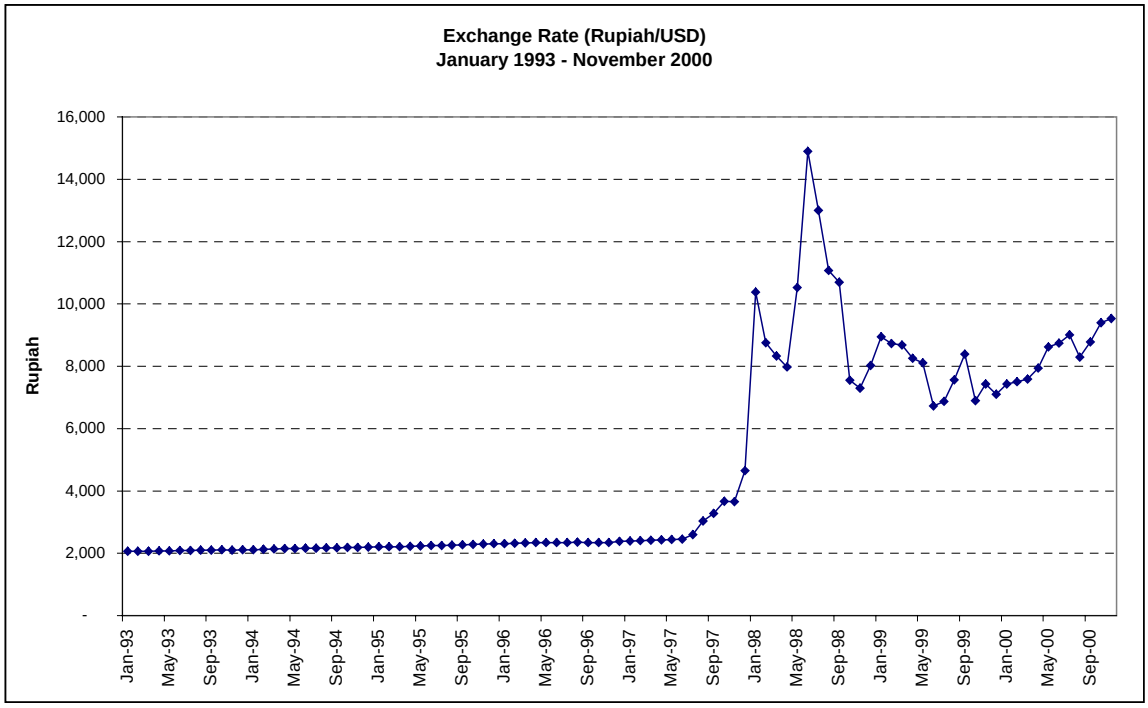
Indonesia economic crisis and its socio-economic consequences

As previously mentioned, in the mid of 1997 Indonesia was struck by economic crisis that was part of the larger effects of financial crisis within the Asian region. The crisis has led to substantial downshift in the key macro economic

indicators. The turn of events was clearly indicated, for example, by a sharp depreciation of the Rupiah/USD exchange rate which can be seen in Figure 1.1 below, a shrinking of GDP by as much as 14% in the year of 1998 alone, and a steeply increasing of domestic prices, particularly in the food categories (Block *et.al.*, 2004; Knowles, Pernia, and Racelis, 1999).

The Indonesian currency value fell down to as low as 15% from its prior-crisis value within one-year period. Consequently, it had then triggered a sharp increase in domestic prices, particularly for food commodities (the general inflation rate was 78% in 1998, while food prices increased by 118%). Another contributing factor to the worsening of conditions was the severe drought caused by *El Nino* (Sumarto *et.al.*, 2004). The worst condition of the crisis was felt during the month of May 1998, when the New Order Government crumbled. At that time, the crisis had not only badly crippled the economic foundations of the nation, but had also led to the declining of overall welfare status of the families, including their health aspects.

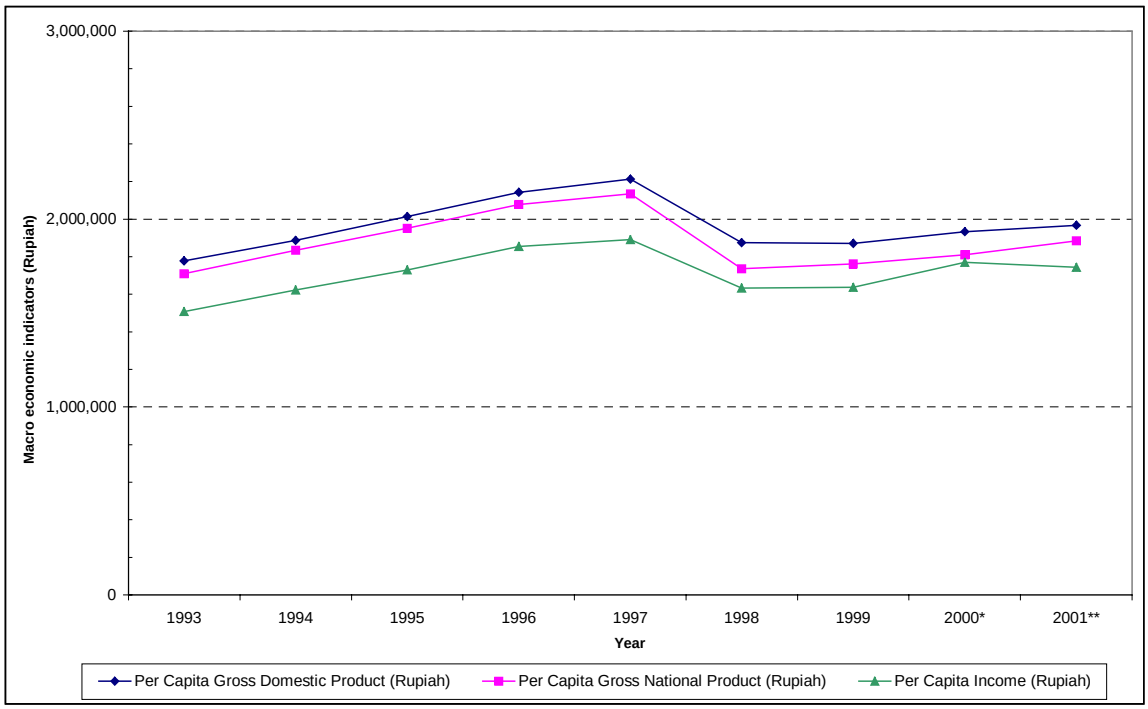
Figure 1.1. Rupiah – USD Monthly Exchange Rate, January 1993 – November 2000



Source: BPS – Statistics Indonesia

Prior to the crisis, however, Indonesia had noted a number of successful socio-economic developments. These facts can be seen from the continuously improving of macro economic indicators until 1997, as illustrated in Figure 1.2. After sudden drop within the period of 1997 – 1998, those indicators were then becoming almost stable in the following year. Although they have since increased slightly, their levels have yet to reach the equivalent levels as that of the last year before the crisis.

Figure 1.2. Macro Economic Indicators, Indonesia, 1993 – 2001
(1993 Constant Market Prices)



Source: BPS – Statistics Indonesia

Daly (1999), accordingly, has also acknowledged the fact that before the crisis, Indonesia had made impressive gains in the community health developments. Health and family planning programs substantially reduced infant mortality from 145 per 1,000 live births in 1967 to 46 per 1,000 live births in 1997.

The decline of the macro economic indicators, translated into the rising of poverty -a well-known welfare indicator- during the crisis period. Based on the World Bank's methodology in measuring poverty using the consumption module of the Indonesian National Socio-economic Survey (so-called *SUSENAS*), it was found that there was an increase of poverty rate[1] from 15.74% in 1996, to 27.13% in 1999, or almost two-folds within 3 years period (Pradhan *et.al.*, 2000).

The increasing percentage of poor people was claimed to be a direct consequence of the economic crisis. Because of this, there are other worsening conditions which started to emerge, such as lack of sufficient food, that was partly also due to the *El Nino* drought, as well as less access to health services, particularly for the poorer of households, due to the higher prices of medications and health care supplies (Frankenberg *et.al.*, 2001). Many cases of malnutrition and declining health conditions, i.e. morbidity, were therefore also supposed to be the effects of the economic crisis.

Kusnanto (2002) further argued that the impacts of the economic downturn as a consequence of the economic crisis, varied among regions. He categorised the provinces in Indonesia into 3 regions based on the perceived level of the impacts of the crisis. His classifications are as follows. Region 1, which consists of the islands of Java and Bali, was perceived to be the most severely hit by the economic crisis.

[1] Poverty rate is defined as a percentage of people living below poverty line to total population; in this case, it was based on expenditure concept.

Region 2, which covers Sumatra, Sulawesi, and Maluku, was almost unaffected by the crisis. In some cases, they might even had benefited from the crisis, since those areas are generally the producer of exported materials, which could reap extra profits due to the lower exchange rates. The last region, Region 3, covers the remaining areas, including West and East Nusa Tenggara, Kalimantan, and Irian Jaya. In addition to experiencing the impacts of the economic crisis, Region 3 also suffered from the effects of *El Nino* drought as well as occasional disturbance of forest fires.

The result of his study revealed that children from poor households in Java and Bali that were perceived to be the most affected by the economic crisis, showed mild changes in nutritional status and even the lowest proportion of cases of severe underweight. On the other hand, children from poor households in the Region 3 that also suffered *El Nino* and forest-fires were shown to have the worst deterioration in nutritional status during the period from late 1998 to late 1999. Even to date, in some provinces at those regions, many cases of child malnutrition are still happening. This might indicate a prolonged effect of a series of difficulties that are experienced in those areas, e.g. economic crisis, natural disasters, poverty, and also lack of sufficient resources[2].

Labour market was another sector directly affected by the economic crisis. Many cases of losing jobs, declining or even losing earnings due to reduced working hours and/or retrenchments in many establishments, had already happened during the crisis period. Based on the annual labour force surveys conducted in the month of August between the year of 1997 and 1998, the percentage of those who works for less than 35 hours per week, had increased from 35.8 to 39.1%. Changing from formal to informal job sectors was also shown to be evident. The share of informal sector employment[3] towards the total had increased from 62.8% to 65.4% between 1997 and 1998, particularly in the urban areas. In the mean time, the unemployment rate had also slightly increased from 4.7 to 5.4% during the same period (Knowles, Pernia, and Racelis, 1999).

Those illustrated facts contribute directly to the socio-economic challenges at the micro or household level, which often forced them to have coping mechanisms in order to deal with the emerging consequences of job cuts and/or reduced income (Deaton, 1997; Stillman, 2001). Based on a number of socio-economic surveys, both pre- and post-crisis periods, it can be seen that the real per capita expenditure pattern had also shifted towards increasing share of food consumption with respect to the overall expenditure. It was believed that the majority of people considered prioritising their expenditure for food rather than on the non-food spending (Deaton, 1997; Knowles, Pernia, and Racelis, 1999; Stillman, 2001). Economic downturn and the changing patterns in consumption behaviour might potentially cause such worsening welfare status -including the health status- of many people.

Knowles, Pernia, and Racelis (1999) also alleged that the crisis had adverse impacts on the human development aspects, due to several reasons driven by the opposing conditions between reduced income and increase of prices. Longer hours of work were often seen as a means of coping with the falling income in order to

[2] Internet sources news: http://www.antara.co.id/en/seenws/?id=4582, 21 June 2005; http://www.reliefweb.int/rw/rwb.nsf/0/8b8bfddc132e88e9c125701a002ae56c?OpenDocument, 8 June 2005; http://news.surfwax.com/food/archives/Malnutrition_Food.html, 3 June 2005.

[3] Informal sector workers are defined crudely as all self employed and family workers, whereas formal sector employments are defined to consist that of employers and employees types of job status (Knowles, Pernia, and Racelis, 1999).

maintain the current level of consumptions. Their findings also stated that the poor group suffered more from the impacts of the economic crisis in their overall aspects of life than those in the non-poor group category. Children, particularly from the poor households, became a vulnerable group to the impacts of the crisis. It was claimed that their health and education, which are parts of human development aspects, were negatively affected by the economic crisis.

Most health indicators suggested that several deteriorations had already taken place during the worse part of the crisis (Block *et.al.*, 2004; Paxson and Schady, 2004; Rukumnuaykit, 2003; Stillman and Thomas, 2004). Increasing number of low birth-weight babies, for example, were more evident during the period of 1997 to 1998. This fact partially reflected the mother's malnourished level, and thus became an intergenerational issue of child malnutrition. By applying parametric estimation using hazard models (Rukumnuaykit, 2003), the probability of infant mortality was found to be higher. Malnutrition, particularly during childhood, is likely to have negative long-term effects on their performance as adults (Rukumnuaykit, 2003; Setboonsarng, 2005). Additionally, morbidity that heightens the chances of dying should also be underlined as another indicator for health status.

Block *et.al.* (2004) underlined the fact that micronutrient intake is one of particular concern. Steep increases in the prices of food, led to poorer quality of dietary intake in terms of micronutrient contents (Block *et.al.*, 2004; Deaton, 1997). Based on the Nutrition Surveillance System (NSS), which was conducted in 14 rounds during the period of January 1996 to January 2001, it was found that in certain regions (rural Central Java), the crisis had already taken a significant impact on the nutritional status of the children (Block *et.al.*, 2004).

Table 1.1 below summarises the price changes for selected commodities of food in the urban markets across 27 provinces from January 1997 to October 1998 (Block *et.al.*, 2004). It could be argued that the sudden jump of prices for various food commodities as direct consequences of the crisis, might contribute to the worsening of health conditions. High inflation rate, particularly for food prices, was driven by a combination of lack of supply owing to the *El-Nino* droughts, as well as the collapse of Indonesia's currency (Rupiah) since the beginning of financial crisis.

Table 1.1. Price Changes for Selected Foods (%), January 1997 to October 1998

Commodity	Mean Price Increase	Standard Deviation
Rice	195.2	29.2
Other cereals & tubers	137.5	101.8
Fish	89.1	67.4
Meat	97.0	49.3
Dairy & eggs	117.1	31.9
Vegetables	200.3	129.5
Pulses, tofu & tempeh	95.2	76.0
Fruit	103.7	61.3
Oils	122.0	74.8
Sugar, coffee & tea	142.9	28.3
Prepared food & beverages	81.4	51.7

Source: Based on the analysis of SUSENAS and BPS surveys of urban market prices in 27 provinces (Friedman and Levinsohn 2001, p. 22).

The high increase in food prices, especially for such essential commodities as illustrated in Table 1.1, had driven many poor households into experiencing difficulties in obtaining sufficient level of nutritional consumption (Deaton, 1997). Cases of malnutrition, particularly among children of the poor households, were then become more apparent as indicated by the finding.

Aside from cases of malnourishment, the Indonesian Family Life Survey (IFLS) data collected between 1997-1998, also suggested a number of other evidences. It was found that the share of medical care expenditure towards the total household expenditure had declined by 14% among the urban households, and by 40% among the rural households. In real terms, expenditure on the health care spending had also declined sharply during the same period, despite the rapidly increasing costs of health care services (Frankenberg, Thomas, and Beegle, 1999).

The utilisation of health care services had similarly been affected. While there was no significant difference in the percentage of adults utilising health care service during the one-month period prior to the above IFLS, the percentage of utilisation by children aged 0-15 had been decreasing from 26 to 20% (*ibid.*).

Those facts were further confirmed by the findings of Saadah, Pradhan, and Surbakti (2000). Based on the National Socio-economic Survey (*SUSENAS*) data sets in the years of 1995, 1997, and 1998, it was found that there were notable changes in the demands for health care utilities, reflected by the percentage of people seeking health treatments. The figures for each of the aforementioned years were initially found to be 25.5%, dropping to 24.4%, and then returning back to 25.5% level. Cases of self-reported disruptive morbidity, i.e. morbidity that disrupts daily activities, showed similar patterns. From 1995 to 1997, there was a slight decline from 9.6% to 9.1%. By 1998 however, the figure had gone up to 10.6%.

