

**THE ROLE OF ALTRUISM IN WELL-BEING THROUGH SOCIAL INTERACTION,
CULTURE, SOCIAL CAPITAL, AND INSTITUTION**

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Abstract

The literature on altruism is often quite broad in that it advocates the existence as well as the importance of altruism in economic decisions. However, altruism is unlikely to be included as an important factor in many well-being models. The main thesis advanced in this study is that altruism cannot be excluded from a well-being model, otherwise the model will not be able to reflect the actual capability of a society to acquire well-being. Through its ability to both utilise the potential of the resources available and produce positive social externalities, the absence of altruism could undermine the ability of the resources to support the well-being of its members. Our models also include resources, social interaction, culture, social capital, and institution because of their obvious role in influencing well-being. The literature in economics has long acknowledged the importance of these variables in well-being and yet a comprehensive analysis of their inter-relationships in influencing well-being has not been extensively explored. This study may be the first comprehensive inquiry into the inter-relationships among these variables using economics principles.

On one hand, the unclear importance of altruism in well-being is caused by the obscure relationship between altruism and transfer behaviour. On the other hand, some altruism models face limitations in their acceptance of the possibility of altruism being extended to people beyond family members. Through mathematical models, this study provides a solution to these problems in two ways. First, inspired by 'Varieties of Altruism' from Phillip Kitcher in 2010, the relationship between psychological and behavioural altruism is precisely defined. Second, the imperfect information assumption is applied in the model.

The originality of this study comes mainly from the following areas. First, this dissertation provides a comprehensive analysis showing the mechanism of how altruism influences multidimensional well-being through social interaction, culture, social capital, and institution. Second, the models explain empirical studies by showing that the positive relationship between altruism and well-being is only relevant for people who perceive themselves as having less resource than others. Third, the models show a low behavioural altruism trap, which explains the difficulty in performing a purely altruistic transfer to others. Fourth, an alternative measure for institution is introduced using the reliability and predictability of behaviour. Fifth, an alternative measure for social capital is offered using the coherence of a society as the core definition of social capital. Sixth, the altruism models developed in this study allow a misperception of own and others' resources. Seventh, the models show that the average level of psychological altruism in a society cannot be assumed to be always equal to zero. Eighth, the relationship between psychological and behavioural altruism is explicitly shown in the models.

Statement

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except due acknowledgement is made in the text.

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... if every man had a tender regard for another, or if nature supplied abundantly all our wants and desires, that the jealousy of interest, which justice supposes, could no longer have place Encrease to a sufficient degree of benevolence of men, or the bounty of nature, and you render justice useless, by supplying its place with much nobler virtues, and more valuable blessings.

David Hume, 1789

CHAPTER 1. INTRODUCTION

This dissertation is an inquiry to identify the role of altruism in well-being. Inspired by Kitcher (2010), altruism is classified into psychological altruism and behavioural altruism. Psychological altruism is the feeling of selfless or the importance of others' well-being compared to one's own well-being. Behavioural altruism is the transfer of resources to others which is inspired by the feeling of selfless. On the one hand, literature in philosophy, development psychology, and evolutionary biology have long confirmed the important role of altruism in human well-being. On the other hand, altruism has not been clearly included as one of the factors in well-being models. Before an empirical study can be reasonably conducted to reveal the relationship between altruism and well-being, theoretical models are needed to precisely point out how well-being is influenced by altruism. This study provides such theoretical models.

In influencing well-being, altruism works in a mechanism that involves other variables. The literature review in Section 1.1 shows that social interaction, culture, social capital, and institution are also involved in the mechanism. Thus, researching the role of altruism in well-being requires investigation into how all these variables fit into the models.

While consideration of the importance of each of the above variables in well-being can be found in the economics literature, a comprehensive mechanism of how all of those variables interacting with one another in influencing well-being is yet to be developed. Without such a comprehensive mechanism, the ability of each variable in explaining well-being seems to be undermined by other variables' roles in well-being. The theoretical models developed in this dissertation are intended to fill this gap in the literature. Section 1.1 shows the inter-relationships among those variables found in the literature, as well as highlighting the gaps or limitations regarding their inter-relationships. The comprehensive background presented in Section 1.2 summarises the models as a general framework showing how these variables are inter-related in this dissertation. This framework serves as the foundation for developing the models in detail in the following chapters.

In developing the comprehensive mechanism, several of the limitations that can be found in the literature need to be resolved in this study. Those limitations include the following. First, the utility function has some difficulties in explaining altruism beyond family boundaries. These difficulties arise because, in making an altruistic decision, an individual has to deal with imperfect information regarding others' well-being. Second, the relationship between psychological and behavioural altruism which is influenced by an individual's resource endowment has not been precisely modelled. This relationship is very important in order to avoid confusion between altruism, which is defined as the degree of the importance of others' well-being, and altruism as transfer behaviour, such as charity (Kitcher, 2010). A third and rather challenging limitation comes from psychology studies. On the one hand, a positive relationship between altruism and mental as well as physical well-being is widely accepted in psychology. On the other hand, some studies in psychology also found that for people who perceive themselves as richer than others, it is more difficult to perform altruistic behaviour. These puzzling findings are not yet explained in economics. Fourth, a limitation comes from the need for a study which can explain the difficulties of performing purely altruistic behaviour. The fifth limitation comes from the need to have a precise relationship between social capital and psychological altruism; institution and psychological altruism; and social interaction and altruism. These limitations are explained in more detail in Section 1.1.

1.1. Literature Review

1.1.1. The insight for the importance of altruism in well-being

The search for the source of well-being in economic development theories had started even before Adam Smith's inquiry into the nature and causes of the differences in economic achievement among nations. Economic development theories have tried to attribute the varying levels of well-being among societies to a number of possible variables. Those variables include endogenous technological innovation, demographic factors and human capital interaction, international spill-over in technology, capital accumulation, and institutional factors. However, it seems there have not been enough lessons learnt by policy makers from recent economic development theories (Lensink & Kuper, 2000).

A fresh insight comes from the institutional development theory, which offers a new dimension on the nature of human beings. In economic terms, human beings can be regarded not simply as human capital in the form of education and skills, but as a combination of many additional qualities that finally influence the institution or the 'rules of the game' in society (North, 1990). Economic development requires particular qualities of human capital (Tinbergen, 1967). Tinbergen conceptualises important 'qualities' for development in human beings as: interest in material well-being; interest in techniques and in innovation; ability to look ahead; willingness to take risks; perseverance; ability to collaborate with other people; and ability to observe certain rules. This is to say that such qualities in human beings are not only contained within notions of education and skills. By viewing human beings' qualities related only to education and skills, some studies may suggest an ambiguous relationship between human capital and economic growth (Barro, 1991 and Mankiw, Romer, & Weil, 1992). The insight above leads to the necessity of reconsidering the importance of altruism in well-being as proposed in some seminal research works such as Nagel (1970); Becker (1974; 1976); Collard (1978); and Margolis (1982).

Adam Smith's (1759) *Theory of Moral Sentiments* can also inspire the importance of altruism. Smith's (1776) *The Wealth of Nations* acknowledged that, even when the butcher, the brewer, and the baker are selfish, we can still expect our dinner. Even when human beings are selfish, the economy can still work properly¹. However, in *Theory of Moral Sentiments*, Smith implies that being selfish is not the only nature of human beings.

How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it (1759, p.11).

Human beings can also be altruistic. Accepting the notion of human self-interest in Smith's first book and at the same time considering possibility of altruism in his second, will prevent a claim that human beings are always altruistic. But human beings are not always selfish either. Some people can be more altruistic than others. In certain situations, an individual can be altruistic and at other times s/he can become selfish. The assumption that human beings are altruistic is discussed in Chapter 2. The altruism models acknowledge that the level of altruism varies among individuals, communities, times, and circumstances.

¹ Paganelli (2008) concludes that *The Wealth of Nations* is a book that criticises self-interest and its abuses.

In this study, use of the term ‘level of altruism’ has been chosen instead of ‘degree of altruism’. ‘Degree of altruism’ has been commonly referred to as the weight attached to others’ consumption in a utility function (such as in Hudson & Jones, 2002; Konrad, 2004; Hori, 2009; and Kohler, 2011). The ability of the ‘degree of altruism’ to explain psychological altruism is limited by an assumption that the weight attached to an individual’s own consumption is constant.² This limitation is addressed in the present study by constructing a measure for altruism as the ratio between the weight attached to others’ consumption and own consumption. Since the formulation for this ratio is different from that for the degree of altruism, the ‘level of altruism’ has been chosen to avoid confusion. Chapter 2 provides an explanation for this choice in more detail. In addition, as altruism can be distinguished by psychological and behavioural aspects, a distinction can also be made between the level of psychological and the level of behavioural altruism.

1.1.2. Psychological and behavioural altruism

Altruism can be defined as an individual’s allocation of resources, which is influenced not only by the bundle of goods one obtains for her/himself but also by the effect of the individual’s choice on others or on society (Frankena, 1963; Collard, 1978; Margolis, 1982; Frankena, 2000; Nuttall, 2002; Okasha, 2008; and Zak, 2008).³ In the commodity related approach, behaviour is altruistic when an individual i ’s marginal utility with respect to other individuals’ consumption (C_{oi}) is greater than zero ($\frac{\partial U_i}{\partial C_{oi}} > 0; i \neq oi$). This means that each additional good consumed by other individuals will increase individual i ’s utility. The same logic can also be applied to utility and intrinsic value related approaches. In the intrinsic value related approach, the individual i ’s utility does not directly come from other individuals’ consumption but indirectly through its effect on other individuals’ intrinsic value. Intrinsic value is the value that thing has in itself (Zimmerman, 2007). The intrinsic value in having lunch is not necessarily equal to the money sacrificed to obtain the lunch; the final benefit is derived from its

² See Section 2.2.3 for the technical explanation.

³ See Section 2.2.3 and 2.4 for the technical explanation regarding the level of psychological and behavioural altruism.

consumption. In the capability approach, intrinsic value is similar to ‘functioning’ (Deneulin & Shahani, 2009).

The intuition behind the explanation above is that there is a relationship between psychological altruism and behavioural altruism (Kitcher, 2010). This dissertation looks at the role of altruism in a society, but the role of resource endowment in an individual cannot be ignored in altruistic behaviour. Therefore, the relationship between psychological and behavioural altruism should be based on a utility function which can satisfy four requirements. First, as the altruism is beyond family boundaries, this utility function should allow an individual to indulge in altruistic behaviour with imperfect information regarding others’ well-being⁴. The accommodation of imperfect information regarding others’ well-being in the altruism models becomes one of the contributions of this study. Second, the role of resource endowment should be included in the function. Third, as the models are designed to show the role of psychological altruism on the well-being of a society, the models should be able to demonstrate that a society can be psychologically altruistic. This requirement is necessary in order to overrule the self-interest assumption. Fourth, provided that a human being can be psychologically altruistic, the model should also be able to explain the difficulty in converting altruism inside the mind into altruistic behaviour. As this function is not yet fully developed in the literature, Chapter 2 addresses the development of the models as well as offering formal mathematical proofs.