Analysis of IFLS data also revealed additional facts regarding the status of the health care facilities during those periods of time. Declining availability of haemoglobin level test, vitamin A, as well as stock outages of certain medications, e.g. antibiotics, experienced by both public and private health service providers, were shown to be quite common (Frankenberg *et.al.*, 2001). Since the availability of critical medical supplies could often mean the difference between cured patients and ailing individuals, this shortages could potentially heightens the risks related to the health status of the general population, and in particular, to the children who are considered to be more vulnerable to this types of risks.

In response to the worsening conditions driven by the economic crisis, the Government of Indonesia (GoI) launched a set of programs called Social Safety Net (SSN), which, in local terms, is also known as *Jaring Pengaman Sosial* (*JPS*). As part of the program, the use of health cards that would entitle its holders for free treatments, at select public health service facilities, was introduced. The target distribution of the cards was those who fall under the poor households group category (Pradhan, Saadah, and Sparrow, 2004). However, as indicated by the findings from a qualitative study by the Asian Development Bank (ADB), the program did not quite meet the expectations (Knowles, Pernia, and Racelis, 1999).

According to the study, many people expressed their concerns about the poor quality of services and medications that they would get by utilising the health cards, instead of paying normal tariff as other regular patients did. As such, a significant percentage of those people preferred not to exercise the provided benefits of the programs except in some extreme cases. Additionally, there were also seemed to be

inadequate information passed onto the cardholders as to what they were entitled to get, and most importantly, how to use the cards in order to realise the maximum benefits provided by the program (*ibid.*). In the end, the program did not seem to be too successful in helping the poor getting back to the better-off conditions as it was originally envisioned.

Children Health Status Indicator

Setboonsarng (2005) pointed out that the health status of an individual could be assessed in a number of ways, such as through measurements of growth and body composition (*anthropometric indicators*), analyses of biochemical contents of blood and urine (*biochemical indicators*), and by examining external physical signs indicating nutritional deficiencies (*clinical indicators*). Among those measures, anthropometric indicators are the most common and easy to apply for the purpose of assessing health and nutritional status of an individual, due to their more practical, less expensive, and less time-consuming approaches. However, even though they are useful as general measures of nutritional status, anthropometric indicators could not differentiate the specific causes of malnutrition.

Anthropometric indicators are very useful according to the United Nations Administrative Committee on Coordination/ Sub-Committee on Nutrition (UN ACC/SCN, 1992), since they provide:

- A practical way of describing the problem;
- The best general proxy for constraints to human welfare of the poorest, including dietary inadequacies, infectious diseases and other environmental health risks;
- Strong and feasible predictors, at individual and population levels, of subsequent ill health, functional impairment and/or mortality;
- Under some circumstances, an appropriate indicator of success or failure of interventions directed toward the many economic and environmental factors underlying the deprivation syndrome.

Results of anthropometric measures are commonly used to indicate nutritional status of an individual. The following measures are considered to be appropriate for the indicators: *underweight or overweight* - for deviations of body weight from the expected weight-for-age; *wasted or obese* - for deviations of body weight from the expected weight-for-height; and *stunted* - for deviations of height from the expected height-for-age (*ibid.*).

To compute the anthropometric indicators, four variables, namely age, weight, height (or length for babies), and sex need to be available. The combination of these variables can later be used to assess the nutritional status of an individual; three indices that are commonly used are *weight for age*, *height/length for age*, and *weight for height/length*. When those indices are compared to the standard references of anthropometric magnitudes, they become anthropometric indicators for the corresponding individuals. Such indicators could then serve as the basis for assessing whether or not a person needs to have a special intervention in order to alleviate his/her nutritional deficiencies (Cogill, 2003; Setboonsarng, 2005).

The explanations for each anthropometric indicator, as well as their advantages and/or disadvantages are summarised as follow (Cogill, 2003):

- **Weight for Age/WFA**: the condition of low weight-for-age is categorised as ***underweight*** for a specific age. This indicator may reflect both past (chronic) and/or present (acute) undernutrition, though it cannot distinguish between the two. Therefore, this measure is recommended as an indicator to assess changes in the magnitude of malnutrition over time.
- **Height for Age/HFA**: Low height-for-age/length-for-age index is identified as ***stunting***. This measure indicates past under-nutrition or chronic malnutrition. It cannot measure short-term changes in malnutrition, but it is a good indicator of past growth failure (a number of long term factors such as chronic insufficient protein and energy intake). Stunting can be used for evaluation purposes but it is not recommended for monitoring, since it is hardly changing in a short term (such as within 6-12 months).
- **Weight for Height/WFH**: Low weight-for-height index is identified as ***wasting***, which indicates that children suffer from current or acute malnutrition, resulting from failure to gain weight or actual weight loss. This indicator may change rapidly and shows seasonal pattern. It is responsive to short-term changes; therefore, it is appropriate for examining short-term effects such as seasonal changes in food supply or nutritional stresses due to illness. It is also useful when exact ages are not determined. However, it is not urged for the purpose of evaluating changes in a non-emergency situation, since it very sensitive to seasonality.

Based on the Food and Nutrition Surveillance System (FNSS) conducted in all the provinces of Indonesia, it was found that there were an increasing number of cases of severe malnutrition among under-five children from 1997 to 1999. The national food consumption surveys from 1995 to 1998, further found that there was a decline in the level of calories consumed by many households, which was lower than 1,500 Kcal and 32.2 grams of protein per capita per day, or less than 70% of the recommended daily allowance. Moreover, another finding also highlighted the increasing prevalence of energy deficit from 48% in 1997, to 51% in 1998, which further confirms the above facts uncovered by the FNSS study (Atmarita, 2000 cited by Setboonsarng 2005, p. 11).

Continuing the story after the crisis, Strauss *et.al.* (2004) brought up the result of the developments in Weight-for-Height/WFH for children under 5 years old as described in the following Table 1.2. The result did not prove significant improvements on the chosen indicators, except for girls at the early ages (3-17 months and 18-35 months). This could mean that, although the periods in between 1997 and 2000 were believed to constitute recovery periods, the impacts of the worsening socio-economic conditions might still remain at large.

Table 1.2. Child Standardized Weight for Height among Boys and Girls, 1997 and 2000

	Boys			Girls		
	1997	2000	Change	1997	2000	Change
Age 3-17 months						
Mean	-0.28 (0.127)	-0.35 (0.094)	-0.08 (0.158)	0.05 (0.144)	-0.27 (0.082)	-0.33* (0.166)
% z score ≤ -2	13.4 (2.33)	12.5 (1.52)	-0.9 (2.78)	7.9 (1.79)	11.2 (1.46)	3.3 (2.31)
Number of observations	302	597		305	534	
Age 18-35 months						
Mean	-0.72 (0.088)	-0.80 (0.065)	-0.07 (0.110)	-0.57 (0.117)	-0.85 (0.069)	-0.27* (0.136)
% z score ≤ -2	12.5 (1.82)	13.9 (1.69)	1.4 (2.49)	13.8 (1.88)	14.8 (1.78)	1.0 (2.59)
Number of observations	367	540		374	487	
Age 36-59 months						
Mean	-0.58 (0.085)	-0.60 (0.058)	-0.02 (0.103)	-0.68 (0.071)	-0.61 (0.051)	0.07 (0.087)
% z score ≤ -2	8.8 (1.46)	7.3 (1.08)	-1.5 (1.82)	9.8 (1.46)	8.0 (1.06)	-1.9 (1.81)
Number of observations	569	710		543	726	

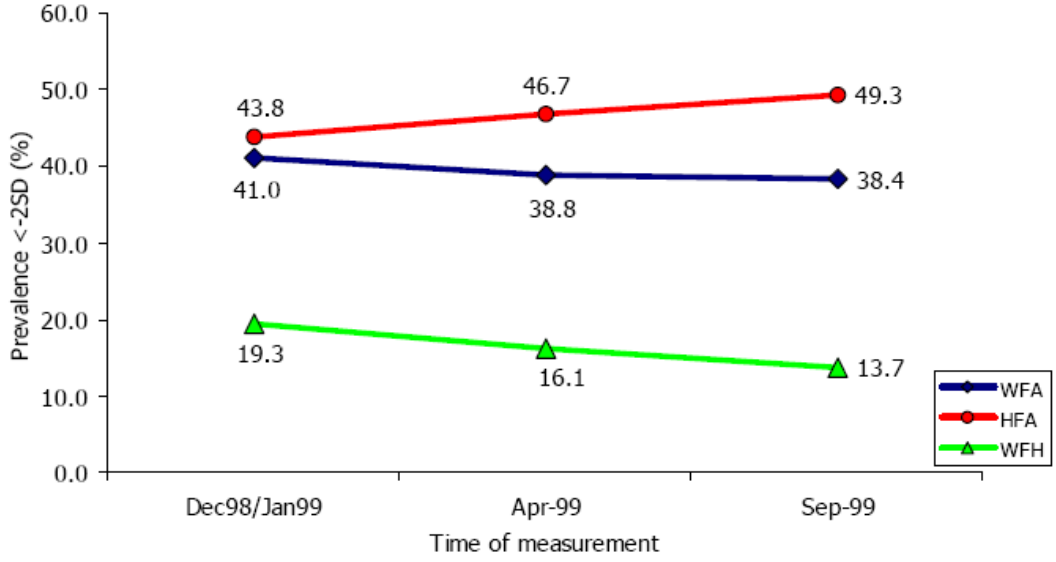
Source: IFLS2 and IFLS3 (Strauss *et.al.* 2004, p.139).
Note:

- Estimates were weighted using individual sampling weights.
- Standard errors (in parentheses) are robust to clustering at the community level.
- Significance at 5% (*) and 1% (**) indicated.

Figure 1.3 below presents the comparison for prevalence of wasting, stunting, and underweight, among preschool children who received supplemental feedings from the Social Safety Net Program[4], at three different points in times. It can be seen from the figure, that the prevalence of underweight (WFA) had not been consistently reduced as well intended. On the contrary, stunting (HFA) had shown an increasing prevalence over the reference time periods. The prevalence of wasting (WFH), on the other hand, had been consistently lessened for as much as 5.5% from the baseline in December 1998/January 1999, up to the end of the project in September 1999. This assessment further highlights the previous disposition that wasting (WFH), which indicates child malnutrition, is sensitive to short-term program interventions, such as those SSN program which provide supplemental foods for the vulnerable group, i.e. children of the poor households.

[4] The data was obtained from the survey in a small-scale study conducted during 1998/1999 to investigate the impacts of the social safety net programme in 5 provinces in Indonesia (Central Java, Yogyakarta, East Java, West Nusa Tenggara and South Sulawesi).

Figure 1.3. Comparison of the Prevalence of Wasting, Stunting, and Underweight among Preschool Children (N=4500) Who Received Supplemental Feeding from Social Safety Net Project



Source: Setboorsarng, 2005 p. 15.

Other indicators such as morbidity can also be used to infer the health status of children. The National Socioeconomic Survey (*SUSENAS*), for example, reported that the percentage of the population who stated health problems during a certain period before the survey, had increased from 12.8% to 14.6% between the years of 1997 and 1998 (Sigit 1998, cited by Knowles, Pernia, and Racelis 1999, p. 30). The above self-reported health problems, can clearly be used as a morbidity indicator.

It will be quite a challenge to study as to what extent the impacts of the economic crisis, which resulted in the fundamental changes of socio-economic status of the majority people in Indonesia, would affect the health status of children. The relations between child health status, morbidity indicators, as well as anthropometric and other measures, deserve further investigations. Therefore, it is the aim of this thesis to study any such relationships.

1.2. Objectives

By clearly depicting and evaluating changes in the households status and characteristics, the health status of children, and the availability of health care services on the supply side, in the periods before and after the crisis, this study aims to assess how the socio-economic changes resulting from the recent economic crisis in Indonesia, affect the health status of children.

1.3. Research Question

The research questions are defined as follows:

1. *What are the main changes in the health status of children for the periods before and after the crisis?*
2. *What are the effects of the level and the changes in socio-economic status of households towards the health status of children?*
3. *What are the effects of the level of availability of health care services on the supply side towards the health status of children?*

1.4. Organization of the Thesis

The remainder of this thesis is organised as follows. The next chapter, Chapter 2, describes the theoretical part of this study, including the conceptual framework, hypotheses, and definitions of the concepts being employed for analytical purposes. Chapter 3 explains the sets of data being utilised in this study, the methodology being applied, and the operationalisations of the concepts. How the predetermined indicators are used to measure the facts shall also be explained in this chapter. Chapter 4 shall then present the results of this study, both in descriptive manners as well as from statistical modelling perspectives. Finally, the last chapter, Chapter 5, shall discuss the conclusions obtained from the results of this study, followed by several points for further discussions.

2. Theoretical Framework

> *"The basic idea is that causes and effects cannot be understood by themselves alone, but only in the context of process, i.e. a series of events or changes of states taking place in a non random way …" (Wunsch, 1988, p.37).*
>
> *" … the conditions under which observable changes in real income can be used to infer changes (increases or decreases) in utility. … The fundamental attraction is that it allows for the possibility that people make utility-enhancing trade-offs across any goods, activities, or states over which they have ability to choose …" (Hansen and Grubb, 2002).*

In order to better understand the processes involved in this study, a conceptual framework needs to be firstly established. Such framework shall define a range of concepts that will be used; as well as any relationships that those defined concepts might have among one another. How each relationship actually plays its roles within the conceptual framework shall be explained using the Hume's Causality Theory that was formulated in the eighteenth century.

According to Hume, a causal relationship arises from the experience of observing objects that are constantly conjoined with each other. Hence, causes and effects are discoverable by experience. He has also acknowledged that the causality perceived is structured by our assumptions, theories, and measurement procedures. One major advantage of this theory is that it could be implemented as the basis of testing hypothesis with both experimental and non-experimental data (Wunsch, 1988).

In addition to the causality theory, another approach is also being employed in this study, especially in order to explain such things as coping mechanisms among the households in response to the crisis. It is a well-known fact that the worsening economic conditions had forced the majority of households to strive for the right strategies to cope with many of its negative consequences. This second approach is thus necessary, and is based on the utility theory.

At the micro or households level, the utility theory distinguishes coping mechanisms into two distinct processes of decision-making strategies. One is categorised as *decision making under risks*, for which the probabilities are explicitly given; while the other one falls into the category of *decision-making process under uncertainties*, where the probabilities are not explicitly given (Bohren, 1990). The two decision-making strategies, however, cannot be easily identified in practice. As such, during the later analysis steps and procedures of this study, this process distinction will not be further considered.

Households coping mechanisms might reveal themselves as changes that can be observed in the households' behaviours, particularly with respect to their consumption patterns. Such tendency is also known as "consumption smoothing" (Wakai, 2004). The households coping strategy can thus be indicated from, among others, the adjustments made to the quantity and/or quality of the food being consumed by the households.

Other likely strategy would be to try to reduce the non-food expenditures. Should this happen, however, it is possible that the health related provisions were among the lesser of priorities. Reduced health care spending would almost certainly result in increased risks and lower status of health of all the members of the households (Knowles, Pernia, and Racelis, 1999). Aside from those possibilities, there

might be other indirect factors, such as poorer sanitation, which could also lead to higher probability of illnesses/morbidity.

2.1. Conceptual Framework

On the basis of macro-micro level and process–context approach of social theory, the impacts of the economic crisis can be observed from both macro and micro level perspectives. For the purpose of this study, the conceptual framework begins by outlining and describing the events and processes, which can be observed at the macro level. From this point of view, the economic crisis is then supposed to be the causal factor for any subsequent outcomes, such as that of the drastic socio-economic changes being felt further down at the households or micro level.

Sudden drops in macro economic indicators, such as that of the decline of economic growth, the depreciation of the currency, and the exceedingly high inflation of rates, serve to identify the impacts of the economic crisis at the macro level. Many researches have proved the cascading effects of the worsening conditions at the macro level towards similarly negative changes in the socio-economic status reflected at the micro level (Block, 2004; Datt and Hoogeven, 2000; Knowles, Pernia, and Racelis, 1999; Rukumnuaykit, 2003; Strauss, J. *et.al.*, 2004). Furthermore, macro economic indicators such as the Gross Domestic Product (GDP), which represents an aggregate function of its compounding components, could be drilled down into the regional levels to provide better context for analysis due to the varying degrees of socio-economic conditions in the country.

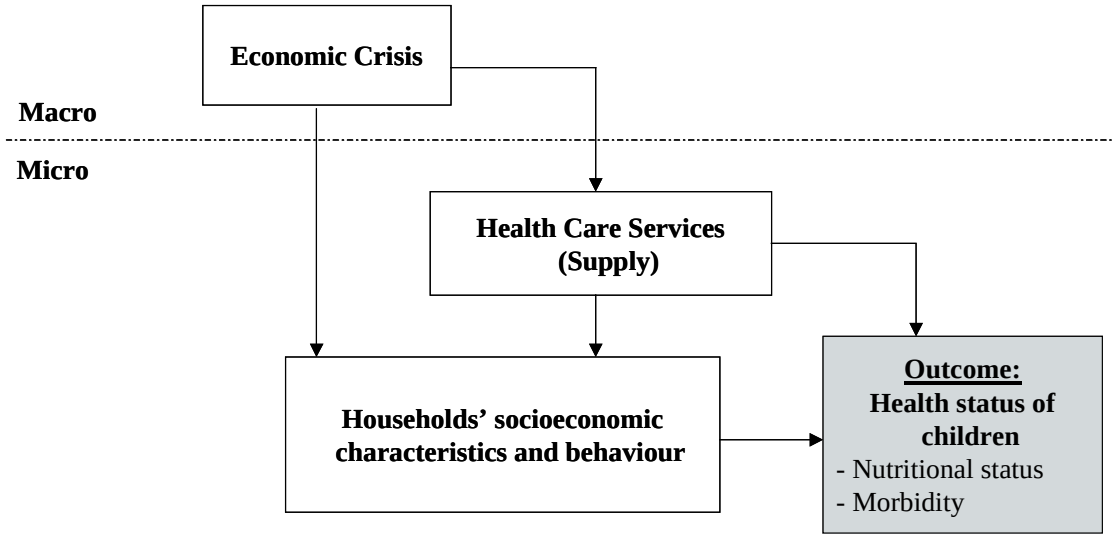
At the household level, those phenomena are revealed by a notable decline in several critical socio-economic indicators. Reduced levels of income, as well as downward shifting of employment status, are examples of sensitive indicators, which were readily affected by the prevailing conditions. According to the utility theory, these will certainly lead to the behavioural changes in the households' expenditure patterns.

Behavioural changes are necessary, and often mandatory, in order to cope with the negative changes on the economic status of the households. As previously stated, the changes could be observed either from the lower quantity/quality of food consumption, or by the larger proportion of food to non-food spending (Deaton, 1997). Either one of these carries certain consequences with respect to the health status of the households' members. Lower quantity/quality of food consumption might lead to cases of malnutrition, whereas higher proportion for food expenditure might imply lower priority for health related provisions.

In addition to the intrinsic consequences of the downward changes in socio-economic status of the households, health status is also affected by several other external variables. The availability of health care services or facilities on the supply side, which in itself is also somewhat influenced by the economic crisis, can also shape the demands for this sector from the households' point of view. Additionally, there are also other environmental factors that need to be taken into account. Housing conditions such as availability of electricity, building materials, and above all sanitary conditions, for example, are known to have impacts on the overall morbidity level of the households.

Children are being perceived to be more vulnerable to the changing socio-economic conditions, which adversely affect the health status of their family. In the conceptual framework, the health status of children is, therefore, assigned as the outcome of the causal processes. A set of which, are the results and consequences of the economic crisis in Indonesia. Figure 2.1 below; illustrate the conceptual framework as well as the relationships among the individual components involved therein.

Figure 2.1. Conceptual Framework



2.2. Hypotheses

Based on the stated research questions in the previous chapter, there are three hypotheses to be made as follow:

1. *The indicators of socio-economic status (SES) of households and health status of children tended to dramatically decline in the period during the time of the crisis, followed by gradual improvements later on.*
2. *The households' SES and characteristics, and also its changes as consequences of the economic crisis affected the health status of children.*
3. *The existence of the supply side of health care contributed to the health status of children.*

2.3. Definition of Concepts

Referring to the previous description of the conceptual framework, the definitions of each concept are explained as follow:

Macro–micro transition and *micro-macro transition* in the process-context approach: is defined as "*two components of the type of social theory under consideration, through which the transition from macro to micro and the transition back to the macro level occur, can be conceived of as the rules of game, rules which transmit consequences of an individual's action to other individuals and rules which derive macro-level outcomes from combinations of individuals' actions*" (Coleman, 1990 p. 19).

Economic crisis: is defined as the crisis in Indonesia that started in the mid of 1997 as a result of the Southeast Asia financial crisis. It was prompted by Indonesia's currency depreciation, and led to the worsening socio-economic as well as several other welfare indicators, which reached the worst condition in May 1998 when the undermined-regime of President Suharto resigned (Block *et.al.*, 2004).

Health Care Service (Supply): in this context, is defined as the availability of health care service provider, i.e. Public Health Centre/PHC (so-called *Puskesmas*), within the community, i.e. enumeration area (EA).

Households' socio-economic characteristics: in this context, is defined as a set of household variables including household head's characteristics and occupational status; socio-economic status of households, e.g. consumption level; and housing characteristics, for instance, whether the house is equipped with electricity and proper sanitary facilities. The changes in socio-economic aspects such as expenditure and occupational status are also included herein.

Households' behaviour: in this context, can be translated as coping mechanism in response to the shocks that were caused by the economic crisis. It might be realised as changes in the consumption patterns such as decreasing of quality and/or quantity of food, or increasing proportion of food share spending.

Health status of children: in this study is defined by two indicators, i.e. illness -as an indicator of morbidity- and anthropometric indicator -that also reflect the nutritional status. Child, in this context, are defined as a person with age less than 15 years old, according to the concept used in the Indonesian Family Life Survey (IFLS), which is used as the primary source of data.

Nutritional status: in this study Weight-for-Height/WFH is chosen to be the nutritional status indicator, due to it being appropriate for examining short-term effects related to seasonal changes in food supply and/or other nutritional related shocks and interventions. Additionally, for the purpose of causal modelling construction, the nutritional status indicator utilises the cut-off point of WFH for wasting prevalence, which is defined as the result of weight falling below the expected values for a child of the same height/length (children under 2 years age), i.e. the z-score for the individual WFH is less than –2 SD of the standard reference for WFH (Cogill, 2003).

Illness: is defined as a child being ill during the last 4 weeks before the interview/ survey, in at least one category of illnesses namely headache, toothache, eyesore, cough, respiratory problem, fever, diarrhoea, skin infection, earache, and worm infestation. The selection on those types of illness is based on them being consistently questioned in all the three waves of the IFLS.

Morbidity: according to the definition in the questionnaire, morbidity is defined as the occurrence/incidence of illness in a population during the specific time reference, i.e. within the last 4 weeks before survey. Furthermore, morbidity can be differentiated specifically for any one type of illness defined, or in generic term, which covers all the types of illness. In this study, morbidity is also further restricted to self-reported cases of illness for children aged less than 15 years old.

3. Data, Methodology, and Operationalisation

3.1. Data

In order to answer the research questions, this study utilises the Indonesian Family Life Survey (IFLS) data sets. The IFLS was designed as a longitudinal survey that was initially held in 1993. This household survey was also accompanied by extensive community and facility data.

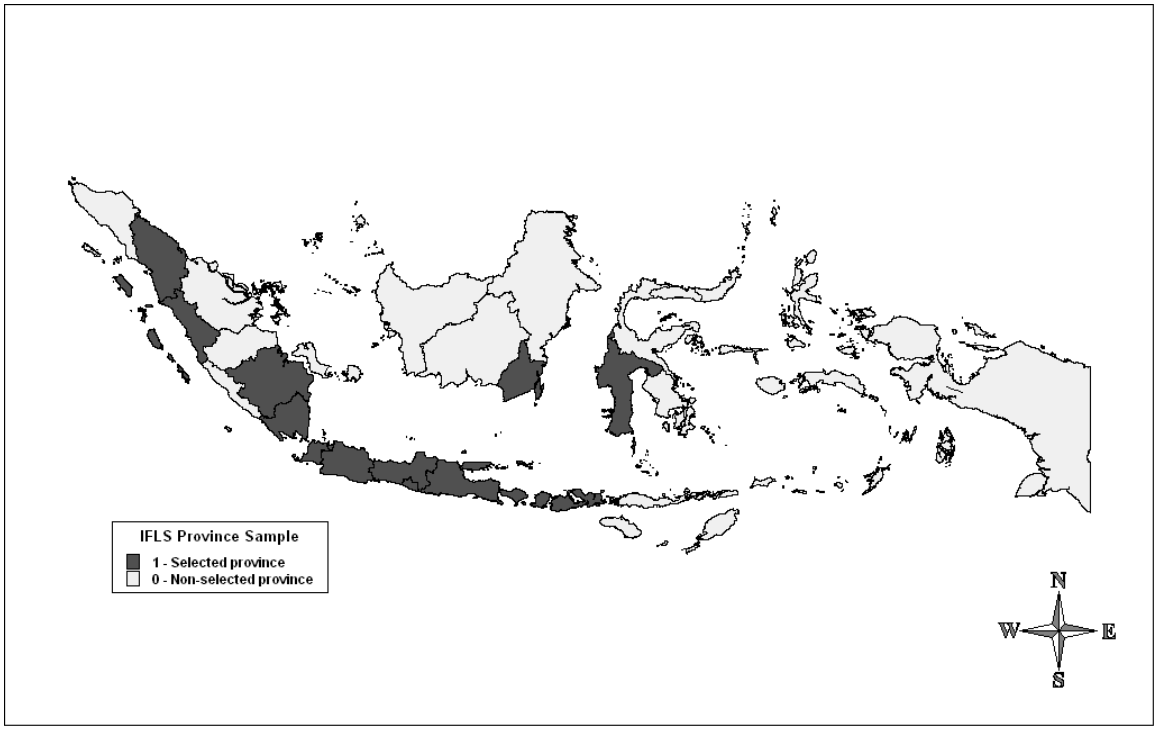
The enumeration areas (EAs) for the IFLS samples were randomly chosen among the nationally representative sample frame of Socio-economic Survey (*SUSENAS*) conducted in 1993. The *SUSENAS* frame was designed by the BPS-Statistics Indonesia, based on the 1990 Population Census (Frankenberg and Thomas, 2000). The survey sample represented about 83% of the Indonesian population living in 13 out of 26[5] provinces in the country. Those were in turn spread across all the major islands of Indonesia. The chosen provincial areas included four provinces in the island of Sumatra (North Sumatra, West Sumatra, South Sumatra, and Lampung), all provinces in Java (DKI Jakarta, West Java, Central Java, DI Yogyakarta, and East Java), and four provinces to represent the other major islands group i.e. Bali, West Nusa Tenggara, South Kalimantan, and South Sulawesi (*ibid*.).

Figure 3.1 illustrates the distribution of provinces in the IFLS sample. The map was based on the condition in the year of 2000, when the number of provinces in Indonesia has already reached 30. Although the map shows that the location of the provinces in the sample are not evenly spread geographically, it is important to note that the number of people living in those provinces represent almost the total number of the population of Indonesia. Therefore, the selected provinces could be taken as representative to the overall population.

In addition to the variations in population density, the provinces of Indonesia also generally differ from one another in regard to the wealth status of the people living in those respective areas. Table A.1 presented in the Appendices, describes the Gross Regional Domestic Product (GRDP), which might indicate the level of prosperity for each of the provinces involved in the sample.

[5] The number of provinces became 27 in 1997, and then grew to 30 by the year of 2000.

Figure 3.1. IFLS Provinces Sample



Source: Author, based on BPS – Statistics Indonesia digitised map of the condition 2000

Frankenberg and Thomas (2000) noted that the first wave of IFLS, namely IFLS1, was conducted during the period of 1993 to 1994. IFLS1 was originally consisted of 7,730 households as its sample. Only as many as 7,224 of those, however, were actually interviewed. The fieldwork of IFLS1 was conducted from 2 August 1993 to 8 February 1994, with around 80% of the total interviews took place during the period of October to December 1993.

As a continuation of the previous survey, the second wave, i.e. IFLS2, was then carried out between 16 August 1997 and 1 April 1998, with almost 90% interviews held during the months of September to December of 1997. The IFLS2 was intended to re-interview the 7,224 original households from the previous wave. However, some of the sample households had either moved, or already splitting up. If it was possible to track the missing households, they would then also be interviewed at the new location. In any case, IFLS2 was able to get hold of roughly 94% of the participating households from IFLS1[6]. One year after the IFLS2 was conducted, a 25% of sub-sample was surveyed in the so-called IFLS2+[7]. This additional survey was primarily performed in order to capture information about the impacts of the Indonesia's economic crisis (Frankenberg and Thomas, 2000).

Following the previous waves of survey, IFLS3 was held on the full sample in the period of June to November 2000. The IFLS3 revisited all the original IFLS1 households, plus the split-off households from both the IFLS2 and the IFLS2+. It covered around 91% of the panel households from the previous waves of surveys (*ibid.*). The field interviews for IFLS3 were performed between 25 June and 19

[6] See http://www.rand.org/labor/FLS/IFLS/hh.html.

[7] The IFLS2+ data is not provided for public use, even though it is supposed to be a good source for describing the phenomena of the economic crisis. Hence, only three waves of the survey data (IFLS1, IFLS2, and IFLS3) can be utilised in this study due to such restriction.

December 2000, with around 83% of the activities conducted during the month of July to October 2000.

Based on the aforementioned periods of the surveys -which represent the time frames before, during, and after the economic crisis- some variables/indicators obtained from all the three waves of the survey are utilised in the descriptive analysis part of this study. However, since some data modules from the IFLS2, such as that of employment and physical health measurements, are not available for public use until the present[8], the modelling part only employs the first and the third waves of surveys in order to maintain a complete set of indicators –shown by some missing variables in the second wave of survey.

According to Strauss *et.al.* (2004), the Indonesian Family Life Survey (IFLS) was designed to provide information for studying households' behaviours and outcomes. It contains rich sets of information collected at both the individual and household levels, and even at the community level. Multiple indicators of economic and non-economic well-beings were captured during this survey, including consumption, assets, education, migration, labour market outcomes, marriage, fertility, contraceptive use, health status, use of health care and health insurance, relationships among co-resident and non-resident of family members, processes underlying the households' decision-making, transfers of money among family members and participation in community activities. Nonetheless, for the purpose of this study, only some parts of the complete modules are utilised, especially those which are believed to relate directly to the topic of the study.

3.2. Methodology

Quantitative approach is the main methodology used in this study. The analysis performed herein is based on secondary panel data derived from the IFLS raw data as the main data source. It is then augmented by literature study. Descriptive analysis is used in answering the first research question, whereas the causal modelling is employed to answer the second and third research questions.

Data Management

In order to perform the analysis on the panel data, selected variables from the three waves of the survey data were prepared in the long format panel data using Stata program. Time series commands in Stata are then employed to evaluate lags and differences, which occurs as those variables experienced shocks due to the effect of the economic crisis.