1.1.3. Altruism and culture

Culture can be defined as a set of shared values and beliefs which are developed through regular communication and/or social interaction (where a face-to-face mode can provide more effective communication) and cumulative through time (Collard, 1978; North, 1990; North, 1994; Casson & Godley, 2000; Lal, 2000; and Collier, 2002). The collectively held values and the collective programming of the human mind for culture from Hofstede (1981) conform this definition. Altruism can be seen as a value; and value can be defined as a guide that provides information on what things ought to do to create

⁴ When altruism is limited within the family, a perfect information assumption is acceptable (see, for example, Leininger, 1986; Bernheim & Stark, 1988; Chakrabarti, Lord, & Rangazas, 1993; Agee & Crocker, 1996; Stark & Wang, 2004; Gatti, 2005; Lindbeck & Nyberg, 2006; Jacobsson, Johannesson, & Borgquist, 2007; and Li, Rosenzweig, & Zhang, 2010)

well-being for the whole of society in the long run (Frankena, 1963; Doyal & Gough, 1991; Frankena, 2000; Nuttall, 2002; Schroeder, 2008; and Zak, 2008). Belief is the attitude of taking a proposition to be the case, or regarding it as true, and this attitude depends on both internal properties of one's brain and also information received from the external world (Schwitzgebel, 2006). Beliefs, for example, in the heavenly life, beliefs in God, and beliefs in super natural power. Therefore, as a value, altruism provides a society with the guidance to consider not only one's own well-being but also the well-being of others when making resource allocation decisions. At the same time, altruistic beliefs provide the necessary reasoning to encourage individuals to accept the value of altruism.

Because culture promotes co-ordination, it can therefore enhance efficiency in utilising scarce resources. Although economic agents are rational, they face a constraint: complete or perfect information is impossible to be owned by economic agents. The gap between the actual information that economic agents have and the complete information is filled by beliefs. Thus, economic decisions are based on actual information and beliefs. At the same time, agents want to legitimise their decisions, and values provide legitimacy for objectives. Different value-systems will lead agents to different ways to achieve different objectives. Values provide information about right and wrong, and beliefs provide information about true and false (Casson & Godley, 2000).

In general, information is a public good. That is why culture is also a public good. Thus, people who communicate regularly through social interaction tend to share the same values and beliefs. Especially in the past, before modern transportation, one village or small town had a very low interaction with other village or town, so each village or town had its own distinctive culture. Values – such as honesty, caring for others, and helping people in trouble – and also beliefs – such as fear of the supernatural or anticipation of heavenly reward – may encourage people to behave in a socially responsible way that in turn will promote higher efficiency.

In a more detailed analysis, Casson & Godley (2000) use a standard demand and supply point of view in their research of culture. From the demand side, culture is needed because it can simplify decision-making. Uncertainty can be reduced because people share the same values, so other people's behaviour becomes relatively more predictable. On the supply side, the division of labour, as noted by Adam Smith, enables specialisation, simplification, repetition, and mechanisation so that certain individuals become

specialists in values and beliefs. These individuals exercise a leadership role in their culture. They become the source of values and beliefs, to be shared by other people in the society.

In short, through social interaction, culture enables a society to experience two things that happen on the level of altruism. First, the cultural process enables a society to share more uniform values, including altruism. Second, the emergence of specialists in values and beliefs in the cultural process opens up the possibility for the members of a society to pursue a higher level of altruism offered by the leaders of values and beliefs. These two properties in the relationship between altruism and culture are more formally developed in Chapter 3. Therefore, one of the tasks of this dissertation is to fill a gap in the literature by developing models to show this relationship between altruism and culture (Section 3.4).

1.1.4. Social capital

Culture cannot exist without a society or a community, and the social capital of a society transforms culture into externalities. Social capital is the internal social and cultural coherence of a society that, through social interactions, generates durable effects in the form of externalities (Hoff & Stiglitz, 2001; Meier, 2001; and Collier, 2002). The coherence of a society is the result of social interaction. There are two types of social interaction, one-way and reciprocal interaction. One-way interaction happens when an individual observes the behaviours of others. Thus, one-way interaction can also be called 'observation'. One-way interaction can exist with or without a network or organisation. On the other hand, reciprocal interaction only occurs with the existence of a network or organisation. Reciprocal interaction needs at least two individuals to create a communication. Social interaction is not only created by interaction within a network or organisation, but also through inter-organisation and inter-network interaction.

A network or organisation can be public and private. A network is a group of people with similar interests in pursuing common objectives without any members of the group acting as its representative or delegate. An organisation is a group of people that has similar interests in pursuing common objectives with one or more of its members acting as its representative or delegate in making decisions (Bourdieu, 1992). In general, a public network or organisation consists of the government, the legislature, and the judiciary.

Some private organisations or networks are designed to earn profit and some others are not. A household can be classified as a private organisation that is not intended to earn profit. The existence of a household head, often the father, characterises the household as an organisation rather than a network.

Since social capital is defined as the coherence within a society, the relationship between altruism and social capital can be identified. Chapter 3 shows that the degree of altruism within a society can also be considered as the degree of the coherence within that society. Based on this premise, models showing the relationship between altruism and social capital can then be developed. As such models do not yet seem to be available, Section 3.5 contributes to the literature by developing the models.

1.1.5. Institution

The values and beliefs that spread through social interaction determine the types of personal and social contracts in a society. A contract is a mutual agreement (Flanagan, 1984; Rosen, 1994; Williamson, 2005; and Cudd, 2008), which will eventually form formal and informal 'rules of the game' or institution. A personal contract is the way by which an individual sees what s/he and others mutually agree on what they ought to do. A social contract is a mutual agreement among the members of a society concerning what each individual ought to do to achieve the long run well-being of the society as a whole (Lerner, Miller, & Holmes, 1976). This means that social interaction does not only characterise the society as an entity, but also delivers feedback in characterising an individual's behaviour. Therefore, culture and social capital determine the type of institution that is built in a society.

Both implicit and explicit contracts are influenced by social capital. An implicit contract is a mutual agreement without a legal or formal mechanism for enforcement (Flanagan, 1984, Rosen, 1994; Williamson, 1994; and Cudd, 2008). An explicit contract is a mutual agreement that does have a legal or formal mechanism for enforcement. Through values and beliefs, social capital can directly influence implicit contracts. Furthermore, because explicit contracts are also based on values and beliefs, social capital is also capable of influencing explicit contracts.

Social capital shapes both explicit and implicit contracts, as well as personal and social contracts. This implies that social capital determines the 'rules of the game' or

institution. Institutions are normative ‘rules of the game’ in a society, which constitutes the incentive structures for the behaviour of both individuals and organisations (North, 1990; North, 1994; Williamson, 1994; Zerbe Jr. & Medema, 1998; Lal, 2000; and Ahrens, 2002). Ahrens (2002) makes a clear classification of institutions, which can be formal or informal. A formal institution consists of formal private and formal public rules i.e. constitutions, laws, and regulations. Conventions, ethical rules, and customs are the three types of informal rules. The classification in detail can be found in Table 1.1.

Table 1.1: Classification of Institutions

Kind of rule	Kind of enforcement	Type of institution	
Convention	Self-enforcing	Type-1-internal	Informal institutions
Ethical rule	Via-self commitment of the actor	Type-2-internal	
Customs	Via informal societal control	Type-3-internal	
Formal private rules	Organised private enforcement	Type-4-internal	Formal institutions
Constitutions, laws, regulations	Organised enforcement by the state	external	

Source: Ahrens, 2002

Chapter 5 shows that the four levels of institution from Williamson (2000; 2005) offers a more obvious channel for the role of altruism in an institution. On one hand, as discussed earlier, cultural processes enable a society to experience a more uniform level of altruism as well as opens up an opportunity for a higher level of altruism in the society. On the other hand, the final level of institution concerns the transaction costs as the consequence of mal-adaption. This mal-adaptation is from disturbances caused by the uncertainty of human behaviour. Thus, the role of altruism in an institution can be traced from Williamson’s (2000) levels of institution. The process starts from the zero level institution, which is the process taking place inside the mind. The first level is informal institutions where social embeddedness such as norms, religious beliefs, customs, mores, and traditions are located. The second level is the institutional environment or the formal institutions such as constitutions, laws, and property rights. The third level is the ‘play of game’ or the enforcement of contracts, which describes the functioning of the ‘rules of the game’. The final step is ‘play of the game’ or the resource allocation level, which

concerns the transaction cost as the consequence of mal-adaption in enforcing a contract. This level is characterised by the degree of reliability and predictability of human behaviour. In Section 5.3.1, we model the detail of the relationship between altruism and institution.

Nonetheless, altruism can also influence well-being without institution. One of the benefits of being altruistic, according to the psychology literature, is health (Schwartz et al. 2009). Even before translating psychological altruism into transfer behaviour, a health benefit can be experienced. Mental health is the element of health which is most likely to be affected by being altruistic, and better mental health can positively influence physical health. Section 4.2 provides the formal mathematical as well as graphical evidence of this non-institutional approach.

1.1.6. The dimensions of well-being

The economic dimension of income as an indicator to measure well-being has long been used for its practicality, but at the same time this monetary approach faces some limitations. Readily available data enables researchers to use time series analysis across countries using income or consumption. However, as some regions are less monetised than others, the accuracy of income to measure well-being can be undermined. In addition, most importantly, some elements of well-being such as relationships cannot be easily found as an aspect of the market. Thus, income alone is not sufficient to cover the multidimensional nature of human well-being (Alkire, 2007; Asselin & Anh, 2008; and Wagle, 2008). This awareness regarding the limitations of income as a measure of well-being leads to some alternative measures. For example, Ura, Alkire, & Zangmo (2012) explains the Gross National Happiness index for Bhutan that includes 9 domains: psychological well-being, time use, community vitality, cultural diversity, ecological resilience, living standard, health, education, and good governance.

Although the multidimensionality of well-being is widely accepted among economists, there is no consensus concerning the dimensions that should be included when measuring well-being. Different approaches create different dimensions. For example, the human needs approach introduced by Doyal & Gough (1991) recommends two dimensions; physical health and autonomy. Nussbaum's work using the capability approach offers more dimensions, i.e. life, health, 'bodily' integrity, senses, imagination and thought, emotions, practical reason, affiliation, other species, play, and control over

one's environment (Nussbaum, 2000). However, all in all, discussions on multidimensional well-being do not seem to be converging to an agreement on the dimensions (Alkire, 2007; Thorbecke, 2007; and Asselin & Anh, 2008).

To cover the dimensions of well-being that can fit appropriately in explaining the role of altruism in well-being, the comprehensive method offered in Alkire (2007) is applied in Appendix 3. Three sources of dimensions are employed: normative assumptions, public consensus, and participation. 'Normative assumptions' are theories which provide some foundations for the dimensions. 'Public consensus' is a set of dimensions chosen by international organisations and governments to measure well-being. 'Participation' is empirical research which produce a set of dimensions.

1.1.7. The role of social interaction

The discussion about inter-relationships among altruism, culture, social capital, and institution above shows that the whole process cannot exist without social interaction. The importance of social interaction in this modelling leads to the use of the social interaction model for altruism developed in Becker (1974). This model allows for an individual to consider not only her or his own well-being but also the well-being of others. However, as social interaction cannot take place without sacrificing some resources in the process, Section 3.2 develops the models to show how resources are involved in social interaction. This inclusion of social interaction provides a contribution to the literature in the form of models that show the role of social interaction in well-being along with altruism, culture, social capital, and institution.