The panel data sets are constructed for both the households and individual levels. The panel data construction is done by utilising linked identities among the waves. Even though the link variable also provides identification for the splitting households, such cases are disregarded in this study. Only the original households that remain intact are followed throughout the three waves of the survey. Consequently, the merged data will be different from the result of merging done by the data provider itself. It is also necessary to not use the provided *weight* variable, due to the different design in the proposed study. All analyses in this study are hence unweighted.

[8] ftp://ftp.rand.org/software_and_data/FLS/IFLS/download.html.

Two panel data sets are constructed. The first data set comes from all the three waves of IFLS panel households. It will be mainly used for descriptive analysis purposes. The second data set, however, is derived only from the first and the last waves of IFLS. Such panel data will then be used to construct the causal modelling, which will be further evaluated in this study. How each panel data set is constructed, is explained below.

The first panel data will be primarily used to capture the overall trends of selected indicators in all the three waves of IFLS. Such trends are exactly the same for both household and individuals level. Hence, for the purpose of analysis, only one of those levels is necessary, i.e. the households level is chosen. The panel data is constructed by using household identity variable as the panel identity to link all the three IFLS data sets. A variable named `wave` with values of 1, 2, or 3 is then defined to represent each individual waves of the survey.

The second panel data set utilises the individuals' (children) unique identities as the panel identity and *wave* as the time variable. Herein, the `wave` variable is specifically generated to contain values of either 1 or 2, which represent the time variable for IFLS1 (1993) and IFLS3 (2000) respectively. As mentioned early on, the IFLS2 (1997) is not incorporated in the panel data due to the unavailability of the physical measurement module, which contains anthropometric measurements necessary to perform models construction.

Descriptive Analysis

To answer the first research question, i.e. to depict the conditions of the socio-economic status of the households and the health status of children in the pre, during, and post-time of the crisis, which correspond to the three waves of the survey, some relevant tables and/or graphs of select indicators are presented. In the descriptive analysis part, the chosen indicators are then described using simple descriptive statistics such as the means of prevalence, complemented by their standard deviation values.

In order to test the presumed relationships among variables, Ordinary Least Square (OLS) regressions are performed. The tests are carried out, for example, to investigate the relationship between macro-economic indicators, which are sensitive to the shocks of the economic crisis, with the changes in households' consumption patterns and expenditures. Similarly, variables related to the health status of children, such as the occurrence of child illness and the proportion of ill children within households, are also tested using this approach.

Causal Modelling

According to Coleman (1981), there are a number of statistical analysis methods that can be used to appropriately interpret the causal inferences among related factors, and *logit* analysis is amongst one of them. Furthermore, he also suggested that some kind of models or theories about the pathway of effects related to those various factors, are usually behind such causal inferences. The underlying mathematical model, therefore, would tend to be a *model of the process*.

In the causal modelling part, the logistic regression models assign each indicator of the health status of children, as the dependent variables. The independent variables are, on the other hand, occupied by the presumed determinant

factors/variables of the children's health status, such as that of the housing characteristics, the characteristics of the head of the households, the households expenditure as a proxy of the households economic status, and also a number of regional and community level variables presumed to be other externally influencing factors. Since the models will be primarily used to evaluate the impacts of such shocks resulting from the economic crisis phenomenon, the lags and differences on the selected variables over time are also included in the models.

For each indicator of the health status of children, namely the nutritional status and self-reported indicator of morbidity, one logistic regression (*logit*) model will be constructed. The models will each employ similar group of independent variables[9], in order to adhere to the conceptual framework being applied in this study. Logistic regression analyses are employed into the models since both the dependent variables are dichotomous with the value of either 1 or 0, where 1 means that the observations meet the defined criteria, and 0 otherwise (Pampel, 2000).

Logistic regression is an iterative procedure that uses maximum likelihood. The first iteration is typically the null or empty model. In other words, the first iteration will be done without the existence of any predictors. A set of predictors is then introduced in the following cycles of iteration of the model. The model is said to converge when the difference between successive iterations are very small. The iteration is then stopped and results are displayed (UCLA ATS, ____)[10].

The likelihood ratio (LR) of chi-square test can be calculated as 2 times the difference between the starting and ending of the log likelihood in the iterations. The numbers in the parenthesis, which can be seen in the results, indicate the number in the degree of freedom of the variables (*ibid*.).

It is a notable fact that Pseudo R2 (Pseudo R-squared) values in logistic regression actually does not always equal to the R-squared values in the Ordinary Least Square (OLS). Due to the wide variety of pseudo-R-squared meanings, it is suggested to carefully interpret this statistics (*ibid*.).

The coefficients of the parameters estimate are the values for the logistic regression equation in the log-odds unit obtained from predicting the dependent variable using the independent variables. These estimates tell about the relationships between the independent and the dependent variables, in which the dependent variables are displayed on the *logit* scale. It is also important to note that an increase of 1 unit (positive value of estimator) in the predictor value, while holding all other predictors constant, would yield an increase by the amount expressed in predicted log-odds of the corresponding dependent variable. Therefore, the prediction equation becomes (Pampel, 2000; UCLA ATS, ____):

$$log(p/1-p) = b_0 + b_1*x_1 + b_2*x_2 + b_3*x_3 \ldots. + b_n*x_n \qquad (1),$$

where p is the probability of the occurrence which defines the likelihood that the event is true.

[9] Due to the difference natures of the two dependent variables, i.e. one is self-reported while the other represents a measured health indicator; it is not possible to use the same exact model for both cases. Instead, in order to preserve the consistency of each component in the conceptual frameworks, the independent variables used on both models will be grouped into suitable categories.

[10] See Internet source: http://www.ats.ucla.edu/stat/stata/output/old/logistic.htm.

The proposed model is thus written as follows:

$$y_{ijk} = f(\alpha_{ijk}, \beta_{jk}, \delta_k) \qquad (2)$$

where $y_{i\,jk}$ - health status indicator of child *i* from household *j* in the community *k*, as a function of individual's characteristics α_{ijk}, household's characteristics β_{jk}, and community variables δ_k.

3.3. Operationalisations

How each component of the conceptual framework being treated in the analyses process, is further explained in this section. This part will mostly deal with how the conceptual framework is operationalised onto variables and how such variables are being defined. Additionally, the measurements of the indicators used in the analysis are also described in this section in order to give a better understanding.

Descriptive Analysis

For operationalisation purposes, the economic crisis phenomenon can be described both at macro and micro levels. At macro level, the impacts of the economic crisis can be immediately seen from the decline in macro economic indicators such as indicated by that of the Gross Regional Domestic Product (GRDP). The provincial level of GRDP for those provinces in the IFLS sample, are presented in Table A.1. At the micro or households level, the crisis can be observed from the changes in socio-economic indicators during the periods of the survey, such as that of the real per capita expenditure, employment status, and housing conditions which include characteristics of sanitary facilities available to the households.

Another micro level consequence that will also be investigated in this study is the changes in the households' behaviour. This indicator might be measured through the shifting of the households' consumption patterns, i.e. proportion of food spending to the total expenditure. Such phenomenon was likely to happen since it is popularly believed that people, in such situation, would mostly prioritise on the necessity fulfilment of their food provisions, rather than on the non-food (Deaton, 1997). In this study, the significance of this assumption shall be tested using OLS regression.

Two types of indicators shall measure the health status of children as the outcome of this study. The first type of health indicator is represented by self-reported illness, which indicates morbidity. Whilst the second type, which represents measured health indicator, is reflected by the nutritional status of the children, wherein this study, Weight for Height/WFH is chosen[11].

However, due to the unavailability of the physical health measurements module for the second wave of IFLS (IFLS2), the anthropometric indicator for the three waves could not be utilised in the descriptive part. Instead, this indicator will only be elaborated at the modelling part.

In this study, morbidity is originally defined as the occurrence of illness of children aged less than 15 years old during the last 4 weeks before the survey.

[11] Since WFH is quite sensitive to seasonal/short-term effects such as that of the shocks resulted from the economic crisis, it is therefore selected to be the preferred nutritional status indicator for children.

However, since many parts in the descriptive analysis are done at the household level, the definition of morbidity is, therefore, extended to that of the household level. For descriptive analyses purposes, morbidity is thus defined as the occurrence of illness of at least one child aged less than 15 years old during the last 4 weeks before survey, within the eligible households (i.e. households who have at least one child under 15 years of age). If the household meets such condition, then the *sick* variable is either set to 1 when there was indeed a case of child illness, or 0 otherwise. For those households who are not eligible at all, the *sick* variable is replaced by missing value.

Another variable that will be used as an indicator related to morbidity is the proportion of the number of children under 15 years of age who were ill during the reference time, i.e. in the last 4 weeks before survey, to the total number of children within the same household. This indicator reflects the severity level of child morbidity experienced by each of the households in question. A higher proportion can then be interpreted as households who have a more serious problem with respect to the health status of their children.

In addition to the general definition of illness, the occurrence of child illness will be further differentiated according to the types of illness being adopted in this study. There are ten distinct types of illness consistently questioned in all the three waves of the survey, namely headache, toothache, eyesore, cough, respiratory problem, fever, diarrhoea, skin infection, earache, and worm infestation. Further analysis in this study, particularly in the modelling part, will only explore a subset of those ten types of illness categories.

In order to provide clearer pictures of the changes in socio-economic status of the households, as well as the health status of children, panel data containing selected variables from the three waves of IFLS will be constructed. From this panel data, suitable figures and illustrations will then be derived to aid further analysis.

Causal Modelling

For the purpose of explaining causal relationships in the modelling part, panel data sets will be constructed from the IFLS1 (1993) and IFLS3 (2000) data sets respectively. Furthermore, only individuals below 15 years age are included in such panel data sets. The results of analysis performed on the models are therefore only true for those individuals who meet this specified criterion.

The dependent variables for the models[12], i.e. the left hand side variables, consist of indicators, which represent the health status of children. Whereas on the right hand side, the independent variables, contain a set of variables which include housing/residential indicators (including sanitation), as well as other characteristics of the households (consisting of the changes in socio-economic conditions and household's behaviour). The community level variable representing the availability of health care service provider, i.e. the existence of Public Health Centre (PHC), will also be added as one of the independent variables.

As previously mentioned, the dependent variables in the modelling parts are occupied by both child morbidity indicator –defined as occurrence of child illness- and anthropometric indicator, i.e. prevalence of child wasting. Wasting is defined as the z-score (or standard deviation score) of observation, which has a value of less than

[12] For each indicator of the health status of children a specific model is constructed.

–2SD[13] of the reference standard for WFH according to the WHO system. Both the morbidity and the anthropometric indicator are then presented as dichotomous variables of 0 (meaning the applied conditions are not satisfied) and 1 (meaning the applied conditions are all met).

The calculation of z-score is done using the *NutStat* application module of Epi Info[14] software, based on the 2000 CDC reference. The results of the z-score computation are then translated into the dichotomous variable, after applying the cut-off point categorisation as defined by the WHO system mentioned earlier. Having a value of 1 in this variable, therefore, means that the calculated z-score for those observations, fall below the –2SD requirement defined in the category, whereas a value of 0 indicates the opposite.

Straight inclusion of the results of the z-score calculations from the generated panel data is, however, appeared to be very problematic. This is mainly due to the fact that not all the necessary anthropometric measurements are available for all of the observations within the resulting data set. There are many cases where either the weight or the height measurement is missing from the individual panel data. Furthermore, the use of such WFH indicator is not considered to be appropriate at the higher ages, particularly for those with age of more than 10 years old[15]. Both of the facts resulted in a higher tendency of missing values in the data set.

Since wasting -as an anthropometric indicator- is sensitive to seasonality and rapid changes in nutritional status, another equivalent measure or adjustment is needed to overcome the above shortcomings. By comparing the results of computation of z-score for WFH and BMI (Body Mass Index) -which is usually used as an anthropometric indicator for adults- it is found that both the results are not significantly different[16] from one another. Therefore, due to the similarity of the underlying concepts and uses of WFH and BMI, and also because of the fact that both of the z-score computations are not significantly different, the missing z-score values of WFH could then be replaced by the non-missing z-score values of BMI. The cut-off point for wasting categorisation in this study is thus applied at these modified z-score values.

In addition to the above mentioned variables defined at the individual level, a set of other variables representing the effects of the economic crisis (so-called *shock variables*) are also utilised. The differences or lags in certain variables, such as expenditures, consumption patterns, as well as other households and housing characteristics between the first and the last wave of IFLS, serve to highlight such changes that can be observed in the periods before and after the crisis. The significance levels of these shock variables in the model, are supposed to provide the answer as to whether the economic crisis affected the outcome or not.

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[13] Based on WHO system, cut-off points for z-score are categorised as follows: <-1 to >-2 of z-score is classified as mild malnutrition, <-2 to –3 of z-score is categorised as moderate, whereas <-3 of z-score would fall under a severe malnutrition classification (Cogill, 2003).

[14] Epi Info(TM), database and statistics software for public health professionals, 2004. This application was developed by the Epidemiology Program Office of the Centers for Disease Control and Prevention (CDC). Epi Info(TM) software is in the public domain and freely available for use, copying, translation and distribution. "Epi Info" is a trademark of the Centers for Disease Control and Prevention (CDC).

[15] Concluded from the results of z-score calculation for WFH, which is for those ages > 10 the z-score is always missing.

[16] Tested using the t-test command for z-score of WFH and z-score of BMI.

Using the lags or changes in variables, means that the first panel data set (in this case are observations from the IFLS1 – 1993), will then become missing values. Consequently, these observations are then dropped off from the model. Hence, the resulting model is only applicable for the second panel data set, i.e. the IFLS3 (2000).

Variable Definitions and Computations

In order to give a better understanding about the whole process of analysis involved in this study, explanations on how variables are defined and computed, are provided in the following table.

Table 3.1. Definition and Computation Process of Variables

Variable name	Description	Definition and Computation
Individual level:		
`headache, eyesore, toothache, cough, respiratory, fever, diarrhea, skininf, earache, worm infestation`	Specific types of illness employed in this study.	A value of 1 indicates that the child has suffered the respective type of illness (headache, eyesore, toothache, respiratory problem, fever, diarrhoea, skin infection, earache, or worm infestation), or 0 if otherwise.[17]
`sick`	Occurrence of child illness within the last 4 weeks prior to the survey, in at least one of those defined types of illness.	Computed by summing up the occurrence of the individual types of illness. A value of 1 in this variable is assigned if the resulting sum is greater or equal to 1, or 0 if otherwise.
`fldcdcwhz, fldbmiz,`	Z-scores for WFH and BMI respectively	The z-scores for both WFH and BMI are calculated using the *NutStat* of the Epi Info software application based on CDC 2000 Reference.

[17] Even though, there are many more types of illness appeared on each waves of IFLS, not all of them were being consistently questioned throughout. Thus, in this study only those 10 distinct types of illness are being considered on the consistency basis.

Table 3.1. ***Continued***

Variable name	Description	Definition and Computation
Individual level (*Continued*):		
z_wfhbmi	Modified z-score for WFH	Initially z_wfhbmi is equal to the value of fldcdcwhz, if fldcdcwhz is then found to be missing (particularly for children older than 10 years of age), z_wfhbmi will be replaced by the value of fldbmiz (if fldbmiz itself is not missing).
wastingwfhbmi	Cut-off point of z-score for WFH (herein the modified z-score for WFH)	A value of 1 indicates the z_wfhbmi is less than -2.0, otherwise 0.
female	Female child (girl)	Defined whether the child is female or male, 1 if female, and 0 otherwise.
Household level:		
mpcnfood	Monthly per capita food expenditure	Calculated based on the last week of household's food consumption * (52/12) for each household member (the weekly amount is divided by household size). In case of missing value, an imputation was made using the median of food expenditure within the same enumeration area where the household lives. This computation procedure follows the example in the programming of expenditure for IFLS1 given by the data provider.
mpcfoodcons	Monthly per capita non-food expenditure	Calculated based on the last 12 months of non-food expenditure divided by 12 and the size of the household. Missing values are also treated in similar way as that of the food expenditure. This computation procedure also follows the example given by the data provider.
mpce	Monthly per capita total expenditure	Summarised values of mpcnfood and mpcfoodcons.