1.1.8. The role of altruism in multidimensional well-being

The discussion above has shown the inter-relationships among altruism, social interaction, culture, social capital, and institution. When most of the individuals' allocation of resources in a society is influenced not only by their own consumption but also by the effect of the allocations on others' well-beings, most of them are altruistic. The culture that is then created by these individuals would tend to have similar traits, i.e. the culture would also be altruistic. The general level of altruism in a society forms the degree of coherence in that society. This coherence is its social capital, which is an important aspect influencing the type of institution within the society. Through one-way

interaction and social interaction in network and organisation, social capital determines not only the informal 'rules of the game' or institution but also formal institutions such as law, constitution, and regulation. Discussions around economic development tend to nominate not only social capital, but also culture as important factors for institution. North (1990) shows that culture is the basic determinant of institutional structure, and this is supported by Landes (1998), who claims that the history of economic development shows culture as the most important factor influencing growth. Another supporting argument from Ruttan in Meier (2001) remarks that 'culture matters' remain pervasive in development thought.

Three types of externalities are then created by a combination of institution with other capitals, i.e. natural capital, financial capital, human capital, and physical capital⁵. The first externality is a lower transaction cost. Transaction costs are the costs in exchanges, which may take the form of mal-adaption to changes in the market (Williamson, 1994; 2005; and Medema, 1998). Especially when they are altruistic, conventions, ethical rules, customs, formal private rules, constitution, laws, and regulations can increase the predictability of the behaviour of others, so mal-adaption can then be reduced, and eventually transaction costs will be lower. This informal and formal institution is strengthened by the building of trust through social interaction. In other words, the institution can create effective governance or efficient arrangements on ongoing contractual relations. These efficient and effective arrangements are able to create order, mitigate conflict, and realise mutual gains in economic exchange (Ahrens, 2002 and Williamson, 2005).

The second externality is knowledge. Conventions, ethical rules, customs, formal private rules, constitution, laws, and regulations can facilitate copying and pooling of information or knowledge. Knowledge can then be transferred from those who are 'rich' in knowledge to 'the poor'. This means that copying can also be favourable in promoting equality. Moreover, such pooling of knowledge and information can also encourage innovation. However, there is a negative side of copying knowledge that has the potential to inhibit innovation.

⁵ DFID (1999) classifies capital into natural, financial, human, physical, and social capital. Since social capital along with institution has already been previously considered as the source of the three externalities in this study, social capital does not need to be mentioned again.

The third externality is overcoming the free-riding problem. Conventions, ethical rule, customs, formal private rules, constitution, laws, and regulations are also capable of inducing spontaneous and conscious decisions. These decisions can enhance the capacity of coordinated collective action in which the free-riding problem can be overcome. The capacity of coordinated actions increases a society's capability to sanction against opportunism, which also means lower transaction costs; to provide public goods; and to reap economies of scale, especially from non-market activities. In addition, reducing the free-riding problem and increasing collective actions can also improve equality. The positive effects of a better institution are not limited to a lower transaction cost, better knowledge, and lower free-riding activities. Although some 'rules of the game' are only applicable within organisations and networks where they are stipulated, the impacts they bear may not be limited within those organisations or networks. Impacts may also be experienced by people outside the society in which the rules are applied. The nature of externalities implies that the benefit from the institution will also be received by people outside the organisation or society. The benefit is not exclusive to the members of the organisation/network/society/community, but is also experienced by others. Thus, a higher degree of equality is also created.

As described above, the whole process involving social interaction, culture, social capital, institution, and finally the resulting multidimensional well-being depends initially on the nature of the human beings involved in the process. For example, social capital can create an institution that is capable of delivering the three externalities. However, there is a situation in which this process will not work. When the level of altruism is very low, or the level of self-interest is extremely dominant, social capital and institution will only create limited benefit to some individuals. Thus, a situation could be created where culture, social capital, and institution can increase inequality or reduce well-being. When the level of altruism is not sufficient, the capacity of culture, social capital, and institution in creating multidimensional well-being will be undermined.

As noted at the beginning of this chapter, models should also be able to explain two interesting findings in psychology studies on the relationship between altruism and well-being. In psychology literature, there is emerging evidence of the positive effect of altruism on mental and physical well-being (Schwartz et al., 2009). However, this relationship is challenged by some empirical studies on the influence of subjective self-

perceptions about social class rank on other- versus self-oriented behaviour. Some studies show that this positive relationship between altruism and well-being is only relevant for people who perceive themselves as having less resources than others. For example, Kraus, Piff & Keltner (2011) show that people who perceive themselves as richer than others are less altruistic than people who think they belong to a lower class. The direct effect of altruism on health is discussed in Chapter 4 and the effect through institution is discussed in Chapter 5.

1.1.9. The need for a comprehensive model

The literature review discussed above and other literature that is related to altruism⁶ has been constructive in many ways, but a comprehensive mechanism has not been developed yet. Consequently, empirical support to reveal the role of altruism in multidimensional well-being is undermined by the lack of a comprehensive theoretical model.

A more comprehensive theory of the origin of multidimensional well-being that incorporates the roles of altruism, social interaction, culture, social capital, and institution in the economy needs exploration. Singling out the origin of well-being on only one variable such as culture or institution unavoidably creates oversimplification. Sen (1997) stresses a general idea of the danger of oversimplification and overgeneralisation, such as, profit maximisation being the only motive for producers; Asian values, such as the extraordinary performance of Japan and Korea in the mid-20th century, as the only cause for Asian economic ‘wonders’; and western morals as the source of the western superiority.

1.2. Theoretical Framework

Based on the theoretical review described above, the process of understanding how altruism influences multidimensional well-being is summarised in Figure 1.1. The diagram illustrates the simultaneous inter-relationships among the key variables, which include altruism, social interaction, culture, social capital, institution, natural capital, financial capital, physical capital, human capital, and multidimensional well-being. This framework

⁶ See, for example, Friedrichs (1960); Hamilton (1963; 1964a, b); Hirshleifer (1977); Khalil (1990); Epstein (1993; 2008); Fountaine (2000); Foster & Rosenzweig (2001); Easterlin (2003); Gowdy (2004); Lunt (2004); Leightner (2005); and Basu (2010).

serves as the foundation for constructing the models that explain the role of altruism in multidimensional well-being in the following chapters.

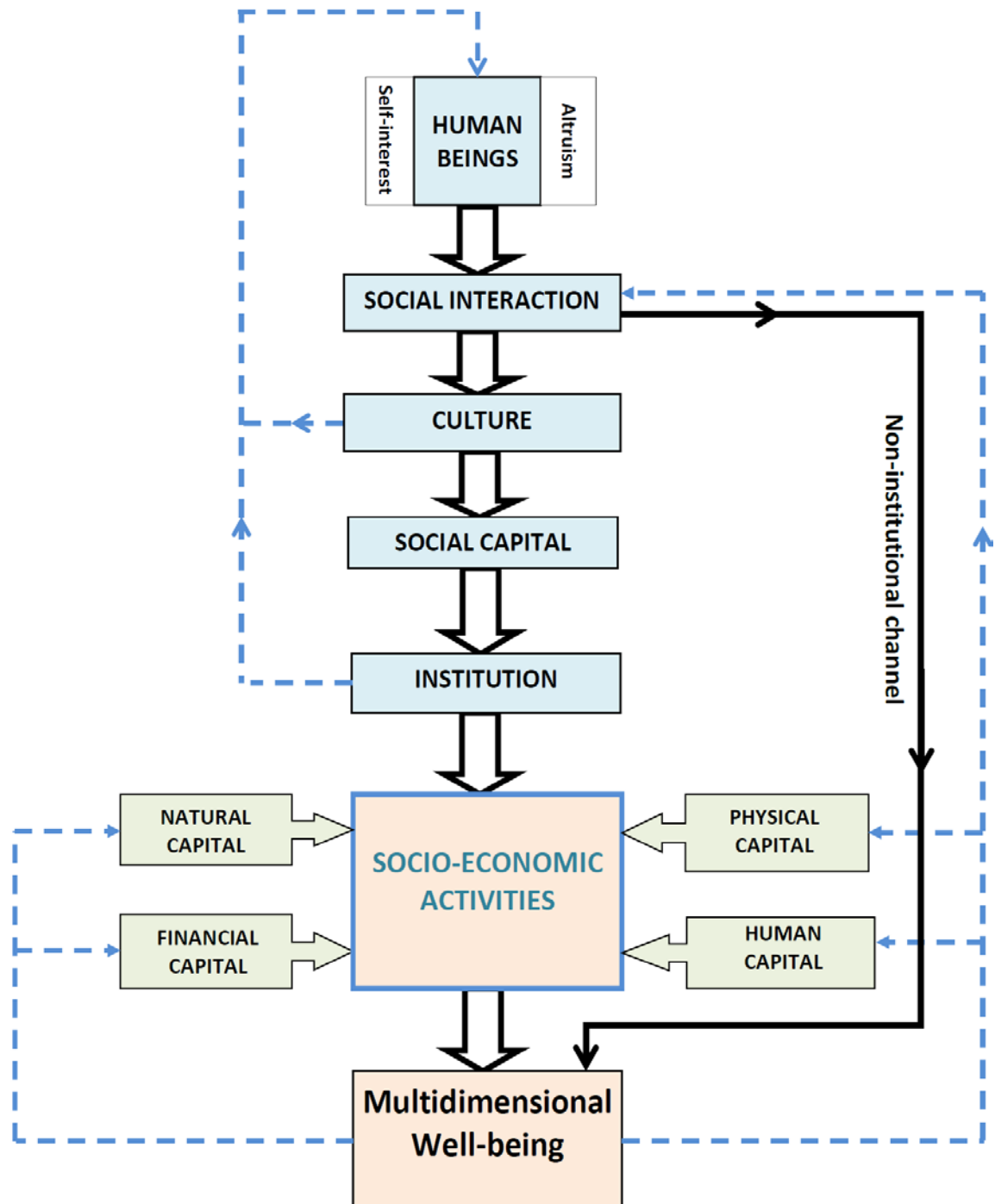


Figure 1.1: The Role of Altruism in Multidimensional Well-being

Through social interaction, culture, social capital, and institution, the level of altruism in a society is capable of influencing the level of well-being. At the same time, through its capacity to influence social interaction, the level of well-being also influences culture, social capital, institution, and the level of altruism.

One important variable implicitly covered by the framework in Figure 1.1 is transfer behaviour. Altruism can be defined as either merely a concern for the well-being of others (psychological altruism) or as behavioural altruism (Kitcher, 2010). Therefore, the models developed in the following chapters will also cover the relationship between psychological and behavioural altruism. In addition, because the whole process from altruism to multidimensional well-being is related to social interaction, the models will also explain the relationship between altruism and social interaction.

1.3. Objectives

Considering the literature review above, the main objective of this study is to develop theoretical models showing a comprehensive mechanism of how altruism influences multidimensional well-being through social interaction, culture, social capital, and institution. The development of the models is broken down into the following detailed objectives.

The first objective is to develop models that show the relationship between psychological altruism and behavioural altruism. The models should be based on a utility function which can satisfy four requirements. First, this utility function should be able to accept altruism beyond family boundaries. The challenge then is to make the models in line with the fact that an individual faces imperfect information regarding the well-being of others. Second, the level of altruism deriving from the utility function should reflect a pure altruism. An impure altruism such as warm-glow giving should be avoided in the models⁷. Third, as the models are designed to show the role of psychological altruism on the well-being of a society, they should be able to show that a society as a whole can be

⁷ Chapter 2 shows that when the utility of an individual is directly influenced by the transfer to others, the level of altruism created by the utility function can include an impure altruism. The level of altruism of an individual which reflects a pure altruism only should be derived from a utility function which is influenced by the consumption of others. Thus, the transfer to others from this individual should be included as part of the total consumption of others.

psychologically altruistic. Fourth, the models should also be able to explain the difficulty in converting psychological altruism into behavioural altruism.

The second objective is to develop models that show the relationship between altruism and social interaction. All of the variables included in this models, i.e. culture, social capital, and institution cannot exist without social interaction. Thus, from the beginning, the altruism models should be designed to include the role of social interaction in the mechanism. Nonetheless, the models also need to show that an individual's resources are important to perform social interaction.

The third objective is to develop models that show the relationship between altruism and culture. The literature review above shows that a cultural process enables a society to experience two changes to the level of altruism. First, after the cultural process, a society experiences more uniform values, including altruistic values. Second, the cultural process can spread and then strengthen the altruistic values and beliefs of the members of the society. These two possible results of the cultural process should be included in the models.

The fourth objective is to develop models that show the relationship between altruism and social capital; the coherence among members of a society. Changes to the level of altruism after the cultural process indicate that the importance of others to each individual in the society also changes. Coherence, and thus the social capital, is also affected. This mechanism should be reflected in the models.

The fifth objective is to develop models that show the relationship between altruism and institution. On one hand, the cultural process has the capacity to create a more uniform as well as a higher general level of altruism in a society. On the other hand, the reliability and predictability of human behaviour determines the 'play of the game' or the final level of institution (Williamson, 2000). Therefore, the models should be able to display the connection between these two facts.

Finally, *the sixth objective* is to develop models that show the relationship between altruism and multidimensional well-being. Through social interaction, culture, social capital, and institution, altruism has the capacity to create positive externalities. These externalities include a lower transaction cost, greater knowledge, better health, a greater capacity for coordinated actions, and greater equality. These externalities are the source of greater multidimensional well-being. As described in the literature review above, the

models should also take into account an approach that considers altruism as able to influence well-being without using institutional channels. Showing the role of altruism in well-being in this final objective also means constructing comprehensive models, which include social interaction, culture, social capital, and institution.

1.4. Organisation of the Thesis

The models to explain the whole framework from altruism to multidimensional well-being is developed through mathematical modelling from Chapter 2 through to Chapter 7 as follows.

Chapter 2 develops models to explain the relationship between psychological and behavioural altruism as described in the first objective. The models are based on the construction of a utility function for an altruist. The findings from this chapter have been summarised in a paper titled 'Altruism and Transfer Behaviour' that was presented at the Warsaw International Economic Meeting 2012 in Warsaw, Poland.

Chapter 3 develops models to describe the inter-relationship among altruism, social interaction, culture, and social capital. Thus, this chapter addresses the second, third, and fourth objectives of this dissertation. The mathematical psychological and behavioural altruism equations derived in Chapter 2 serve as the foundation for the models in this chapter. The findings in this chapter have been summarised in a paper titled 'The Role of Psychological Altruism in Social Capital and Multidimensional Well-being' that was presented in the Public Happiness Conference 2013 in Rome, Italy.

Chapter 4 and 5 develop models to show two approaches to the influence of psychological altruism in multidimensional well-being, the non-institutional approach in Chapter 4 and the institutional approach in Chapter 5. The comprehensive models of the role of altruism in well-being through social interaction, culture, social capital, and institution which combine both approaches can be found in Chapter 5. These two chapters have been summarised in a paper titled 'The Role of Altruism in Well-being' and presented in the 82nd Southern Economic Association Annual Meeting 2012 in New Orleans, U.S.A.

The analysis to determine the dimensions of well-being applied for Chapter 4 and 5 is provided separately in Appendix 3 to avoid distraction from the main discussion on altruism. Although the multidimensionality of well-being is widely accepted among economists, there has not been a consensus concerning what dimensions to be included

in such an analysis. This appendix applies the method developed by Alkire (2007) in designing the multidimensionality of well-being in a study. Three sources of dimensions are employed: normative assumptions, public consensus, and participation.

Chapter 6 provides some additional evidence to support the conclusions from the previous chapter. To further stress the importance of altruism in well-being, this chapter is organised by assuming a model of a society where there is no psychological altruism. The findings in this chapter and all of the previous chapters have been summarised in a paper titled 'Modelling The Role of Altruism in Well-being through Social Interaction, Culture, Social Capital, and Institution' and presented in the 26th RSE-ANU PhD Conference in Economics and Business in Canberra, Australia.

Chapter 7 provides the general conclusions, policy implications, and some suggestions for further research. The organisation of this dissertation is summarised in Figure 1.2.

1.5. Limitations

As this study is focused more on developing a comprehensive mechanism on how altruism influences well-being, some aspects in the modelling cannot be addressed extensively. This comprehensive approach has been chosen because in general there have been many studies on each of the variables included in this dissertation. Hence, constructing a comprehensive mechanism which reflects the inter-relationships among those variables becomes the main contribution of this study. Some detailed aspects of the modelling have been simplified to allow more attention to be placed on the general mechanism.

The first limitation is on the choice of the utility function. The model is based on a utility which is influenced only by the attainments of the individual. These attainments are represented by consumption. Using a different kind of utility function may reveal some different characteristics of altruism in its role in well-being. For example, Easterlin (2003) proposes a different function which shows that an individual's happiness is not only influenced by her or his attainments, but also the individual's aspirations.

However, the core thesis of this study, that well-being is positively influenced by altruism through social interaction, culture, social capital, and institution, can be supported by most kinds of utility functions. This choice for the utility function might not be the only choice possible, but the objective of the thesis will not be compromised by

the choice. However, Chapter 2 describes some advantages of the Cobb-Douglas utility function compared to other functions in explaining the role of psychological altruism in well-being. This explanation shows that the choice of utility function is not merely based on an arbitrary judgement. In addition, every utility function has its own challenges compared to real diverse human behaviour. Using a different utility function can result in different outcomes, but will still demonstrate the same main thesis.

Chapter 2 discusses the ability of the altruism model applied in this study in explaining envy. However, to avoid distracting the attention from the core analysis of the study, envy will not be discussed in the following chapters. The models are limited to only paying attention to a positive level of psychological altruism.

A limitation also comes from the fact that this study is entirely based on developing theoretical models. Applying the models on empirical data could have verified the strength of the models in the real world. As building the theoretical models has consumed considerable resources and time, the empirical part of the study will be conducted as a separate study as further research.

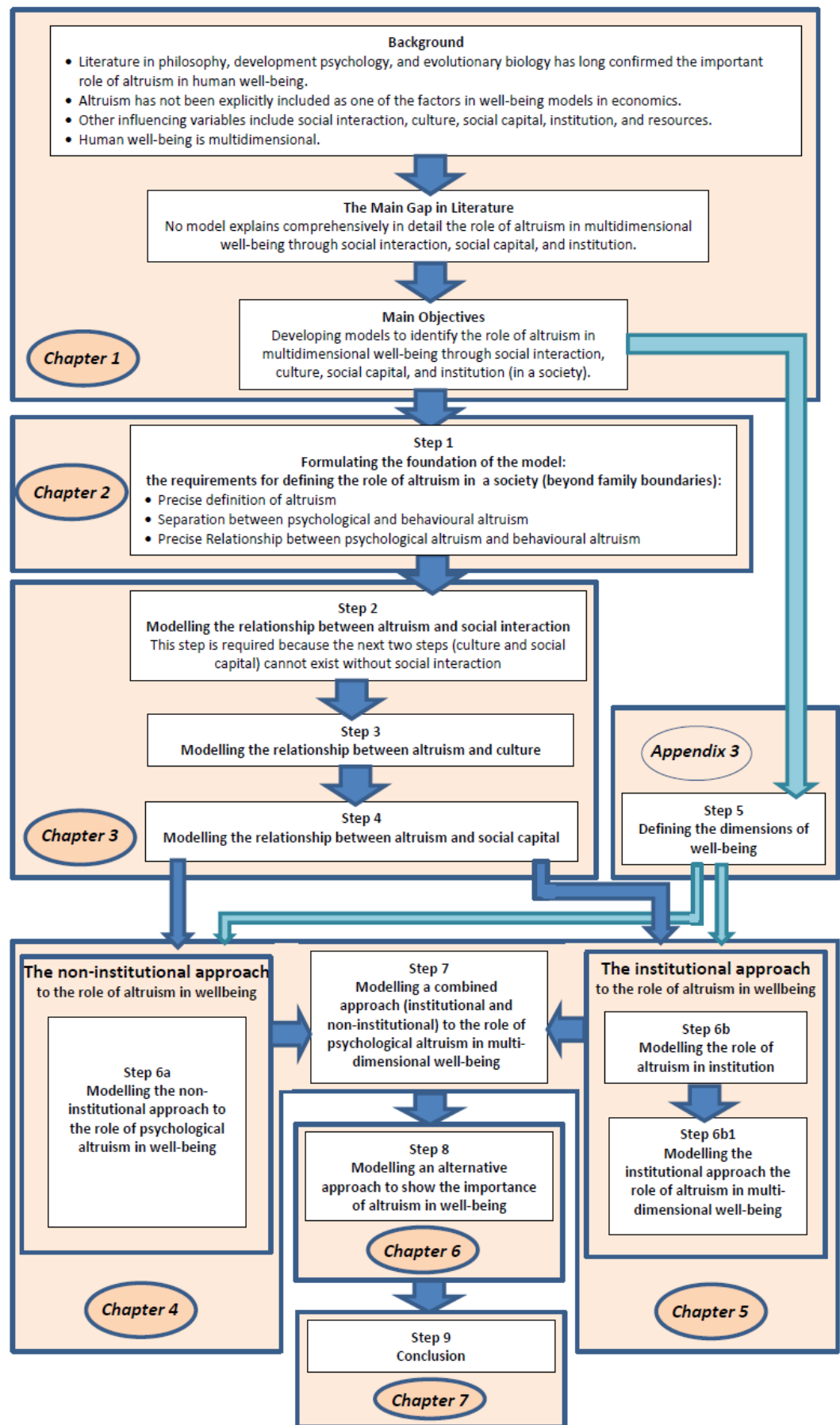


Figure 1.2: Thesis Summary

CHAPTER 2. PSYCHOLOGICAL ALTRUISM AND TRANSFER BEHAVIOUR

2.1. Introduction

The disagreement regarding the importance of altruism in well-being is caused on the one hand by the obscure relationship between altruism and transfer behaviour, and on the other hand, by the inability of the available altruism models to accept the possibility of individuals being altruistic to people beyond family members. This chapter⁶ solves those problems in two ways. First, the relationship between psychological and behavioural altruism is precisely defined, and second, the imperfect information assumption is applied in the model. Among other things, it is shown that only when the level of psychological altruism is sufficiently high can transfer of resources beyond family boundaries be performed in a society.

Literature in philosophy, psychology, and evolutionary biology acknowledge not only the existence of altruism in human beings but also its importance in influencing individual well-being and society as a whole⁷. In economics, there are some constructive works that advocate the existence as well as the importance of altruism in economic decisions (such as Nagel, 1970; Becker, 1974; 1976; Collard, 1975; 1978; and Margolis, 1982). However, mainstream economists are unlikely to include altruism as an important factor in explaining economic and non-economic well-being. Some factors, such as endowment, culture, social capital, and institution, have long been included as the influencing factors for well-being. Because the relationship between altruism and each of those influencing factors have not yet been developed in literature, a comprehensive study that includes altruism as one of the factors influencing well-being becomes difficult to perform. This thesis builds the models by defining the relationship between altruism and each of the factors and a comprehensive mechanism can finally be developed.