Table 3.1. ***Continued***

Variable name	Description	Definition and Computation
Household level (*Continued*):		
rmpce	Real monthly per capita expenditure	Calculated by dividing the mpce with the provincial deflator for each year relative to the 1993 indices (disregarding the urban-rural distinction). The deflator is calculated based on the provincial level of the monthly general Consumer Price Index (CPI) with the base values of April 1988 - Maret1989 = 100. The detail of the general provincial CPI is described in Table A.2.
prfood	Proportion of per capita food spending towards the total per capita expenditure	Calculated by dividing the mpcnfood with mpce.
qpce	Quintile of per capita expenditure	Calculated by dividing cumulative of mpce into quintiles for each province and year of surveys.
indexsani	Sanitation index	Generated from the components of sanitation, which consist of sanitary condition, clean drinking water, and having toilet. Computed by summarising all of those three components (value for each component is 0/1) and then dividing it by 3.
prworking	Proportion of the number of working household members	Computed by dividing the number of working household members with the household size.
propempl	Proportion of household members who work as employee	Computed by dividing the number of household members who work as employee with the total number of working people in the household.
prunder5	Proportion of children under 5 years old in the household	Computed by dividing the number of children under 5 years old by the household size.
haveu15	Household having at least one child of age less than 15 years old	Computed by collapsing (sum) the dummy variable for individuals aged less than 15 years old for each of the household. If the sum is greater or equal to 1, then this variable is set to 1, otherwise 0.

Table 3.1. ***Continued***

Variable name	Description	Definition and Computation
Household level (*Continued*):		
haveu15sick	Household having at least one child of age less than 15 years old, who has been ill within the last 4 weeks before survey	Computed by collapsing (sum) the dummy variable for individuals aged less than 15 years old, who has been ill within the last 4 weeks before survey, for each of the household. If the sum is greater or equal to 1, then this variable is set to 1, otherwise 0.
propu15sick	Proportion of ill children within the last 4 weeks, to the total number of children in the same household	Computed by dividing the number of ill children with the total number of children in the same household. Both the number of ill children and the total number of children are summarised from the household members aged less than 15 years old.
wstatus	Working status of the head of household (primary job)	Generated from the working status question for the head of household in the questionnaire, and defined into 4 categories: self-employed (with or without any help from family/unpaid worker), employer, employee (public and private), and family/unpaid worker. Only true (value of 1) for employed head of household, otherwise 0.
whourlw_t	Average of total working hours of all working household members in the last week (in hours)	Computed by collapsing the total of working hours (both from primary and additional job) of all the working household members.
hieduch	Education attainment of the household head is junior high school (secondary level) or higher	A value of 1 indicates that the head of household had at least completed the secondary level education (i.e. junior high school), and 0 otherwise.

Table 3.1. ***Continued***

Variable name	Description	Definition and Computation
Community (EA) level:		
`dist_subdist`	Distance of the EA to the governing sub-district office	Computed based on the information of the distance (km) of EA relative to the governing sub-district office. The distance is defined as 0 if the EA is located within the area of the governing sub-district office.
`exis_phc`	Existence of Public Health Centre (PHC) in the EA.	Computed by defining whether at least one PHC exists in the sampling area.

Aside from those above listed variables, there are a number of other variables that are employed during the analysis process. Such variables, however, are only used to aid during common computation procedures, such as generating dummy variables from one type of variable to another, and so forth.

4. Result

4.1. Data Management

As previously mentioned, there are two main panel data sets constructed for the purpose of analysis. The first panel data came from all the three waves of the IFLS. The second panel data, on the other hand, is generated only from the first and the third waves of the survey. Moreover, while the first panel data is formed at the household level, the second panel data is targeted at the individual level, so that children of age less than 15 years old, for example, can then be further examined.

Panel data from the three waves of survey

The merging of data files from the three waves of survey, resulted in a panel data set that contains 6,444 households for each survey wave. A set of information related to both households characteristics –including socio-economic indicator such as expenditure-, as well as housing conditions, are contained within this panel data set. Consequently, household descriptive analysis will be primarily derived on the basis of this panel data set.

From those three households panel data, around 66% to 75% have at least one child with less than 15 years of age. The highest percentage is found in the first wave with 75.1%, followed by the second wave with around 71.3%, and finally, the lowest is found at the third wave, with a value of 66.1%. The decreasing number of households in this panel data does, however, make sense. Due to the relatively long period between consecutive waves of survey, households with children aged close to 15 years old, might not be as eligible in the following wave(s) of survey as they were in the previous wave(s).

Panel data from the first and the third waves of survey

Different procedures are applied in order to construct this second panel data set, i.e. the two-waves panel data set. Firstly, identity variables are used to link individual person within the households in both IFLS1 and IFLS3 data sets. The first IFLS data set is then filtered out to contain only of those individuals with age of less than 15 years old. This, and the resulting data set from the third wave of survey, formed the two-waves individual panel data set. Additionally, the related households variables for such panel individuals such as the household head’s characteristics, housing conditions, as well as variables related to the households' socio-economic conditions, are then merged.

After applying the age constraint of less than 15 years old on the first data set, the merging process of those two data sets resulted in 2,724 panel children. This number is in turn spread among 2,217 eligible households within each wave of the survey. The age constraint is necessary in order to be able to follow and monitor the changes in the children health status during the reference period from 1993 to 2000. Furthermore, it is especially important in predicting the likelihood of whether the health status of children was being affected by the changing of socio-economic conditions through the assigned models.

The limitation of using only two waves of IFLS cannot be avoided due to data dissemination matters at the provider level. The fact that both physical health measurements and employment modules of the IFLS2 are not available, prevented it

from being used as another base for data analysis. Hence, the modelling part of this study utilises only the remaining two waves of IFLS data.

4.2. Descriptive Analysis

Socio-economic indicators

The commonly used micro economic indicator in Indonesia, i.e. per capita expenditure, is presented in Table 4.1. The table illustrates a continuously increasing monthly per capita expenditure –broken down into their components of food and non-food expenditure- during the period of the surveys in both nominal and real terms. During the period between 1993 and 1997, the monthly per capita expenditure had increased for about 5% in real terms. A steep rise for up to about 51% was then observed during the next period between 1997 and 2000.

The exhibited trends seemed to not concur with the trends observed in the macro economic indicators. As already mentioned in the background part of this study, the macro economic indicators had indeed plummeted during the period of 1997-1998. However, after a brief period of stability they have since shown a steady increase, even though their values have not yet reached the equivalent level as that of the time before the crisis. Such difference in trends might be due to reliability and validity issues with respect to the expenditure information being collected. These could be caused by either underestimated expenditure data being captured, or worse, because of missing data.

Further scrutinising on this particular issue is therefore strongly suggested. In the data management processes, all the missing expenditure information was imputed by the median values of households' expenditure data within the same enumeration area (EA). Such measure was necessary in order to not lose the object of observations during the analysis phase. Thus, the result for this kind information needs to be carefully interpreted. The crude estimation approach used to construct this variable can be immediately seen from the large standard deviation values for this variable.

Unweighted variables used in this analysis might also contribute to the highly deviate value of variables compared to their calculated means. Therefore, the figures presented hereunder should only be considered as evidence of the utilised data, i.e. panel households from the three-waves of IFLS, and not to represent the actual conditions. Nevertheless, they could serve as a rough picture towards the actual trends of the figures, even if not at a precise level.

The computation for real expenditure is, additionally, also crudely constructed. General deflators of yearly Consumer Price Index (CPI) from each capital in the sample provinces[18] were used during calculations. The resulting figures are, therefore, also tend to be less precise at illustrating the actual conditions.

[18] The Monthly CPI in Indonesia is calculated for the provincial capital cities of Indonesia, as well as a number of major cities throughout the country. It should be noted that the CPI is designed to be used as price deflators for urban areas, and not for rural areas. However, since this study is not emphasised at the economic contents, this approach is considered to be acceptable.

Table 4.1. Monthly Per Capita Expenditure (MPCE) of Panel Households of IFLS 1993, 1997, and 2000 (Rupiah)

Year	Variable	N	Mean	SD
1993	Monthly per capita food expenditure	6,444	39,705	42,440
	Monthly per capita non-food expenditure	6,444	27,745	50,852
	Total monthly per capita expenditure	6,444	67,451	77,149
	Real MPCE (total)	6,444	67,451	77,149
1997	Monthly per capita food expenditure	6,444	59,979	66,121
	Monthly per capita non-food expenditure	6,444	36,284	56,204
	Total monthly per capita expenditure	6,444	96,264	99,378
	Real MPCE (total)	6,444	70,797	74,610
2000	Monthly per capita food expenditure	6,444	97,920	94,241
	Monthly per capita non-food expenditure	6,444	55,966	97,684
	Total monthly per capita expenditure	6,444	153,886	162,297
	Real MPCE (total)	6,444	107,248	113,783

Source: Authors' calculation

The proportions of food and non-food spending to the total expenditure reflect the households' consumption patterns. Furthermore, these consumption patterns also imply the welfare status of the households involved. It is believed that a higher share of food expenditure usually means a lower welfare status. The decomposition of food and non-food share towards the total per capita expenditure is presented in the Table 4.2 below.

Table 4.2. Decomposition of Food and Non-Food Per Capita Expenditure (PCE) Share to Total Monthly PCE, Panel Households of IFLS 1993, 1997, and 2000 (%)

Year	Description	%
1993	Food share	43.4
	Non-food share	56.6
1997	Food share	56.1
	Non-food share	43.9
2000	Food share	48.8
	Non-food share	51.2

Source: Authors' calculation

The result presented in the above table, seems to be inline with the original assumption concerning the increased share of food spending as an indirect indicator to the declining socio-economic status as a consequence of the economic crisis. There is an increase in food expenditure share for about 13% between the year of 1993 and 1997. Afterwards, when the worst of the economic crisis had been surpassed in 1998, the proportion of food to non-food expenditure returned back to a similar pattern as in the original point of time in 1993, even if the actual percentage had not yet reached the same exact level by the year of 2000.

The spike in food share proportion during the time of the crisis can be interpreted to have two meanings. First, the steep rise in food commodities during the

crisis had driven higher spending in order to maintain an equal level of food consumption. And secondly, the crisis had possibly forced changes in the households' expenditure pattern towards higher proportion of food spending, as a short of coping mechanism, especially for the poorer of the households.

However, to properly validate the claims that such evidence resulted from the consequences of the economic crisis, formal verification procedure such as construction of OLS regression on those sets of figures needs to be performed. Likewise, OLS regressions are also needed to be carried out for the other variables, which are also presumed to be affected by the economic crisis. The results of these OLS regressions are summarised in Table 4.6 further down this chapter.

Children Health Status Indicator

The following tables, Tables 4.3, 4.4, and 4.5, describe the health status of children measured at the household level. The morbidity indicators used in these cases are the occurrence of illness among children aged less than 15 years old, within the last 4 weeks prior to the survey. As indicated previously, the panel data from which these three tables are constructed, consist only of eligible households with at least one child of age less than 15 years old in the survey years of 1993, 1997, and 2000.

The overall prevalence of child illness[19] at the household level, as well as their severity level indicated by the proportion of the number of ill children towards the total number of children in the same household, are presented in the Table 4.3 below. Both indicators have a similar tendency during the periods of the surveys, in that their numbers had both increased in the two periods between 1993 and 1997, as well as from 1997 to 2000. However, the increase in the first period is almost twice as much as that of the increase in the second period.

[19] Household has at least one child being ill during the last 4 weeks prior to the survey.

Table 4.3. Child Morbidity Indicators at Household Level – Summary

Description	1993	1997	2000
Proportion of ill children within the last 4 weeks, to the total number of children in the same household	0.45 (0.42)	0.59 (0.41)	0.65 (0.41)
Prevalence of households with at least one ill child within the last 4 weeks	0.63 (0.48)	0.74 (0.44)	0.78 (0.41)
Prevalence of households with at least one ill child in the last 4 weeks who had:			
- Headache	0.33 (0.57)	0.60 (0.82)	0.60 (0.81)
- Eyesore	0.05 (0.25)	0.09 (0.35)	0.09 (0.32)
- Toothache	0.11 (0.34)	0.22 (0.48)	0.23 (0.51)
- Cough	0.49 (0.66)	0.64 (0.85)	0.72 (0.86)
- Respiratory	0.04 (0.19)	0.08 (0.29)	0.07 (0.28)
- Fever	0.37 (0.59)	0.64 (0.85)	0.64 (0.83)
- Diarrhoea	0.10 (0.32)	0.20 (0.49)	0.18 (0.46)
- Skin infection	0.11 (0.35)	0.21 (0.52)	0.21 (0.51)
- Earache	0.03 (0.17)	0.03 (0.18)	0.00 (0.04)
- Worm infestation	0.04 (0.22)	0.07 (0.32)	0.00 (0.06)
Total number of households who have children < 15 years old	**N = 4,841**	**N = 4,746**	**N = 4,258**

Source: Author's calculation
Note: Numbers in the parentheses are standard deviation of means.

Table 4.3 also shows similarly increasing trends in the break down of morbidity indicators by types of illness during the period of 1993 to 1997, except for the case of earache problem, which seems to be relatively stable. During the following period of 1997 to 2000, the trends started to vary in their patterns. For headache, eyesore, fever, and skin infection, the prevalence of illness was unchanged from their previous states. Respiratory related problems, diarrhoea, earache, and worm infestation, show a slight decline in their numbers of occurrence. However, cases of coughing were reported to have increased by as much as 8% within this period.

Due to the all increasing trends in the periods before and after the crisis, for both the prevalence of child illness and the severity level of child morbidity, it cannot therefore be concluded that the shocks related to the economic crisis had indeed adversely affected the health status of children. Even if the increase in the first period

looks to be significantly higher than that of the second period, it still does not justify the increase in the latter period.

However, by looking at the break down on the specific type of illness, a mild clue can be inferred. All types of illness except that of earache are shown to be increasing in their occurrence just as Indonesia experienced the impacts of the economic crisis in the first period between 1993 and 1997. These are then followed by either a decline (four out of ten), unchanged (four out of ten), or an increase (two out of ten) in the means occurrence of child illness during the second period between 1997 and 2000. Such simple facts suggest that the shocks related to the economic crisis might indeed bear their consequences towards an increasing prevalence of child illness on the specific types of illness (except that of earache). After the worst of conditions had been passed, however, the signs of improving health status, or at least stabilising, are then observed. Furthermore, one of the two increasing types of illness, namely occurrence of cough, can be explained in relation to the increasing level of pollution as generally true in the current environmental settings of Indonesia.

In order to investigate any relationships between the prevalence of child illness and the level of socio-economic status of the households, transformation matrices containing the quintiles of monthly per capita expenditure (MPCE) –which classify the households' welfare status- and the occurrence of child illness within the households, are constructed. Table 4.4 and 4.5 below present the mean values, standard deviations, and the frequencies (count) of the occurrence of child illness for each quintiles of the MPCE, among consecutive waves of the survey.

Table 4.4 shows a cross-tabulation between the prevalence of illness in the year of 1993 broken down by the quintiles of households MPCE, and similar variables from the 1997 panel data set. The row variables are that of the 1993 survey, whereas the column variables consist of observations from the 1997 survey. Accordingly, Table 4.5 also shows a cross-tabulation of similar variables with the 1997 survey panel data populating the row variables, and the 2000 survey panel data acting as the column variables.