⁶ An earlier version of this chapter was presented as a paper in the Warsaw International Economic Meeting (WIEM) 2012 in Warsaw, Poland.

⁷ In biology, the existence of altruism and the importance of altruism on 'inclusive fitness' (the well-being of the society as a whole) are also found in animals (see, for example, Connor & Norris, 1982; Dugatkin, 2006; and Horner et al., 2011).

To explain the role of altruism in society, the nature of an individual's altruism in a model need not be limited by family boundaries⁸. In allowing the possibility of altruism to exist beyond family boundaries, some adjustments need to be applied in an economic analysis. These adjustments are required in order to make a precise definition of altruism as well as to describe its relationship to an individual's economic decision. Introduction of the possibility of societal altruism implies that the model should replace an assumption of perfect information with one of imperfect information. To avoid confusion in formulating a definition of altruism, pure altruism is chosen. Impure altruism, such as warm-glow giving, is excluded in the model. In other words, for the purposes of the present study, impure altruism is not altruism. Further, Kitcher (2010) gives a valuable insight by explicitly separating psychological from behavioural altruism. This separation is helpful in making a precise definition of altruism. In short, there are three guidelines to follow: (a) the model is expected to be able to assume pure altruism; (b) the model should be capable of offering a possibility for societal altruism; and (c) it should define the relationship between psychological altruism and behavioural altruism.

Section 2.2 starts with formulating the utility function in a way that is capable of facilitating the possibility of an individual being altruistic to other members of a society. A precise definition of the psychological level of altruism can then be made. Section 2.3 provides the reasoning behind choosing the Cobb-Douglas utility function as well as the properties of some potential utility functions that can explain altruism beyond family boundaries. In Section 2.4, the relationship between psychological altruism and transfer behaviour is developed. As the foundation of the model, the utility function is designed to be able to specifically demonstrate that human beings are fundamentally complicated. The level of altruism varies among individuals, societies, and times. Furthermore, the level of altruism in each individual also fluctuates. Altruism is influenced by many factors such as resources, age, mood, gratitude, genetic factors, gender, norm, bystander, information, model, and relatedness. Therefore, instead of using a general utility function, the model formulates a specific utility function. Conclusions can then be derived by maximising a utility function based on the three guidelines above. Section 2.5 shows

⁸ Some models are more focused on altruism within family boundaries, parental altruism, or intergenerational altruism (see, for example, Bernheim & Ray, 1987; Bernheim, 1989; Laitner & Juster, 1996; Altonji, Hayashi, & Kotlikoff, 1997; Caballe, 1998; Lambrecht, Michel, & Thibault, 2006; Nowak, 2006; and Bruhin & Winkelmann, 2009).

that the relationship between the two types of altruism and resources lead to an alternative formula with which to measure the psychological altruism level empirically. Section 2.6 advances the imperfect information assumption on the ability of an individual to acquire a precise own resources information. Section 2.7 applies the model from the previous sections to explain how other factors in the literature of psychology, evolutionary biology, and economics can influence behavioural altruism. The relationship between altruism and public goods is explained in Section 2.8. Section 2.9 provides some concluding remarks on the results.

This procedure produces four main results: a specific utility function which allows different levels of psychological altruism beyond family boundaries; a precise definition of psychological and behavioural altruism; the relationship between the two categories of altruism; and possible explanations of how some factors suggested in the literature of psychology, biology, and economics affect transfer behaviour. These results enable further research into the role of altruism in the well-being of a society (discussed in Chapters 3, 4, and 5).

2.2. Level of Altruism in Individuals

2.2.1. Imperfect information assumption

The imperfect information assumption used in this chapter is about the information on the well-being, consumption, and resources of the members of a society. A series of imperfect information assumptions will be introduced gradually. In the beginning, Section 2.2.2 introduces that an imperfect information assumption means that each individual does not know about the well-being of each other individual in the society. Later in this section, the imperfect information is extended to examine the situation that each individual does not know the consumption and resources of each other individual in the society. Because the information on the consumption of others is not available, information about the well-being of others is not available either. This type of imperfect information assumption is maintained in the following sections until Section 2.6 enhances this assumption. This section explains that an individual does not only face imperfect information regarding the consumption and resources of others, but also of her or his own resources.

2.2.2. Utility function of an altruist

Although there are many different accentuations on how altruism is defined in the literature (such as in Nagel, 1970; Becker, 1974; Collard, 1978; Margolis, 1982; Bernheim, Shleifer, & Summers, 1985; Green, 2005a, b; Neusner & Chilton, 2005; Frank, 2006; and Kitcher, 2010), we defined altruism at the very beginning of this study as an individual's concern for the well-being of others. Furthermore, altruism is capable of influencing decision-making regarding the allocation of resources. If not limited by family boundaries, the word 'others' can include people not personally known. Consequently, an individual does not have the capability required for measuring the exact level of well-being in others. Individuals face imperfect information regarding the well-being of others. Each individual does not know the well-being of other individuals in the society. An individual can only make an estimation of others' well-being based on the more observable attributes attached to other individuals. Thus, the altruism in this study is the commodity-related altruism from Collard (1978), so that the utility function is

$$u_i = u_i(x_i, x_j),$$

where u_i is the utility of individual i in the commodity related altruism, x_i is the consumption of individual i , and x_j is the consumption of individual j [$i \neq j$]. The other of Collard's (1978) utility functions with a less observable indicator is the utility-related altruism or

$$U_i = U_i[u_i(x_i), u_j(x_j)]$$

where U_i is the utility of individual i in the utility-related altruism. In this utility-related altruism, what matters is not others' consumption but others' utility.

The consumption- or commodity-related approach is in line with Becker (1976). The well-being of others is estimated by measuring their consumption of goods and services. The more goods and services consumed by others, the higher the expected level of their well-being. Therefore, others' consumption will influence the altruist's utility, but

an individual can only influence the others' consumption by managing her or his own resources. In maximising her or his own utility, an individual faces a trade-off between using her or his own resources for her or his own consumption and for consumption by others. The giving of part of an individual's resources to increase the well-being of others may mean sacrificing one's own well-being. What is important to an individual is not only the goods and services s/he consumes but also others' goods and services. This individual's utility in this study becomes

$$U_i = U_i(C_i, C_{ooi} + C_{oti}) = U_i(C_i, C_{oi}) \quad (2.1)$$

C_i is the goods and services consumed by i ; C_{ooi} is the initial consumption of goods and services of other individuals in the society; C_{oti} is the additional consumption of others transferred from individual i 's resources; and C_{oi} is the total consumption of others after transfer from individual i . When the initial consumption of others is added to the transfer from this individual, it becomes the total consumption of others after the transfer of resources from this individual or

$$C_{oi} = C_{ooi} + C_{oti} \quad (2.2)$$

Considering that the utility equation in (2.1) is indirectly influenced by the transfer to others, this function is in line with the 'goods altruism' in Margolis (1982). The utility is expressed as

$$U^{**} = U^{**}(x, z)$$

where $x = (x_1, x_2, \dots)$ is the vector of goods for the actor's own use and $z = (z_1, z_2, \dots)$ is the vector of goods available to others. The other utility function from Margolis (1982) is the 'participation altruism' in

$$U^* = U^*(x, y)$$

where $y = (y_1, y_2, \dots)$ is the vector of goods or resources given away. Goods altruism (U^{**}) gains utility from an increase in the goods available to others (z), and participation altruism (U^*) gains utility from giving resources away for the benefit of others (y).

Unlike studies by Becker (1976), Collard (1978), and Margolis (1982), which examine the altruist's utility as a general function, this study investigates a more specific utility function in a Cobb-Douglas form. Hence, the utility function is written as

$$U_i = C_i^\alpha C_{oi}^\beta \quad (2.3)^9$$

or

$$U_i = C_i^\alpha (C_{ooi} + C_{oti})^\beta \quad (2.4)$$

where α represents the i 's utility elasticity with respect to her or his own consumption and β is the i 's utility elasticity with respect to others' consumption. Now utility is a function of own consumption, others' initial consumption, and transfer of resources to others. Others' initial consumption combined with the transfer to others yield the total consumption of others after transfer of resources from individual i .

Two problems arise when equations (2.3) or (2.4) are applied. First, these equations are still strongly influenced by an assumption of perfect information which is unlikely to be the case for altruism beyond family members. When altruism is limited within a family, a perfect information assumption is acceptable. However, to accommodate the possibility that an individual can also be altruistic to other members of a society, the model can no longer rely on an assumption of accessible information on others' total consumption. In some previous models (such as Becker, 1976; Collard, 1978; and Margolis, 1982), what matters to an altruist is the total of others' consumption. Unfortunately, information on the total consumption of others is not always readily available to every individual of a society. Meanwhile, what really influences the utility of an individual is the well-being of each individual in the neighbourhood. Average consumption information enables an individual to personalise others as if they were one individual. Put differently, the average

⁹ Two other utility functions have also been examined, but theories in altruism could not be mathematically described as convincingly as the Cobb-Douglas function discussed in this text. The discussion on the properties of these functions is provided in Section 2.3.

resources owned by others are more readily compared to an individual's own resources, which is difficult to be applied on the total figure. Moreover, for societal altruism, the information, or at least the perception, on the total figure is relatively more difficult to acquire in making an instant decision to choose between self- and group-interest. On the other hand, regardless of the accuracy, a society's members are more likely able to have a picture of the general or average well-being of others than the total figure.

Therefore, the utility function of an individual expressed as $U_i = C_i^\alpha C_{oi}^\beta$, which also means $U_i = C_i^\alpha (\sum_{j=1}^{n-1} C_j)^\beta$ poses a problem. n represents the total population of a society and thus $n - 1$ is the number of others. The problem comes from the difficulty of obtaining information on $(\sum_{j=1}^{n-1} C_j)$, because it is likely that this individual only has limited information on others. The information available for this individual might only be $\sum_j^k C_j$ where $k < (n - 1)$. For an individual whose society included in the utility function encompasses a very large population, the information as expressed in $\sum_j^k C_j$ should be based on the fact that $k \ll (n - 1)$. This failure to obtain sufficient information for the utility function technically means that this individual consequently also fails to decide the allocation of the resources between self- and group-interest, which is unlikely to happen in the real world.

Second, in equations (2.3) and (2.4) the weight (β) is attached uniformly to every other individual in the society, which of course would not be the case in reality. An individual is assumed to be uniformly altruistic to everybody else. For example, the level of altruism in an individual is also partly influenced by the degree of relatedness (Piliavin & Charng, 1990 and Dugatkin, 2006). Recognising this second weakness of equation (2.3) or (2.4) above, a seemingly much more precise utility equation would be

$$U_1 = C_1^\alpha C_2^{\beta_2} C_3^{\beta_3} C_4^{\beta_4} \dots C_n^{\beta_n} \quad (2.5)$$

Unfortunately, equation (2.5) cannot solve the first weakness, because this equation is again based on the assumption of perfect information. Applying this equation implies that each individual always consciously calculates the impact of the consumption of all other individuals to her or his own utility. The calculation will be even impossible if the

information of consumption of each other individual in the society is unavailable, which would be the case in the real world.

To be more precise, equation (2.5) is only applicable when altruism is limited among nuclear-family members or for a small society. In a very small society, information on the consumption of other individuals is accessible. So that, whenever an individual is altruistic to someone else in the society, this individual can immediately make up her or his total utility because s/he knows the consumption of the other individual s/he is altruistic to. However, since altruism is theoretically not only possible among family members (Piliavin & Charng, 1990 and Dugatkin, 2006), the model should also be applicable in a larger society setting. Based on equation (2.5) above, for example, if someone living in Sydney was altruistic to people suffering from flood in Queensland or famine in Somalia, s/he needs the information on the consumption of those people in the flood- or famine-affected areas. Because this kind of information is unlikely to be available, this individual fails to define her or his utility. In fact, what is really needed by this individual is only the general well-being or average consumption of those people in Queensland or Somalia.

Both problems on others' consumption to a limited extent can be dealt with by simplifying equation (2.5) into

$$U_i = C_i^\alpha \bar{C}_{oi}^\beta \quad (2.6)$$

where \bar{C}_{oi} is the average consumption of others. This new formulation is based on the assumption of imperfect information. The well-being of others is more normally perceived by an individual in the society as the average consumption. This assumption is superior as it is impossible to constantly acquire information on the consumption of each other individual, especially in a large society.

However, considering that $\bar{C}_{oi} = \frac{C_{ooi} + C_{oti}}{n}$, what makes this formulation less attractive is that the transfer of resources from individual i is assumed to be evenly distributed to others. This assumption means that, in a society of 100 people for example, giving 9 units of resources to one individual alone induces the same utility as giving the same amount of resources to all other individuals (0.09 units each). Moreover, especially when the size of the population is large ($M_i \ll C_{ooi}$ where M_i is the resources available

for i), transferring nothing to others would create approximately similar utility as donating everything for others because

$$\frac{C_{ooi} + 0}{n} \cong \frac{C_{ooi} + M_i}{n}$$

$$\bar{C}_{oi}^{gives\ nothing} \cong \bar{C}_{oi}^{gives\ everything}$$

Therefore, $\frac{\partial \bar{C}_{oi}}{\partial C_{oti}} \approx 0$ and thus $\frac{\partial U_i}{\partial C_{oti}} \approx 0$. Bearing in mind the fact that giving to others almost does not improve anything on others' well-being, a rational individual will choose to use all of her or his resources for her or his own consumption, which creates higher marginal utility. Consequently, even if the level of altruism of this individual is extremely high, still s/he will not be motivated to transfer resources to others. In the end, equation (2.6) implies that psychological altruism cannot induce behavioural altruism. Pure behavioural altruism does not exist in the real world at all.

Consequently, instead of using $\bar{C}_{ooi} + \bar{C}_{oti}$ (to represent the perceived average consumption of others) as one of the variables which determines total utility, $\bar{C}_{ooi} + C_{oti}$ can better reflect what an individual has in mind regarding the general well-being of others. On the contrary, if $\bar{C}_{ooi} + \bar{C}_{oti}$ was applied, transfer to others would insignificantly influence total utility since $\bar{C}_{ooi} + \bar{C}_{oti} \approx \bar{C}_{ooi}$. In other words, what an individual gives to the society as a whole would not significantly increase the general well-being of others. If this is the case, then an individual would never be encouraged to behave altruistically. Although altruistic behaviour could (insignificantly) increase the general well-being of the society, the decision to do altruistic behaviour is essentially based on the availability of resources of an individual. A soldier who is heroically defending her or his country in a battle does not necessarily think that without her or him alone the country will be defeated. But rather, being aware that s/he has the capability to participate in the battle, s/he feels that it is her or his duty to do so. Likewise, someone who is voluntarily saving a child from being drowned does not necessarily think that this deed can save all drowning people in a society. That is why $\bar{C}_{ooi} + C_{oti}$ can better serve as an element which influences the utility function of an individual.

Therefore, such a problem should be avoided to allow the possibility of pure behavioural altruism through the imperfect information assumption. Hence, equation (2.4) should be modified, becoming

$$U_i = C_i^\alpha (\bar{C}_{ooi} + C_{oti})^\beta \quad (2.7)^{10}$$

where \bar{C}_{ooi} is the average initial consumption of the rest of the society. In a society with a large population size, the perception on the well-being of others is more influenced by the average well-being of others rather than the total. Moreover, getting information or at least an impression of the initial average consumption of all other individuals $\left(\bar{C}_{ooi} = C_{ooi}/n - 1\right)$ is more likely than knowing its total (C_{ooi}). This new utility function implies that now β is the individual i 's utility elasticity with respect to the average initial consumption of others (\bar{C}_{ooi}) and the transfer from i to others. Although $\bar{C}_{ooi} + C_{oti}$ is not the same as the average consumption of others after the transfer (\bar{C}_{oi}), $\bar{C}_{ooi} + C_{oti}$ can better reflect the level of consumption of others after the transfer conceived by individual i . In short, the consumption of others is illusory but practically conceived by an individual as the average consumption of others plus the total resources that have already been given up for others. Accordingly, giving to others is capable of creating more than just a trivial improvement on others' well-being. As others' well-being, to some extent (depends on the magnitude of β in each individual's utility function), influences an individual's total utility, pure behavioural altruism becomes a possibility. Provided that $C_{oti} > 0$, now it is possible that

$$\frac{\partial \hat{\bar{C}}_{oi}}{\partial C_{oti}} > 0 \text{ and thus } \frac{\partial U_i}{\partial C_{oti}} > 0.$$

where $\hat{\bar{C}}_{oi}$ is the perceived average consumption of others.

¹⁰ Other Cobb-Douglas utility functions have also been examined (i.e. $U_i = C_i^\alpha (C_{ooi} + C_{oti})^\beta$, and $U_i = C_i^\alpha (\bar{C}_{ooi} + \bar{C}_{oti})^\beta$), but only equation (2.7) brings a rigorous explanation of the concept in altruism and well-being to the rest of this study.

Note that the utility function was not formulated as $U_i = C_i^\alpha \left(\bar{C}_{ooi} + \frac{C_{oti}}{m} \right)^\beta$ where m is the number of people who receive transfer from i , so that $m \leq n - 1$. This formulation was not chosen because it suffered similar problems as the $U_i = C_i^\alpha \bar{C}_{oi}^\beta$ in equation (2.6) above. For example, Mr Smith is considering between giving 100 units of his resources to 4 other individuals in his society, namely Jones, Frank, Bill, and George, or giving 125 units to those people plus Benny. In the first alternative, his perceived consumption of others will be $\bar{C}_{ooS} + \frac{100}{4} = \bar{C}_{ooS} + 25$, while in the second choice it is $\bar{C}_{ooS} + \frac{100+25}{4+1} = \bar{C}_{ooS} + 25$. It is evident that Mr. Smith's perceived consumption of others in the first alternative is exactly the same as the second, despite the fact that in the second alternative he should sacrifice an extra 25 units of his resources for others. The implication is that giving more to others creates the same perceived consumption. This is the reason why this formulation was not chosen.

In Andreoni's (1990) terminology, the model of utility as shown in equation (2.7) can be considered pure altruism. By allowing the transfer to others entering into the model in equation (2.7) only once ($\hat{C}_{oi} = \bar{C}_{ooi} + C_{oti}$), pure altruism can be assumed in the model. The individual's utility is not directly obtained from the giving, but rather it is indirectly obtained from the impact of the transfer on others' consumption. Otherwise, if the model had been formalised based on Margolis (1982) as

$$U = U_i = C_i^\alpha (\bar{C}_{ooi} + C_{oti})^\beta C_{oti}^\gamma,$$

it accommodated the possibility of warm-glow giving or impure altruism as defined in Andreoni (1989; 1990). The transfer entered the model twice: first, the transfer indirectly influenced utility through its impact on the consumption of others, and secondly, this transfer had a direct impact on the utility. On one hand, allowing transfer to enter the model only indirectly through the consumption of others also means that goods altruism (Margolis, 1982) is chosen instead of participation altruism. On the other hand, participation altruism enables an individual to obtain additional utility only from giving directly regardless of the magnitude of the impact of giving on others' consumption. This

kind of altruism opens the possibility of warm-glow giving (Andreoni, 1990)¹¹ such as giving for status, reputation, reciprocity, as well as implicit exchange.

However, although equation (2.7) can be considered as using goods altruism instead of participation altruism, this does not necessarily mean that there are no direct effects at all in this study. Behavioural altruism can create positive health well-being effects (Schwartz et al., 2009) and also positive economic well-being effects through the improved social position achieved from better social interaction (Wetterberg, 2007) of the altruistic individuals. These direct effects need consideration because they can take place though the transfer to others is not based on warm-glow motivation. Better health is derived from giving, especially when the giving is purely altruistic. Regardless of whether the giving is motivated by pure or impure altruism, the better social position that is obtained from the higher level of social interaction by the altruist can result in improved economic well-being. Since equation (2.7) closes the possibility of direct effects of behavioural altruism flowing to altruistic individuals, these direct effects will be treated separately in the chapter discussing the effect of altruism on well-being.

One more adjustment is needed in anticipating the assumption of imperfect information, however, because equation (2.7) still entails perfect information. Formulating the utility function as $U_i = C_i^\alpha (\bar{C}_{ooi} + C_{oti})^\beta$ means that \bar{C}_{ooi} is equal to $\frac{1}{n-1} \sum_{j=1}^{n-1} C_j$. Under the perfect information assumption, an individual is capable of acquiring information on $\sum_{j=1}^{n-1} C_j$ but this is not necessarily the case in an imperfect information situation. When information is not perfect, it is likely that an individual is only able to obtain information on $\sum_{j=1}^m C_j$ where $m < n - 1$. So, in order for an individual to be able to make resource allocation decisions, s/he has to fill the gap between what information is accessible and what information the individual wants to have. The information gap is thus

$$\sum_{j=m+1}^{n-1-m} C_j = \sum_{j=1}^{n-1} C_j - \sum_{j=1}^m C_j$$

Because the information gap cannot be filled with actual data, what is applied to fill the gap is only the perceived or expected consumption, so that

¹¹ Menges, Schroeder, & Traub (2005) provide some evidence for the existence of impure altruism.

$$\hat{\bar{C}}_{ooi} = \frac{\widehat{\sum_{j=1}^{n-1} C_j}}{n-1} = \frac{\sum_{j=1}^m C_j + \sum_{j=m+1}^{n-1-m} \hat{C}_j}{n-1}$$

where $m < n - 1$ and $\hat{\bar{C}}_{ooi}$ is practically the perceived initial average consumption of others. Therefore, the utility function becomes

$$U_i = C_i^\alpha \left(\hat{\bar{C}}_{ooi} + C_{oti} \right)^\beta = C_i^\alpha \hat{\bar{C}}_{oi}^\beta \quad (2.8)$$

where $\hat{\bar{C}}_{ooi}$ is the perceived average consumption of others. Instead of using the arithmetic mean of the initial consumption of others, this utility function uses the perceived initial average consumption of others to accommodate the imperfect information assumption. Because this utility function is intended to open the possibility of a society based of pure altruism (where imperfect information assumption is consequently applied), later-on in the rest of this study (for simplicity), the function will be referred to as the pure-society-altruism utility function. The process to formulate the utility function in equation (2.8) can be summarised in Figure 2.1.

2.2.3. The level of psychological altruism

Concern for the well-being of others is psychological altruism. Concern is essentially a motivational state that to some extent can influence an individual's economic decisions. Sometimes this motivational state is strong enough to be reflected in economic decision-making, but at other times the level of psychological altruism is too weak to modify the real economic decision. Thus, in behavioural altruism, the individual's allocation of resources is influenced not only by the bundle of goods one obtains for oneself but also by the effect of one's choices on the society (Frankena, 1963; 2000; Collard, 1978; Margolis, 1982; Nuttall, 2002; Okasha, 2008; and Zak, 2008).