Table 4.4. Matrix Transformation of The Prevalence of Child Illness at Household Level, 1997, Based on Quintiles of MPCE in 1993 and 1997

1993 quintiles of MPCE	1997 quintiles of MPCE					Total
	1	2	3	4	5	
1	0.72	0.66	0.75	0.74	0.57	0.71
	(0.45)	(0.47)	(0.44)	(0.44)	(0.51)	(0.45)
	576	229	123	70	21	1,019
2	0.73	0.76	0.74	0.84	0.55	0.75
	(0.45)	(0.43)	(0.44)	(0.37)	(0.50)	(0.44)
	218	344	232	138	58	990
3	0.67	0.77	0.78	0.75	0.75	0.75
	(0.47)	(0.42)	(0.41)	(0.44)	(0.43)	(0.43)
	124	246	260	232	124	986
4	0.78	0.74	0.72	0.73	0.80	0.75
	(0.42)	(0.44)	(0.45)	(0.45)	(0.40)	(0.43)
	59	112	234	279	241	925
5	0.54	0.73	0.69	0.76	0.75	0.74
	(0.51)	(0.45)	(0.46)	(0.43)	(0.43)	(0.44)
	28	56	123	220	399	826
Total	0.72	0.74	0.74	0.76	0.74	0.74
	(0.45)	(0.44)	(0.44)	(0.43)	(0.44)	(0.44)
	1,005	987	972	939	843	4,746

Source: Author's calculation

Table 4.5. Matrix Transformation of The Prevalence of Child Illness at Household Level, 2000, Based on Quintiles of in MPCE 1997 and 2000

1997 quintiles of MPCE	2000 quintiles of MPCE					Total
	1	2	3	4	5	
1	0.72	0.80	0.77	0.76	0.61	0.75
	(0.45)	(0.40)	(0.42)	(0.43)	(0.50)	(0.43)
	412	236	162	70	18	898
2	0.81	0.74	0.77	0.80	0.82	0.78
	(0.40)	(0.44)	(0.42)	(0.40)	(0.39)	(0.41)
	243	259	199	138	49	888
3	0.77	0.81	0.85	0.77	0.75	0.80
	(0.42)	(0.39)	(0.36)	(0.42)	(0.43)	(0.40)
	135	190	215	192	112	844
4	0.73	0.77	0.81	0.78	0.78	0.78
	(0.45)	(0.42)	(0.40)	(0.42)	(0.42)	(0.41)
	60	125	211	258	190	844
5	0.79	0.82	0.77	0.75	0.82	0.79
	(0.42)	(0.39)	(0.42)	(0.43)	(0.38)	(0.40)
	28	61	102	199	394	784
Total	0.75	0.78	0.80	0.77	0.79	0.78
	(0.43)	(0.41)	(0.40)	(0.42)	(0.40)	(0.41)
	878	871	889	857	763	4,258

Source: Author's calculation

The patterns shown in both tables 4.4 and 4.5 above do not seem to directly suggest any linear relationship between the quintiles of monthly per capita expenditure and the prevalence of illness experienced by the households in question. Thus, it is not quite simple to explain the effects of economic crisis to the health status of children from these two variables alone, i.e. the households' socio-economic status represented by their welfare indicator, and the children health status represented by self-reported morbidity indicator.

In order to get a better understanding about the effects of the economic crisis towards the health status of children, OLS regressions are performed on the key variables. The changes in the socio-economic status of the households as direct consequences of the economic crisis, i.e. the shock variables, are represented by the changes in *ln* of per capita Gross Regional Domestic Product (GRDP) at macro level, and the changes in *ln* of real MPCE at micro level respectively. The OLS regressions are performed to test the significance level of these two independent variables towards the dependent variables at the household level, namely the prevalence of child illness and the severity level of child morbidity, both from the macro perspective as well as from the micro perspective.

Additionally, an OLS regression is also performed to verify the effects of the economic crisis towards the changes in households expenditure pattern at the macro level. The dependent variable being tested in this case is that of the changes in proportion of food spending to the total MPCE. The results for both the macro and micro level OLS regressions are summarised in the following Table 4.6. In performing OLS regressions, each dependent variable is evaluated for both the second and the third waves of survey.

Table 4.6. OLS Regression Results of the Predetermined Effect of the Economic Crisis Indicators to the Shock Variables - Household Level, 1997 and 2000

Variable	Coefficient		Standard error
Macro level:			
DV: Changes in the proportion of food spending to the total MPCE			
(1) IV: Changes in *ln* of per capita GRDP for the 2nd wave	0.03510	*	0.01744
Constant	0.00684		0.00470
R-squared	0.0006		
N	6,444		
F (1,6442)	4.05	*	
(2) IV: Changes in *ln* of per capita GRDP for the 3rd wave	-0.01316		0.01253
Constant	0.01235	**	0.00238
R-squared	0.0002		
N	6,444		
F (1,6442)	1.10		

Table 4.6. ***Continued***

Variable	Coefficient		Standard error
DV: Occurrence of child illness within household			
(3) IV: Changes in *ln* of per capita GRDP for the 2nd wave	-0.07827		0.12528
Constant	1.26004	**	0.03395
R-squared	0.0001		
N	4,746		
F (1,4744)	0.39		
(4) IV: Changes in *ln* of per capita GRDP for the 3rd wave	-0.34451	**	0.09246
Constant	1.25280	**	0.01766
R-squared	0.0033		
N	4,258		
F (1,4256)	13.88	**	
DV: Proportion of ill children to the total number of children within the household			
(5) IV: Changes in *ln* of per capita GRDP for the 2nd wave	-0.04571		0.04787
Constant	0.60136	**	0.01297
R-squared	0.0002		
N	4,746		
F (1,4744)	0.91		
(6) IV: Changes in *ln* of per capita GRDP for the 3rd wave	-0.24457	**	0.03635
Constant	0.62997	**	0.00694
R-squared	0.0105		
N	4,258		
F (1,4256)	45.28	**	
Micro level:			
DV: Occurrence of child illness within household			
(1) IV: Changes in *ln* of real MPCE for the 2nd wave	-0.04404		0.02440
Constant	1.71651	**	0.26380
R-squared	0.0007		
N	4,746		
F (1,4744)	3.26		
(2) IV: Changes in *ln* of real MPCE for the 3rd wave	-0.00533		0.02652
Constant	1.34041	**	0.28954
R-squared	0.0000		
N	4,258		
F (1,4256)	0.04		

Table 4.6. ***Continued***

Variable	Coefficient		Standard error
Micro level (*Continued)*:			
DV: Proportion of ill children to the total number of children within the household			
(3) IV: Changes in *ln* of real MPCE for the 2nd wave	0.05150	**	0.00930
Constant	0.03462		0.10052
R-squared	0.0064		
N	4,746		
F (1,4744)	30.68	**	
(4) IV: Changes in *ln* of real MPCE for the 3rd wave	0.06492	**	0.01041
Constant	-0.05696		0.11372
R-squared	0.0090		
N	4,258		
F (1,4256)	38.86	**	

Note:
** Significant at 1% level
* Significant at 5% level
DV : Dependent variable
IV : Independent variable

Table 4.6 admits, although partially, the underlying assumption that the economic crisis had affected several predetermined variables. At the macro level, the changes in *ln* of per capita of GRDP, which represent macro economic shocks variable, are evaluated against three chosen variables consisting of: (a). Changes in the proportion of food spending to the total MPCE, which is presumed as an intermediate indicator representing the changing of households' behaviour; (b). Occurrence of child illness as morbidity indicator at the households level; and (c). Proportion of ill children to the total number of children within the household, which represent the severity level of the prevalence of child illness.

In the first OLS regression, it is found that during the period between 1993 and 1997, the evidence shows of positively significant relationship at 5% level, between the proportions of food spending towards the total MPCE, and the changes in *ln* of per capita GRDP from the first to the second wave of survey. What it means, is that the changes in the GRDP as an independent variable, is proven to be significantly affecting the changes in food share expenditure as the response variable. However, due to the positive sign of the coefficient, the result seems to be in contradiction with the common perception that a higher share of food expenditure is driven by a declining welfare status represented by macro economic indicators such as that of GRDP.

In order to comprehend what is happening with respect to the sign of the coefficient, one needs to consider how the OLS regression was performed on the above dependent and independent variables. The data used for calculating the changes in *ln* of per capita GRDP are that of 1993 and 1997 respectively. As shown in Table

A.1 of the Appendices, they are indeed increasing in their respective values for the two years in question. However, the changes in the proportions of food spending towards the total MPCE did not occur across the time period of 1993 to 1997 in its entirety. In fact, it happened only within a subset of such time period, i.e. during the heat of the economic crisis which started from the mid of 1997 and reached its lowest level of conditions in the mid of 1998.

If one is to look at the figures of GRDP for the year of 1997 and 1998 illustrated in Table A.1, which incidentally was also the time span for IFLS2 (1997) data collection activity, then it is obvious that there was a negative change (decrease) of GRDP during that period of time. Having considered this additional information, it now makes sense that the sign of the coefficient is positive, since the real changes of GRDP affecting the increase of food share spending, is actually negative.

The above reasoning is further confirmed by looking at the relationship between the two variables in the following period between 1997 and 2000. Even though the relationship itself is not significant at either 1% or 5% level, the coefficient is correctly showing a negative sign when the underlying values of GRDP as the independent variable, are shown to be increasing (positive). The OLS regression analysis performed on these two variables can thus be taken to mean that while the sudden decrease in the macro economic indicator significantly result in the increase of food share spending, the opposite is not necessarily true.

The second predetermined variable, i.e. the occurrence of child illness in the household, reveals a different story. It is not statistically significant in the period between 1993 and 1997. However, it is shown to be significant with the negative sign in the following period. This means that positive change of the GRDP, as evident during the recovery period following the economic crisis, is consistently followed by declining number of occurrence of child illness.

In a similar fashion, the third dependent variable, namely the proportion of ill children to the total number of children within the same household, also alternates from being insignificant in the first period, to becoming statistically significant in the next period. Therefore, it can be concluded that the severity level of child morbidity, tends to decrease as the macro economic indicator shows signs of improvement.

At the micro level, there are also two predetermined indicators assigned as the dependent variables. Those are the occurrence of child illness in the households, and the proportion of ill children to the total number of children within the households respectively. For the independent variable, the changes in *ln* of real MPCE is chosen to represent the shock variable resulting from the economic crisis.

For the first dependent variable, i.e. the occurrence of child illness, the OLS regression performed shows that changes in *ln* of real MPCE did not have significant effect to the prevalence of child illness for the two periods of 1993-1997 and 1997-2000. This fact further confirms the previous finding illustrated in Table 4.4 and Table 4.5, regarding the non-linear patterns of the prevalence of child illness in relation to the quintiles of expenditure, or households' economic status. It is, therefore, of less priority to pursue this matter further in order to try to find any such relationships between these two variables.

The second dependent variable, in contrast, has a positive sign and is found to be significant for both the 1993-1997 period, as well as the 1997-2000 period. Even though the result shows that the effect of changes in real MPCE towards the

proportion of ill children in the household is both significant and positive at the same time; a careful interpretation is needed in order to capture the correct message.

In literal sense, it is suggested that greater increase of real MPCE means a correspondingly increasing trend in the severity level of child morbidity. However, such interpretation is not necessarily true as a matter of fact. A more appropriate conclusion could be drawn by considering the above fact in reverse order. The causal-effect relationship between the two variables is thus becoming as follows. A household with higher severity level of child morbidity tends to have higher expenditure. From then on, it could be further argued that the additional spending were necessary in order to provide for health related treatments.

Other studies (Thomas and Frankenberg, 2000; Lindeboom and van Doorslaer, 2004) have found that subjective content reflecting the health status, such as that of self-reported illness, has a tendency of systematic bias. Hence, in addition to the socio-economic status indicators utilised above, other factors need also be considered when analysing such relationships involving this kind of response. It should also be further contrasted with other types of health indicator, such as that of physically measured health indicators.

In light of the above findings and suggestions, further investigations need to be carried out in order to comprehensively explain the effects of the changes in socio-economic status, as one of the consequences of the economic crisis, towards the health status of children as the outcome indicator. For this purpose, two causal-effect models are constructed to complement the above descriptive analysis.

4.3. Causal Modelling

The construction of models used to explain the causal-effect relationships among select variables, relies primarily on the application of logistic regressions to those interacting variables. As previously mentioned, there are two dependent variables representing the health status of the children, namely the occurrence of illness and the incidence of wasting. Both of these response variables take a value of either 1, when their corresponding conditions are satisfied, or 0 if otherwise.

The independent variables, on the other hand, are categorised into four distinct groups of variables. The first group consists of variables expressed at the macro level, i.e. Regional/Provincial level. To serve this purpose, the change in *ln* of GRDP is used as the independent variable. Furthermore, Regional/Provincial dummy variables are generated in order to investigate the significance of the effects of such macro economic shocks resulting from the economic crisis within each Regional or Provincial area.

The second and third groups of independent variables consist of those variables, which are expressed at the micro level. The second group covers all the determinant variables at the households level, whereas the third group lists the individual level variables. There is actually only one variable in the third group, namely *female* child, which takes a value of 1 if true, and 0 otherwise.

Finally, the last group of variables is that of the community level variables, which in this case refers to the enumeration area (EA). There are two variables in this category, namely the existence of Public Health Centre, and the distance to the governing sub-district office expressed in kilometre unit.

Both the occurrences of child illness and wasting for the individual children are analysed separately. The results of logistic regressions for the two dependent variables are presented in Table 4.7 and Table 4.8 respectively. It is also worth to reiterate the fact that the models are constructed only on the basis of the individual panel data obtained from IFLS1 (1993) and IFLS3 (2003). The lags or changes of variables are, therefore, refer to the whole period of 1993-2000. Such a relatively long period of interval is barely sufficient to capture the finer details related to the effects of the economic crisis. Hence, the results need to be carefully interpreted in order not to draw premature conclusions.

Table 4.7 below, presents the results of logistic regression for the occurrence of illness of the individual child, against the predetermined set of independent variables mentioned above. While the following table only deals with the general type of illness, a number of similar models are provided for certain types of illness in the Appendices (Table A.3–Table A.6.)

Table 4.7. Logistic Regression Results for the Occurrence of Child Illness, IFLS3, 2000

Dependent Variable: Child was ill within the last 4 weeks before the survey (1/0)			
Variable	Coefficient		Standard Error
Constant	-0.12175		0.25514
Macro level (Regional/ Provincial variables)[20]:			
Changes in *ln* of per capita GRDP from the previous wave	-0.32828		0.26858
Provincial dummy variable for North Sumatra	0.30710		0.20096
Provincial dummy variable for West Sumatra	1.24054	**	0.32392
Provincial dummy variable for South Sumatra	0.52397	*	0.22872
Provincial dummy variable for Lampung	1.65790	**	0.42003
Provincial dummy variable for Central Java	0.62093	**	0.19011
Provincial dummy variable for Yogyakarta	1.49463	**	0.45227
Provincial dummy variable for East Java	0.45677	*	0.17847
Provincial dummy variable for Bali	-0.24721		0.22861
Provincial dummy variable for South Kalimantan	0.92283	**	0.35382
Provincial dummy variable for South Sulawesi	1.17704	**	0.27233
Micro level (household):			
Changes in *ln* of real MPCE from previous wave	0.07330		0.09347

[20] Prior to the use of provincial dummy variables, regional categorisation concept of Kusnanto (2002) has been tested for the model. However, the results are somewhat ambiguous, especially in relation to the sign of the coefficients of the key components/variables. Partial analyses involving observations from specific provinces and regions have accordingly been performed. The results revealed that there are no significant differences among those tested provinces and regions. Hence, it is decided to use the provincial dummy variables instead, to explain the impacts of the economic crisis experienced by different provinces/areas.