Many previous studies (such as Hudson & Jones, 2002; Konrad, 2004; Hori, 2009; and Kohler, 2011) define β as the degree of altruism. However, this thesis considers β as merely the elasticity of utility with respect to others' consumption, because an increase in

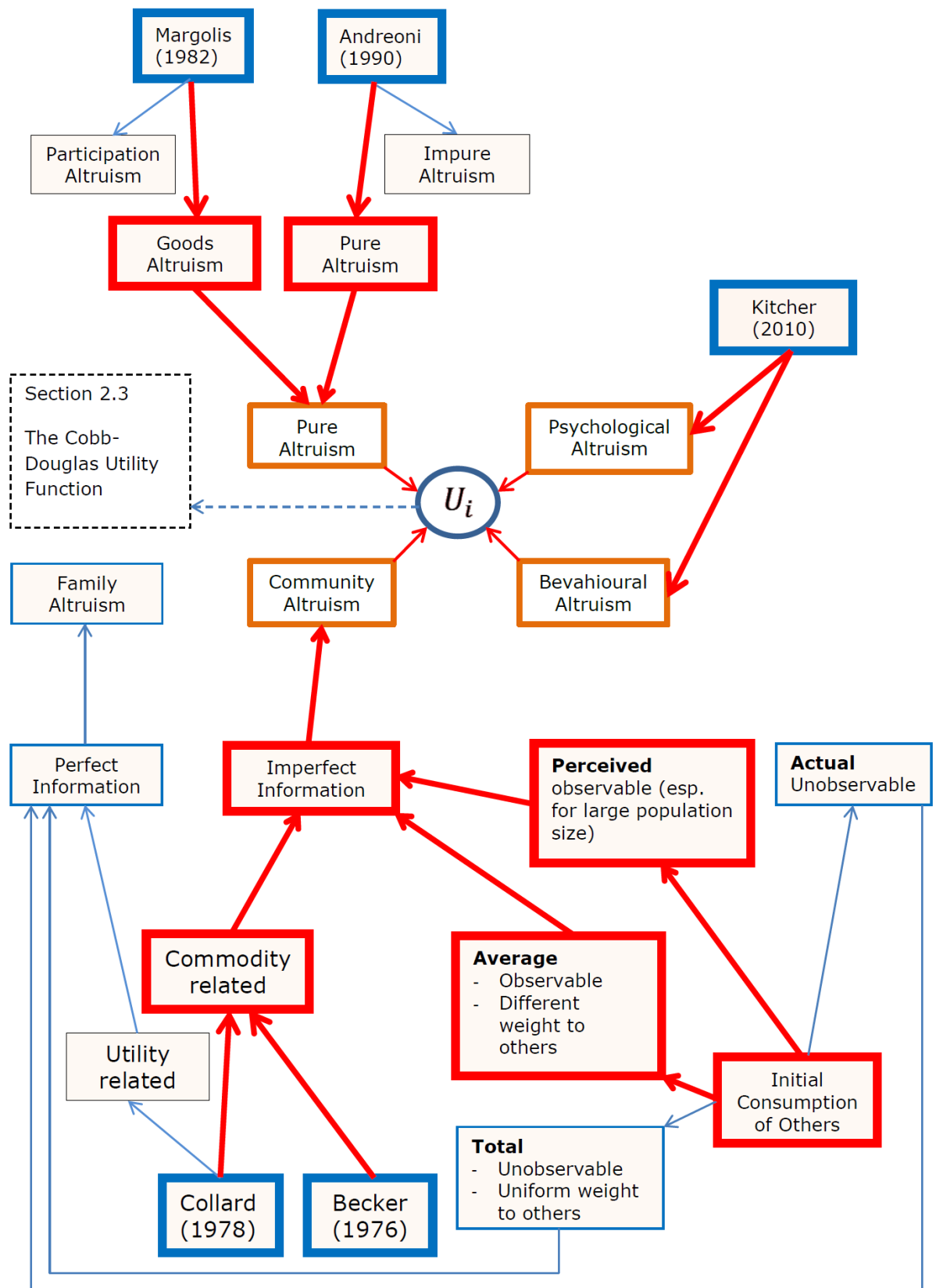


Figure 2.1: Utility Function Formulation Summary

β does not necessarily mean an increase in the degree of altruism. For example, a rate of increase in α which is greater than the rate of increase in β implies that the importance of an individual's own consumption is increasing relative to others' consumption. Despite the absolute increase in β , this individual is actually getting less altruistic. This problem can be overcome by restricting

$$\alpha + \beta = 1 \quad (2.9)$$

With this restriction, any changes in either β or α directly influence how an individual perceives the importance of others' consumption in comparison to her or his own consumption. This restriction can also mean that the utility function in equation (2.8) is exhaustive in that all variables, in this case all the consumptions of all other members in the society, have been included in the function.

However, because the degree of altruism is influenced by both β and α , the indicator for altruism should include β and α . Defining the degree of altruism as the ratio of β over α can be a solution. As β has been commonly referred to as the 'degree of altruism' (such as in Hudson & Jones, 2002; Konrad, 2004; Hori, 2009; and Kohler, 2011), the β and α ratio will be referred to as the 'level of altruism' in this study or

$$L_i = \frac{\beta}{\alpha} \quad (2.10)$$

where L_i is the level of psychological altruism of individual i . The level of psychological altruism is reflected by the relative importance of others' consumption compared to one's own consumption. Thus, the level of psychological altruism is reflected by the ratio β/α . Higher L_i represents a higher level of psychological altruism. Therefore, the utility function in equation (2.7) leads to Definition 2.1 below.

DEFINITION 2.1.

If (1) an individual is psychologically altruistic to other members of a society, and thus faces imperfect information regarding the consumption of others, and (2) impure altruism

is excluded from the definition of altruism, then the level of psychological altruism of an individual is the ratio between the weight attached to the perceived average consumption of others and the weight attached to own consumption of the individual's utility function.

β reflects the individual i 's utility elasticity with respect to the 'average' consumption of others, plus her or his transfer to others, rather than the 'total'. Hence, equation (2.10) takes into account the number of people in the society, the number of people to whom individual i is psychologically altruistic, and also the level of individual i 's utility elasticity towards each member of the society. By assuming the same level of one's utility elasticity towards each member of a society to whom one's utility is related, being psychologically altruistic to more people means a higher level of psychological altruism. For instance, when individual A 's utility is influenced by only four other society members' consumption, while individual B is psychologically altruistic towards five other members, individual A is of course considered psychologically less altruistic than B . The β of individual A is lower than B , and that in turn also means L_A is lower than L_B . As long as A and B live in the same society, or the number of members of the society where A lives is exactly the same as for B , $L_A < L_B$ still holds true. The inference will be different if, for example, A lives in a society of ten people, while there are twenty people in the B 's society.

Every human being's level of psychological altruism ranges from perfectly self-interested (When $\beta = 0 \Rightarrow L_i = 0$) to perfectly altruistic (When $\alpha = 0 \Rightarrow L_i = \infty$). By adopting equation (2.9) that $\alpha = 1 - \beta$, one cannot be perfectly altruistic (high β) and at the same time highly self-interested (high α). The level of altruism is stated in $\frac{\beta}{\alpha}$ which implies that there is a trade-off between the two kinds of interests, using resources for oneself and for others.

However, when it is assumed that more of one's own consumption always increases i 's utility, this means $\alpha > 0$. Put differently, it is assumed that lower own consumption means lower i 's utility. On the contrary, the impact of others' consumption on i 's utility has to be assumed differently since it is possible that, to some individuals or in certain situations, an increase in others' consumption decreases one's utility.

Moreover, in the case of a very altruistic individual, β can be relatively very large, and on another individual β can also be negative. For example, if individual i views individual j as an enemy or competitor, this could mean that more goods and services consumed by j will decrease i 's satisfaction in life. This possibility of β to be positive, zero, or even negative can explain what is meant by Collard (1978) that the self-interest assumption in neoclassical economic theory is neutral.

Economic man is often thought, particularly by non-economists, to be particularly unpleasant and reprehensible abstraction. He is brutish, unsympathetic and probably misanthropic. This is a mistaken view. To be sure, economic man is incapable of sympathy, benevolence or love. But he is also incapable of envy, malevolence or hatred. In short, he is splendidly neutral to others. He is concerned *only* with the bundle of goods and services he is to receive. Self-interest, it may therefore be argued, is a neutral or middle assumption and certainly morally more attractive than envy, malice or hatred (Collard, 1978, p.6).

Thus, considering the possible values of β and α above, L_i or the level of psychological altruism in an individual can be one of the following eight range of values as described in Table 2.1. In the case of an 'extremely high' level of psychological altruism, consumption for oneself does not have any impact on one's utility at all and this could cause one's resources – natural, physical, financial, and human – to be wholly used for the well-being of others. When two or more individuals with 'extremely high' levels of psychological altruism are confronted by each other in utilising limited resources, Collard's (1978) 'after you problem' could arise. This is an example of the absurd results caused by excessive altruism cited from Hutcheson and Dante in Collard (1978). Two excessively polite individuals would face difficulty in passing through a narrow doorway because each of them would insist that the other pass first, and as result nobody could get through. 'Very high' levels of psychological altruism has a similar meaning but, at this level, additional consumption for one's self still gives additional, although relatively small, utility. Lying in the middle between the 'extremely high' and 'high' levels of altruism is the 'balanced' level, where others' consumption has the same importance as one's own consumption.

Table 2.1: Eight Range of Values of the Level of Psychological Altruism

β	α	Values of β versus α	L_i	Attribute of the level
1	0	$\beta > \alpha$	$L_i = \infty$	Extremely high
		$\beta > \alpha$	$1 < L_i < \infty$	Very High
		$\beta = \alpha$	$L_i = 1$	Balanced
$0 < \beta < 1$	$0 < \alpha < 1$	$\beta < \alpha$	$\frac{2}{3} < L_i < 1$	High
			$\frac{1}{3} < L_i \leq \frac{2}{3}$	Moderate
			$0 < L_i \leq \frac{1}{3}$	Low
0	1	$\beta < \alpha$	$L_i = 0$	Zero
$\beta < 0$	> 1	$\beta < \alpha$	$L_i < 0$	Extremely low or Extremely self-interested

When L_i is greater than zero but lower than one, the level of psychological altruism can be categorised as ‘low’, ‘moderate’, or ‘high’. The closer to 1, the stronger the level of psychological altruism, and the closer to 0, the weaker. For convenience, these three categories are only arbitrarily obtained from splitting the range greater than zero to less than one into three equal levels; each level is one third of the total.

In ‘zero’ level, or when others’ consumption does not have any influence on one’s utility, what is important is only one’s own consumption or there is no altruism at all. In ‘extremely low’ levels, others’ consumption decreases one’s utility in that β becomes less than zero. This last level of psychological altruism is not only more likely to induce someone not to transfer even a small part of her or his resources to others, but the exact opposite can happen. This kind of individual is also capable of transferring others’ resources to become hers or his. Free-riding activities, stealing, and corruption are among the examples of such outcomes.