Table 4.7. ***Continued***

Variable	Coefficient		Standard Error
Increasing average of total working hours for employed household members in the last week	-0.24919	*	0.11149
At least one of the employed household members has additional job	0.25749	*	0.11735
Changes in sanitation index from the previous wave	-0.45260	*	0.18767
Increasing proportion of food spending to the total MPCE	0.23596	*	0.11174
Education attainment of the household head is junior high school (secondary level) or higher	-0.14201		0.12066
Working status of the household head: self employed	-0.25459		0.14673
Working status of the household head: employee	-0.22903		0.13790
Downward change of household head's working status from the previous wave	0.01851		0.12115
Proportion of children under 5 years old	5.32831	**	0.65791
Household size	0.10118		0.02625
Household is living in urban area	0.62060	**	0.12926
Micro level (Individual):			
Female children	0.08366		0.10896
Community level (EA):			
Existence of Public Health Centre	-0.23039	*	0.11513
Distance to the governing sub-district office (km)	0.00153		0.00265
Pseudo R^2	0.0941		
N	2,270		
LR Chi^2 (26)	220.25	**	

Note:
** Significant at 1% level
* Significant at 5% level
- Previous wave: IFLS1 (1993)

In the above table, the changes in natural logarithm of both GRDP and real MPCE, which represent direct measurements of shock variables at both macro and micro level respectively, do not seem to significantly affect the occurrence of child illness. In other words, the effects of the economic crisis towards the health status of the children are not readily visible from the changes in these macro and micro economic indicators.

However, as shown previously in the descriptive analysis part, such changes in macro and micro economic indicators do affect the indirect variables representing the overall socio-economic status at the household level, especially the increase in food share expenditure. The latter variable is found to be significant at 5% in the above model. What it means is that the increase in food share expenditure, which indicates lower welfare status, leads to higher likelihood of the occurrence of child illness.

Therefore, it can be concluded that the economic crisis phenomena represented by the drastic decline in the macro and micro economic indicators, indirectly contribute to the increasing occurrence of child illness.

Employment related factors in the Table 4.7 above, which include having additional job and increasing average of the total working hours for employed members of the household, also significantly affect the occurrence of child illness. The two variables, however, have opposite signs in their coefficients. These highlighted facts deserve further explanations.

The increase in the average working hour might result in the improvement of household's income level. Hence, it does make sense that the relationship is negative as indicated by the sign of its coefficient. It literally means that an increasing average of working hours, which often mean additional source of income for the corresponding households, results in the decrease of the probability of child illness. Needing additional jobs, on the other hand, can be interpreted to mean that the households in question are being not in a relatively high level of the socio-economic status. This reasoning is shown to be true by looking at the result of logistic regression, which is significant at 5% level, and shows positive sign on its coefficient. This finding further supports the presumption that the occurrence of child illness is more likely to happen in the households with lower level of socio-economic status.

In relation to the demographic aspects of the household, the proportion of children under five years old in household, as well as the size of the household, have been shown to be positively affecting the probability of the occurrence of child illness. In other words, the bigger the size of the household, and the higher the proportion of the younger children within the household, tends to experience more occurrence of child illness.

Location wise, being in the urban part of an area, also positively contributes to the higher occurrence of child illness. This is perhaps related to the environment factors, in which the urban areas are usually more densely populated, as well as more polluted. Such conditions may eventually lead to more cases of child illness. This fact is also further supported by the negative coefficient in the change of sanitation index, which is also significant at 5% level. What the latter means is that, the better the sanitation facilities available for the households, will more likely to reduce their probability of having a child member of the family being ill.

Table 4.7 also displays the result of regional variations with respect to the impacts of the economic crisis towards the occurrence of child illness. From the significance level of the coefficients in the provincial dummy variables, it is found that in the provinces of North Sumatra, West Sumatra, Lampung, Central Java, Yogyakarta, East Java, South Kalimantan, and South Sulawesi, the changes in *ln* of per capita GRDP reveal positive relationships with the occurrence of child illness. Hence, the consequences of the economic crisis in those areas had indeed significantly affected the health status of the children.

Finally, the community level variables consisting of the existence of Public Health Centre and the vicinity to the governing sub-district office show a mixed result in relation to the dependent variable. The existence of Public Health Centre understandably contributes to the decrease in the occurrence of child illness, as indicated by negative sign of its coefficient. On the other hand, the vicinity to the governing sub-district office, which can be translated as urbanisation level of the surrounding area, do not have significant impact on the outcome variable. It can

therefore be concluded that the supply side of health care facilities, actually plays an important role towards the health status of children.

The second causal modelling is presented in the Table 4.8 below. It explains the results of logistic regression for the occurrence of child wasting[21], which is assigned as the response variable, against several predetermined independent variables. Even though the predictors in the model are still consisting of the same group of independent variables as in the first model, the ways in which the model were constructed are slightly different to that of the previous one, especially in the details of individual predictor variables being used.

Originally, it was considered to use the same modelling variables for the two logistic regressions analysis, i.e. the probability of child illness and the probability of child wasting. However, it was later found that some of the predictor variables generate too much noise when applied to the second model. Additionally, several of those independent variables in the first model were in themselves not suitable to be incorporated into the later model, due to their overly high standard error values.

Table 4.8. Logistic Regression Result for the Occurrence of Child Wasting, IFLS3, 2000

Dependent Variable: Child is categorised as wasting (1/0)			
Variable	Coefficient		Standard Error
Constant	-2.58403	**	027175
Macro level (Regional/Provincial variables):			
Changes in *ln* of per capita GRDP from previous wave	-0.32969		0.33683
Provincial dummy variable for North Sumatra	-0.74557	*	0.31434
Provincial dummy variable for West Sumatra	-0.53308		0.38923
Provincial dummy variable for South Sumatra	0.30823		0.33354
Provincial dummy variable for Central Java	0.45825	*	0.21314
Provincial dummy variable for East Java	-0.60833	*	0.25625
Provincial dummy variable for Bali	-0.99783	*	0.40444
Provincial dummy variable for South Kalimantan	-1.08051		0.63620
Provincial dummy variable for South Sulawesi	-0.42652		0.32964
Micro level (household):			
Downward change of the quintile of MPCE from previous wave	0.19806		0.16331
At least one of the employed household members has additional job	-0.24285		0.15958
Change in sanitation index from the previous wave	0.47881		0.25887
Change in the proportion of food spending to total of MPCE	0.21670		0.46508

[21] Cut-off point of Weight for Height (WFH) indicator, which is defined as 1 if the z-score < -2SD of the standard reference, and 0 otherwise.

Table 4.8. ***Continued***

Variable	Coefficient		Standard Error
Working status of the household head: self employed	0.77910	**	0.22442
Working status of the household head: employee	0.68587	**	0.22153
Downward change in the household head's working status from the previous wave	0.16707		0.16527
Proportion of the number of household members working as employee to the total number of employed household members	0.73375	**	0.22223
Lag in wasting from the previous wave	1.66592	**	0.15592
Micro level (Individual):			
Female children	-0.22253		0.15000
Community level (EA):			
Existence of Public Health Centre	-0.13826		0.15325
Distance to the governing sub-district office (km)	-0.01806	*	0.00861
Pseudo R^2	0.1317		
N	1,802		
LR Chi^2 (21)	186.78	**	

Note:
** Significant at 1% level
* Significant at 5% level
- Previous wave: IFLS1 (1993)

In the above model, the natural logarithm of per capita GRDP is also shown to be non-significant with negative sign of coefficient. For the micro level (household), a similar conclusion can be seen with respect to the economic indicator being used, which in this case, is the downward change of the quintiles of MPCE. Since this later independent variable is expressed as a negative change, the sign of the coefficient is accordingly shown to be the opposite to that of the same variable in the previous model, i.e. positive sign.

The household variables that are found to be significantly contributing to the likelihood of child wasting are that of employment factors which represent the socio-economic status of the households. Such variables include the working status of the households' head and the proportion of the number of employed household members.

The working status of the households' head is specifically chosen to be that of self-employed and employee status. It is natural to assume that those two classifications imply a relatively lower households' socio-economic status compared to the other working status classification, namely being an employer. Furthermore, the proportion of the number of employed household members also reflects the socio-economic status of the households. A higher proportion in the number of employed household members usually translates to a lower socio-economic status of the

corresponding household, since the needs for higher income stream are pretty obvious in this case.

Having the above three predictor variables to be both significant at 1% level and positive in their sign of coefficients, strongly implies that the socio-economic status of the households, does indeed affected the occurrence of child wasting. To be more precise, the lower the socio-economic status of the households, as indicated by their overall employment characteristics, the higher it is the probability of encountering cases of child wasting in the family.

In addition to the socio-economic status of the households, the occurrence of child wasting also seems to be carried forward for a longer term of periods. The lag in the occurrence of child wasting between the period of 1993 and 2000 shows a highly significant relationship, with a positive sign of coefficient. This finding illustrates that the occurrence of wasting is more likely to also be affected by past nutritional factors.

Table 4.8 also highlights the fact that the impacts of the sudden decline in the households' socio-economic status, varies among provinces with respect to the occurrence of child wasting. A previous study by Block *et.al.* (2004), which found that the nutritional status of children in Central Java is more affected by the economic crisis, is also supported by the result presented in the above table. For Central Java, the coefficient is both positive and significant at 5% level. The provinces of North Sumatra, East Java, and Bali, all have a negative coefficient and significant also at 5% level. In those areas, the likelihood of child wasting due to macro economic downturn, are hence found to be lower than in the former region.

With respect to the community level variables, the last model shows that the existence of PHC does not directly affect the likelihood of child wasting. However, distance from the governing sub-district office does indeed affect the outcome at 5% significance level. Since the vicinity to the centre of sub-district government typically indicates urbanisation level of the neighbouring area, the result then suggests that the further it is from the centre of activity, the healthier the children are with respect to the cases of wasting. This later finding can also be explained by looking at the environmental characteristics of urbanised areas, such as that of higher pollution level which adversely affect the health status of the people living in the surrounding areas in general.

Wasting, in this model, was initially chosen as the preferred indicator for nutritional status due to its responsiveness towards seasonal effects or short-term rapid changes, e.g. shocks resulting from the economic crisis. However, the logistic regression result on this indicator as the outcome did not appear to be inline with that assumption. As shown by the causal model presented by Table 4.8, all the socio-economic shock variables at both macro and micro levels are not significant in explaining the occurrence of wasting. Thus, the probability of child wasting in this case is not clearly shown to be affected by such socio-economic shocks.

5. Conclusion and Discussion

5.1. Conclusion

It is commonly perceived that the economic crisis, which struck Indonesia by the mid of 1997, has led to a number of appalling consequences, resulting in the sudden decline of the overall welfare status of the people (Block *et.al.*, 2004; Frankenberg *et.al.*, 1999; Frankenberg, Thomas, and Beegle, 1999; Knowles, Pernia, and Racelis, 1999), including the health status of the general population (Frankenberg *et.al.*, 2001; Rukumnuaykit, 2003; Saadah, Pradhan, Surbakti, 2000).

From macro perspectives, the downturn of events were clearly indicated by the collapse in many of the key macro economic indicators, such as declining of Gross Domestic Product (GDP) and steeply increasing of prices, particularly for food commodities (Frankenberg, *et.al.*, 2001). The macro shocks were then reflected at the micro level. At micro level, the impacts of the shocks varied depending on a number of factors, which include the socio-economic status of households, as well as other households' characteristics. Both the households' characteristics and their socio-economic status represent the fundamental capacities of the households in coping with such shocking turn of events.

Households' coping mechanisms can be seen through the shifts in their basic survival behaviours. Among other things, the change in the households' consumption patterns towards a higher proportion of food share spending is perceived to be the most common strategy, especially for the poorer of the households (Deaton, 1997). Table 4.2 clearly illustrates that there had been a notable increase in food share spending during the time of the crisis. However, due to the seemingly contradictive sign of coefficient in the analysis performed on the food share expenditure and the variable representing the shocks, relationships between these two variables are not immediately obvious.

Only after further scrutinising on the actual changes of the macro economic indicator directly corresponding to the shift in the food share expenditure pattern, that their relationships presented in Table 4.6 become much clearer. It is found that while the sudden drop in welfare status of households significantly shows a pattern of increasing food share expenditure, a steady improvement on the economic status of households does not directly relate to the decrease in the proportion of food to non-food spending of the corresponding households.

Table 4.6 also presents the result of analysis on the other predetermined variables. Not all of those variables, however, directly support the presumed relationships between the economic crisis phenomena and the outcome indicators of the health status of children. Only in the third wave of survey, that the effects of the changes in *ln* of GRDP are shown to be significant at 1% level, with negative sign of coefficient, to both the occurrence of child illness, as well as to the severity level of child morbidity within the households. These trends highlighted the facts that the higher the level or GRDP, which indicate improved households' socio-economic status, results in the decrease of the prevalence and severity level of child illness.

To put this study in context, the evidence of declining health status of children is summarised in Table 4.3. It is shown that all the important children health indicators related to morbidity had already declined during the period of 1993 to 1997, whereas afterwards, the changes are quite varied from one health aspect to another. This result also admits the unclear relationships between the shocks resulting

from the economic crisis and child morbidity as one of the outcome indicator. Over more, Table 4.4 and Table 4.5 also suggest that there are no clear linear relationships between child morbidity and the socio-economic status of the households in which they are living, which, in this case, are based on the quintiles of MPCE. The logistic regression model for the occurrence of child illness, however, provides better insights into these matters.

In the causal modelling for the occurrence of child illness, both the direct measurements of macro and micro economic indicators are also not proven to be of significant contributions. Nevertheless, the changes in those two indicators have been shown to be significantly affecting a number of other households' socio-economic indicators, which are, in turn, significantly affecting the occurrence of child illness. It can therefore be concluded that the impacts of the economic crisis towards such outcome indicator of the health status of children, are somewhat indirect and not immediately obvious.

The second model attempts to explain the occurrence of child wasting. Although the results of analysis on this model reveal different trends than that of the previous model, there are also a number of similarities, especially related to the non-significance of the direct measurement variables of the economic shocks at both macro and micro levels. Only the households' employment characteristics are explicitly shown to be significant with respect to the occurrence of child wasting. However, these aspects can also be used to explain indirectly the relationships between the households' socio-economic status and the occurrence of child wasting as the second indicator of the health status of children.

Additionally, it should also be noted that the prevalence of child wasting is also significantly affected by the lags in the wasting variable itself at 1% level. Since practically all of the direct measures of shock variables are not significant, it can therefore be concluded that the occurrence of child wasting are less likely to be affected by the short-term effects of the economic crisis, but rather, by the long-term and non-economic related factors.

This later finding seems to be supported by Micklewright and Ismail (2001), in that, despite being a good candidate for welfare status indicator, nutritional status does not highly correlate to the household income or consumption level. Other determinant aspects such as that of environmental and genetic factors should also be considered when utilising such indicator. Furthermore, the recent publication by Müller and Krawinkel (2005) emphasises the fact that child malnutrition are not only affected by the socio-economic status of the household where the children are living, but also embedded into other factors such as mother's education and dietary knowledge -in particular of substantial micronutrients-, provision of safe drinking water and proper sanitation facilities, quality of health services, breast-feeding habits, as well as exposure to infectious diseases.

It is also important to note that the impacts of the economic crisis found in this study towards the outcome indicator, vary among areas, i.e. provinces. This fact can be seen from the differences in the signs and also significance levels of the statistics in the models presented in Table 4.7 and 4.8. Therefore, this study further supports the findings of previous studies done by Kusnanto (2002) on the regional differences of the impacts of the economic crisis, as well as many other surveys designed for the specific purpose of measuring location sensitive variations of nutritional status of the children.

The last hypothesis regarding the contribution of the existence of Public Health Centre to the health status of children shows differing results. Whereas the occurrence of child illness is clearly reduced by the existence of such facilities, the occurrence of child wasting is nonetheless unaffected statistically. This actually makes a common sense though, since people mostly only visit PHCs in order to get treatments for their current ailments.

5.2. Discussion

The analysis on the effects of socio-economic changes to the health status of children in this study cannot be optimally accomplished due to the many obstacles encountered along the way. Some technical problems, particularly related to the availability issues of the supporting data, have forced certain, less desirable approaches to be taken in order to explain the economic crisis phenomena. Unavailability of the necessary anthropometric measurements for IFLS 1997, for example, resulted in the jumping of interval of the panel data used for modelling purpose. A lot of information, which could help in portraying what had exactly happened during the heat of the economic crisis, is therefore missing from considerations.

Reliability issues surrounding the expenditure information, which are apparent from the misaligned trends between macro and micro economic indicators, may also lead to the failure to draw accurate interpretations. This shortcoming might explain why such variable and its changes are not significant for the two models in the causal modelling part of this study. Fortunately, the expenditure information can still be connected to other variables indirectly representing the shocks phenomena, for example that of the proportion of food share spending to the total expenditure, which may help to explain the outcome.

Extended modelling analysis, e.g. multinomial *logit* regression might be better at explaining the causal-effect relationships between the independent variables and the dependent outcome variable, i.e. the health status of children, due to the possibilities of utilising more altered aggregations on the dependent variable side. The occurrence of illness, for example, can be further differentiated into more than one group of variables according to the categorisation of types of illness. The same approach could also be applied to the levels of the z-score for WFH with respect to the reference standards. This type of analysis had already been done in a number of researches, particularly involving complex explanatory factors as the outcome indicators (Micklewright and Ismail, 2001).

The fundamental design of this study mandates that the panel data generated to derive the analysis be different than that of the suggested procedures given by the data provider. It is necessary in order to closely monitor only those households who remain intact throughout all the three waves of IFLS, and not be distracted by the possibility of complications arising from the splitting of households, as well as households gaining new members. Consequently, the provided weight variable from the data provider cannot be incorporated into the analysis.

Unweighted results of such analysis, particularly in the descriptive part, cannot therefore be interpreted to be true for the level of the original sample coverage of IFLS, much less for the general population. Thus, it is important to emphasise that those findings outlined in this study are only directly supportable for the eligible households sample. Even so, pending special precautions, the trends uncovered herein

might still be relevant for the wider scope of sample, or to the general population for that matter. In the causal modelling part, however, the unweighthed analysis really does not matter. Since the design of this study is primarily directed towards rational analysis for investigating causal-effect relationships between the changing of socio-economic status and the health status of children, the unweighted results are therefore of less concern.

Special notes are also delivered to the data provider and other survey designers, in that, whilst the rich contents of questionnaires give the benefits of providing a lot of choices for research topics, it has inherent weaknesses due to reliability and quality of the data/information being gathered. Aside from their usefulness in providing over the time information, panel data remains generally hard to handle. This is partly due to sample attrition problems, as well as from the inconsistency of variable definitions across the waves (Menard, 2002; Visser, 1985). In this study, such problems manifest themselves as constraints, for examples, in defining the outcome indicators which were restricted by the types of illness being consistently questioned; and in the inability to investigate the effects of changes with respect to the availability of PHCs at the community level, due to structurally different question of this aspect across the individual waves of the survey.

Finally, the time limitation imposed on this study has also become another constraining factor, which prohibitively narrows down the number of research and investigations that can be carried out. The characteristics and lifestyles of the mothers, for example, could not be investigated due to the relatively short period of time allocated for this study, even though they might partly contribute to the health status of their children. It is therefore suggested that this type of study should be conducted within a longer period of time, so as to be able to extensively and exhaustively examine all the possible avenues. In the end, a better research quality in terms of substance, as well as a more accurate interpretation of the results, could be expected for any such a study.

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Appendices

Table A.1. GRDP per capita of IFLS Provinces Samples
(1993 Constant Market Prices)

Province	1993	1994	1995	1996	1997	1998	1999*	2000**
North Sumatra	1,697,968	1,830,005	1,960,536	2,108,670	2,267,570	1,996,988	2,024,927	2,092,722
West Sumatra	1,444,921	1,528,962	1,641,689	1,742,291	1,931,079	1,790,035	1,808,158	1,861,021
South Sumatra	1,582,023	1,653,474	1,752,147	1,851,973	1,968,276	1,795,544	1,813,576	1,865,337
Lampung	850,331	893,108	967,919	1,027,250	1,123,015	1,034,159	1,049,866	1,061,831
Jakarta	5,867,834	6,248,111	6,686,735	7,190,967	8,393,272	6,914,253	6,883,322	7,095,199
West Java	1,441,898	1,514,628	1,604,432	1,718,502	1,753,740	1,411,393	1,413,173	1,449,950
Central Java	1,166,805	1,238,818	1,317,134	1,401,996	1,432,725	1,254,201	1,287,441	1,326,531
Yogyakarta	1,390,640	1,503,375	1,625,415	1,740,613	1,764,638	1,556,764	1,561,524	1,613,980
East Java	1,479,027	1,573,518	1,689,486	1,813,689	1,915,896	1,596,984	1,616,012	1,668,182
Bali	2,000,675	2,133,113	2,283,896	2,446,944	2,508,160	2,377,722	2,364,761	2,407,240
West Nusa Tenggara	724,530	765,393	814,649	866,486	916,783	877,144	892,934	1,180,224
South Kalimantan	1,659,734	1,765,733	1,887,357	2,034,025	2,193,686	2,043,661	2,067,497	2,132,358
South Sulawesi	1,030,697	1,092,358	1,162,880	1,241,280	1,314,788	1,230,697	1,251,233	1,297,049
Total 26 provinces	1,731,618	1,829,940	1,944,166	2,078,620	2,212,590	1,896,101	1,894,688	1,954,557

Source: BPS - Statistics Indonesia
Note: * - preliminary figures
** - very preliminary figures

Table. A.2. The IFLS' Provinces Sample's Capital Cities General Consumer Price Index
(April 1988 - Maret1989 = 100)

Capital City	Province	1993	1997	2000
Medan	North Sumatra	1.4296	1.9554	2.2281
Padang	West Sumatra	1.3706	1.8681	2.2659
Palembang	South Sumatra	1.5689	1.9004	2.1737
Bandar Lampung	Lampung	1.4487	1.9540	2.2405
Jakarta	DKI Jakarta	1.4829	2.0865	2.0775
Bandung	West Java	1.4264	2.1275	2.0393
Semarang	Central Java	1.4469	1.8689	1.9329
Yogyakarta	D.I. Yogyakarta	1.4306	1.8962	2.1259
Surabaya	East Java	1.4922	2.0144	2.0652
Denpasar	Bali	1.5659	1.9863	2.1498
Mataram	West Nusa Tenggara	1.4760	2.0206	2.1085
Banjarmasin	South Kalimantan	1.3800	1.8150	2.0912
Ujung Pandang	South Sulawesi	1.3724	1.8020	2.1012

Source: BPS - Statistics Indonesia

Table A.3. Logistic Regression Result for Fever, IFLS3, 2000

Dependent Variable: Child has had fever in the last 4 weeks before survey (1/0)			
Variable	Coefficient		Standard Error
Constant	-1.38712	**	0.20984
Macro level (Regional/Provincial variables):			
Changes in *ln* of per capita GRDP from previous wave	-0.31519		0.23030
Provincial dummy variable for North Sumatra	0.13587		0.16504
Provincial dummy variable for West Sumatra	0.78371	**	0.21419
Provincial dummy variable for South Sumatra	0.02648		0.18902
Provincial dummy variable for Lampung	0.53441	*	0.24749
Provincial dummy variable for Central Java	-0.01485		0.15180
Provincial dummy variable for Yogyakarta	0.35238		0.28784
Provincial dummy variable for East Java	0.00342		0.15073
Provincial dummy variable for Bali	0.10806		0.21459
Provincial dummy variable for South Kalimantan	0.39919		0.25942
Provincial dummy variable for South Sulawesi	0.47115	*	0.18825
Micro level (household):			
Changes in *ln* of real MPCE from previous wave	0.05156		0.07652
Increasing average of total working hours for employed household members in the last week	-0.22547	*	0.09131
At least one of the employed household members has additional job	0.06652		0.09516
Changes in sanitation index from the previous wave	0.17735		0.15326
Increasing proportion of food spending to the total MPCE	0.05153		0.09058
Education attainment of the household head is junior high school (secondary level) or higher	-0.13051		0.09768
Working status of the household head: self employed	0.01015		0.12064
Working status of the household head: employee	0.02233		0.11429
Downward change of household head's working status from the previous wave	0.21525	*	0.09773
Proportion of children under 5 years old	4.34397	**	0.46795
Household size	0.11876		0.01974
Household is living in urban area	0.30170	**	0.10160

Table A.3. ***Continued***

Variable	Coefficient	Standard Error
Micro level (Individual):		
Female children	0.07905	0.08823
Community level (EA):		
Existence of Public Health Centre	-0.14582	0.09223
Distance to the governing sub-district office (km)	0.00145	0.00155
Pseudo R^2	0.0633	
N	2,270	
LR Chi^2 (26)	199.15 **	

Note:
** Significant at 1% level
* Significant at 5% level
- Previous wave: IFLS1 (1993)

Table A.4. Logistic Regression Result for Cough, IFLS3, 2000

Dependent Variable: Child has had cough in the last 4 weeks before survey (1/0)			
Variable	Coefficient		Standard Error
Constant	-1.1380	**	0.21070
Macro level (Regional/Provincial variables):			
Changes in *ln* of per capita GRDP from previous wave	-0.49040	*	0.23667
Provincial dummy variable for North Sumatra	-0.00293		0.16489
Provincial dummy variable for West Sumatra	0.79244	**	0.21562
Provincial dummy variable for South Sumatra	0.38808	*	0.18834
Provincial dummy variable for Lampung	1.68823	**	0.28911
Provincial dummy variable for Central Java	0.43264	**	0.15205
Provincial dummy variable for Yogyakarta	1.54810	**	0.32891
Provincial dummy variable for East Java	0.09288		0.14930
Provincial dummy variable for Bali	-0.16293		0.21620
Provincial dummy variable for South Kalimantan	0.05784		0.25940
Provincial dummy variable for South Sulawesi	0.10604		0.18698
Micro level (household):			
Changes in *ln* of real MPCE from previous wave	0.12006		0.07709
Increasing average of total working hours for employed household members in the last week	-0.03362		0.09179
At least one of the employed household members has additional job	0.10000		0.09572
Changes in sanitation index from the previous wave	0.06699		0.15419
Increasing proportion of food spending to the total MPCE	-0.06802		0.09115
Education attainment of the household head is junior high school (secondary level) or higher	0.05326		0.09820
Working status of the household head: self employed	-0.01138		0.12154
Working status of the household head: employee	-0.05112		0.11490
Downward change of household head's working status from the previous wave	0.03084		0.09835
Proportion of children under 5 years old	3.56752	**	0.47166
Household size	0.10397	**	0.02004
Household is living in urban area	0.63784	**	0.10234

Table A.4. ***Continued***

Variable	Coefficient	Standard Error
Micro level (Individual):		
Female children	-0.00119	0.08881
Community level (EA):		
Existence of Public Health Centre	-0.36535 **	0.09292
Distance to the governing sub-district office (km)	0.00106	0.00150
Pseudo R^2	0.0727	
N	2,270	
LR Chi^2 (26)	228.47 **	

Note:
** Significant at 1% level
* Significant at 5% level
- Previous wave: IFLS1 (1993)

Table A.5. Logistic Regression Result for Respiratory Problem, IFLS3, 2000

Dependent Variable: Child has had respiratory problem in the last 4 weeks before survey (1/0)			
Variable	Coefficient		Standard Error
Constant	-3.40405	**	0.35981
Macro level (Regional/Provincial variables):			
Changes in *ln* of per capita GRDP from previous wave	-0.70830		0.36815
Provincial dummy variable for North Sumatra	0.29049		0.28136
Provincial dummy variable for West Sumatra	0.52216		0.32288
Provincial dummy variable for South Sumatra	-0.05073		0.34827
Provincial dummy variable for Lampung	0.18965		0.48836
Provincial dummy variable for Central Java	-0.57479		0.30057
Provincial dummy variable for Yogyakarta	0.92908	*	0.41427
Provincial dummy variable for East Java	-0.17180		0.28643
Provincial dummy variable for Bali	-0.51318		0.48803
Provincial dummy variable for South Kalimantan	-0.34199		0.50066
Provincial dummy variable for South Sulawesi	0.26711		0.30739
Micro level (household):			
Changes in *ln* of real MPCE from previous wave	-0.02426		0.14019
Increasing average of total working hours for employed household members in the last week	0.10361		0.16264
At least one of the employed household members has additional job	0.36873	*	0.17023
Changes in sanitation index from the previous wave	0.33994		0.27515
Increasing proportion of food spending to the total MPCE	0.01627		0.16288
Education attainment of the household head is junior high school (secondary level) or higher	-0.10535		0.17522
Working status of the household head: self employed	0.12838		0.21233
Working status of the household head: employee	0.08133		0.20308
Downward change of household head's working status from the previous wave	0.20657		0.16925
Proportion of children under 5 years old	5.59141	**	0.78638
Household size	0.11093	**	0.02957
Household is living in urban area	0.32313		0.18335

Table A.5. ***Continued***

Variable	Coefficient	Standard Error
Micro level (Individual):		
Female children	0.01210	0.15804
Community level (EA):		
Existence of Public Health Centre	-0.60432 **	0.16663
Distance to the governing sub-district office (km)	-0.00993	0.00809
Pseudo R^2	0.0589	
N	2,270	
LR Chi^2 (26)	75.24 **	

Note:
- ** Significant at 1% level
- * Significant at 5% level
- \- Previous wave: IFLS1 (1993)

Table A.6. Logistic Regression Result for Skin Infection, IFLS3, 2000

Dependent Variable: Child has had skin infection in the last 4 weeks before survey (1/0)			
Variable	Coefficient		Standard Error
Constant	-2.03925	**	0.25222
Macro level (Regional/Provincial variables):			
Changes in *ln* of per capita GRDP from previous wave	-0.16564		0.29831
Provincial dummy variable for North Sumatra	0.15547		0.20848
Provincial dummy variable for West Sumatra	0.31472		0.25486
Provincial dummy variable for South Sumatra	0.81404	**	0.21028
Provincial dummy variable for Lampung	0.39850		0.30724
Provincial dummy variable for Central Java	-0.15863		0.19624
Provincial dummy variable for Yogyakarta	0.45231		0.33503
Provincial dummy variable for East Java	0.31781		0.18258
Provincial dummy variable for Bali	-0.31792		0.30275
Provincial dummy variable for South Kalimantan	-0.03605		0.33095
Provincial dummy variable for South Sulawesi	0.56503	**	0.21410
Micro level (household):			
Changes in *ln* of real MPCE from previous wave	-0.04646		0.09379
Increasing average of total working hours for employed household members in the last week	-0.10870		0.11249
At least one of the employed household members has additional job	0.37559	**	0.11582
Changes in sanitation index from the previous wave	-0.09182		0.19040
Increasing proportion of food spending to the total MPCE	-0.06207		0.11131
Education attainment of the household head is junior high school (secondary level) or higher	-0.51134	**	0.12423
Working status of the household head: self employed	0.02824		0.14444
Working status of the household head: employee	-0.07163		0.14133
Downward change of household head's working status from the previous wave	0.14816		0.11708
Proportion of children under 5 years old	2.53531	**	0.54306
Household size	0.053310	*	0.02192
Household is living in urban area	0.10106		0.12770

Table A.6. ***Continued***

Variable	Coefficient	Standard Error
Micro level (Individual):		
Female children	-0.03996	0.10805
Community level (EA):		
Existence of Public Health Centre	0.07135	0.11386
Distance to the governing sub-district office (km)	-0.00862	0.00468
Pseudo R^2	0.0417	
N	2,270	
LR Chi^2 (26)	94.36 **	

Note:
** Significant at 1% level
* Significant at 5% level
- Previous wave: IFLS1 (1993)