Since human beings are complicated (Nagel, 1970), many factors continuously influence how we think and act. The level of psychological altruism is also influenced by many factors, such as genetic, gender, age, mood, norm, bystander, information, relative income, model, and relatedness (Piliavin & Charng, 1990 and Andreoni & Vesterlund, 2001). These factors make an individual’s level of altruism fluctuate from time to time and from one situation to another. For example, one’s level of altruism at old age is higher than at a younger age, or when one is in a good mood the possibility of indulging in altruistic behaviours is higher.

2.3. The Cobb-Douglas Utility Function

The Cobb-Douglas utility function for an altruist as described in Section 2.2 has been chosen from three nominated functions: Cobb-Douglas, linear, and CES (constant elasticity substitution)-like function. The Cobb-Douglas function is used in Becker (1974) as an example to show the relationship between altruism and social interaction, while some other studies (such as Hudson & Jones, 2002; Konrad, 2004; Hori, 2009; and Kohler, 2011) choose a linear utility function to analyse altruism. The third type of function is introduced in this study to extend the coverage of the choices for selection of the utility function. This third function is described as a CES-like function because it looks like a CES function except that the exponent of an individual's own consumption can be different from the exponent of others' consumption. Rewriting equation (2.8) in these three functions yields

$$\begin{aligned} \text{Cobb-Douglas } U_i &= C_i^\alpha (\hat{C}_{ooi} + C_{oti})^\beta = C_i^\alpha \hat{C}_{oi}^\beta \\ \text{Linear } U_i &= \alpha C_i + \beta (\hat{C}_{ooi} + C_{oti}) = \alpha C_i + \beta \hat{C}_{oi} \end{aligned} \quad (2.11)$$

$$\text{CES-like } U_i = C_i^\alpha + (\hat{C}_{ooi} + C_{oti})^\beta = C_i^\alpha + \hat{C}_{oi}^\beta \quad (2.12)$$

A review of the properties of the three functions in the following sections leads to a conclusion that the Cobb-Douglas function is less problematic in explaining altruism.

2.3.1. Property 1: the possibility of zero for own consumption

For the Cobb-Douglas function, when an individual's own consumption is zero ($C_i = 0$), individual i 's utility is zero. This property implies that human beings cannot live without consumption, which is a plausible assumption. Meanwhile, for the linear function, when $C_i = 0$, individual i 's utility can still be positive as long as s/he is altruistic ($\beta > 0$) and others' consumption is not zero ($\hat{C}_{oi} > 0$). This property implies that an altruistic individual can live without consumption, which is unlikely to be accepted as a plausible

assumption. The CES-like function also shows that an individual can live with zero own consumption as long as others' consumption is positive.

2.3.2. Property 2: the possibility of zero for others' consumption

For the Cobb-Douglas function, when individual i is not altruistic at all ($\beta = 0$), her or his utility can remain positive even if others consume nothing ($\hat{C}_{oi} = 0$) so long as own consumption is greater than zero ($C_i > 0$). Meanwhile, when individual i is altruistic ($\beta > 0$), her or his utility will be zero if others' consumption is zero. This property implies that when someone is altruistic, s/he is ready to sacrifice some of her or his consumption to give to others who are starving. By doing so, one can have a higher utility than just consuming alone while people to whom s/he is altruistic are starving to death. This property can also serve as a plausible assumption.

For the other two functions, when individual i is not altruistic at all ($\beta = 0$), her or his utility can remain positive even if others consume nothing ($\hat{C}_{oi} = 0$) so long as own consumption is greater than zero ($C_i > 0$). Up to this point, this property is the same as the one found in the Cobb-Douglas. However, when individual i is altruistic ($\beta > 0$), her or his utility can still be positive if others' consumption is zero ($\hat{C}_{oi} = 0$), so long as her or his own consumption is positive ($C_i > 0$). This property implies that in spite of the fact that someone is technically altruistic ($\beta > 0$), one can just continue having a positive utility just by consuming her or his own resources even if the people to whom s/he is altruistic are starving to death. This property is unlikely accepted as a plausible assumption.

2.3.3. Property 3: the relative importance of others' consumption

For the Cobb-Douglas function, as $\frac{\partial U_i}{\partial C_i} = \alpha C_i^{\alpha-1} \hat{C}_{oi}^{\beta}$, the marginal utility of an individual's own consumption ($\frac{\partial U_i}{\partial C_i}$) is affected by others' well-being (\hat{C}_{oi}^{β}). This property implies that when individual i is altruistic ($\beta > 0$), the higher the level of well-being of others, and the more this individual can enjoy her or his own consumption. In other words, this person wants to make sure that others are happy before being able to

enjoy her or his own resources. In contrast, when others' well-being is low, her or his satisfaction is less influenced by her or his own consumption. This altruistic person cannot enjoy her or his abundant resources alone while others to whom s/he is altruistic are starving. This property can serve as a plausible assumption.

Meanwhile, as $\frac{\partial U_i}{\partial \hat{C}_{oi}} = \beta C_i^\alpha \hat{C}_{oi}^{\beta-1}$, the Cobb-Douglas function also shows that the marginal utility of others' consumption $\left(\frac{\partial U_i}{\partial \hat{C}_{oi}}\right)$ is affected by an individual's own well-being (C_i^α). When an individual is altruistic ($\beta > 0$), her or his ability to obtain happiness from others' well-being is also influenced by her or his own consumption. For example, when this individual has a very low own consumption, s/he cannot enjoy seeing others' well-being as good as when s/he is more prosperous by having higher own consumption. This property can also serve as a plausible assumption.

As $\frac{\partial U_i}{\partial C_i} = \alpha$ for the linear function and $\frac{\partial U_i}{\partial C_i} = \alpha C_i^{\alpha-1}$ for the CES-like function, the marginal utility of an individual's own consumption $\left(\frac{\partial U_i}{\partial C_i}\right)$ is unaffected by others' well-being ($\beta \hat{C}_{oi}$ for the linear function and \hat{C}_{oi}^β for the CES-like function). This property implies that although individual i is altruistic ($\beta > 0$), how s/he enjoys her or his own consumption is not influenced by how happy others are. When others are starving, for example, s/he can enjoy her or his own consumption just as much as if others are prosperous. This technically altruistic person doesn't seem altruistic at all. S/he doesn't really care about the people to whom s/he is altruistic. This property is unlikely to be accepted as a plausible assumption.

The property of these two functions is also problematic because $\frac{\partial U_i}{\partial \hat{C}_{oi}} = \beta$ for the linear function and $\frac{\partial U_i}{\partial \hat{C}_{oi}} = \beta \hat{C}_{oi}^{\beta-1}$ for the CES-like function. When individual i is altruistic ($\beta > 0$), how s/he enjoys others' consumption is not influenced by her or his own well-being. For example, when individual i has a very low own consumption, s/he can derive as much happiness as if s/he is prosperous.

2.3.4. Property 4: the utility when β and/or α are zero

For the Cobb-Douglas and linear functions, when β is zero, individual i 's utility is equal to the utility arising from an individual's own consumption. For the Cobb-Douglas function,

$$U_i = C_i^\alpha \hat{C}_{oi}^\beta = C_i^\alpha \text{ provided } \beta = 0$$

and for the linear function,

$$U_i = \alpha C_i + \beta \hat{C}_{oi} = \alpha C_i \text{ provided } \beta = 0$$

Meanwhile, when α is zero, individual i 's utility is equal to the utility arising from others' consumption. For the Cobb-Douglas function,

$$U_i = C_i^\alpha \hat{C}_{oi}^\beta = \hat{C}_{oi}^\beta \text{ provided } \alpha = 0$$

and for the linear function,

$$U_i = \alpha C_i + \beta \hat{C}_{oi} = \beta \hat{C}_{oi} \text{ provided } \alpha = 0$$

Thus, if individual i 's utility is influenced neither by her or his own consumption nor by others' consumption ($\beta = \alpha = 0$), the utility will be zero. This property can serve as a plausible assumption.

For the CES-like function, when β is zero, individual i 's utility is equal to the utility arising from own consumption plus 1 or $U_i = C_i^\alpha + \hat{C}_{oi}^\beta = C_i^\alpha + 1$. The utility arising from others' consumption is equal to 1. An explanation for this value is hard to find. The same problem arises in explaining individual i 's utility when α is zero as well as when both α and β are zero. When α is zero, individual i 's utility is equal to 1 plus the utility arising from others' consumption or $U_i = C_i^\alpha + \hat{C}_{oi}^\beta = 1 + \hat{C}_{oi}^\beta$. The utility arising from own consumption is equal to 1. If individual i 's utility is influenced neither by her or his own consumption nor by others' consumption ($\beta = \alpha = 0$), the utility will be equal to 2. Thus, this property is unlikely to be accepted as a plausible assumption.

2.3.5. Property 5: ability to explain envy

The Cobb-Douglas function can explain envy. Envy is the feeling of being better off if some other persons become worse off (Becker, 1974) or $\frac{\partial U_i}{\partial \hat{C}_{oi}} < 0$. Provided that $U_i = C_i^\alpha \hat{C}_{oi}^\beta$ and $\alpha, C_i, \hat{C}_{oi}$ are greater than zero, hence $\frac{\partial U_i}{\partial \hat{C}_{oi}} = \beta C_i^\alpha \hat{C}_{oi}^{\beta-1} < 0$ only if $\beta < 0$. As β becomes very small (much less than zero or $\beta \ll 0$), the individual i 's utility becomes very small and approaches zero. This property implies that as individual i becomes more and more envious, others' prosperity creates even greater feeling of being worse-off in individual i . However, there is no possibility of the utility becoming less than zero. This property can serve as a plausible assumption.

For the linear function, provided that $U_i = \alpha C_i + \beta \hat{C}_{oi}$, hence $\frac{\partial U_i}{\partial \hat{C}_{oi}} < 0$ only if $\beta < 0$. As β becomes very small (negative or $\beta \ll 0$), the individual i 's utility arising from others' consumption ($\beta \hat{C}_{oi}$) becomes very small and can be negative. Eventually, when the utility arising from own consumption is less than the absolute value of utility arising from others' consumption ($\alpha C_i < |\beta \hat{C}_{oi}|$), the individual i 's utility also becomes less than zero. The intuition of a less than zero utility is hard to find. This property is unlikely to be accepted as a plausible assumption.

For the CES-like function, provided that $U_i = C_i^\alpha + \hat{C}_{oi}^\beta$ and $\hat{C}_{oi} > 0$, hence $\frac{\partial U_i}{\partial \hat{C}_{oi}} = \beta \hat{C}_{oi}^{\beta-1} < 0$ only if $\beta < 0$. As β becomes very small (much less than zero or $\beta \ll 0$), the utility arising from others' consumption ($\beta \hat{C}_{oi}$) becomes very small and approaches zero ($\beta \hat{C}_{oi} \approx 0$). In this situation, the individual i 's utility only comes from her or his own consumption ($U_i = C_i^\alpha$). This property implies that when an individual is extremely envious, this individual's happiness is no longer influenced by others' well-being. Others' consumption has no influence on this individual's well-being. This relationship between others' consumption and the individual i 's utility does not really reflect the meaning of an envious individual. Thus, this property is unlikely to be accepted as a plausible assumption.

2.3.6. Property 6: the effect of a change in the level of psychological altruism on the indifference curves with $\alpha + \beta = 1$ restriction

For the three functions, when L_i changes, the new indifference curve intersects the initial indifference curve. Thus, the increase in the level of psychological altruism can either increase or decrease utility. This property requires careful consideration in explaining the effect of a change in the level of psychological altruism on utility¹². Figure 2.2 illustrates the indifference curves when the level of altruism changes from L_{i1} to L_{i2} for the three functions.

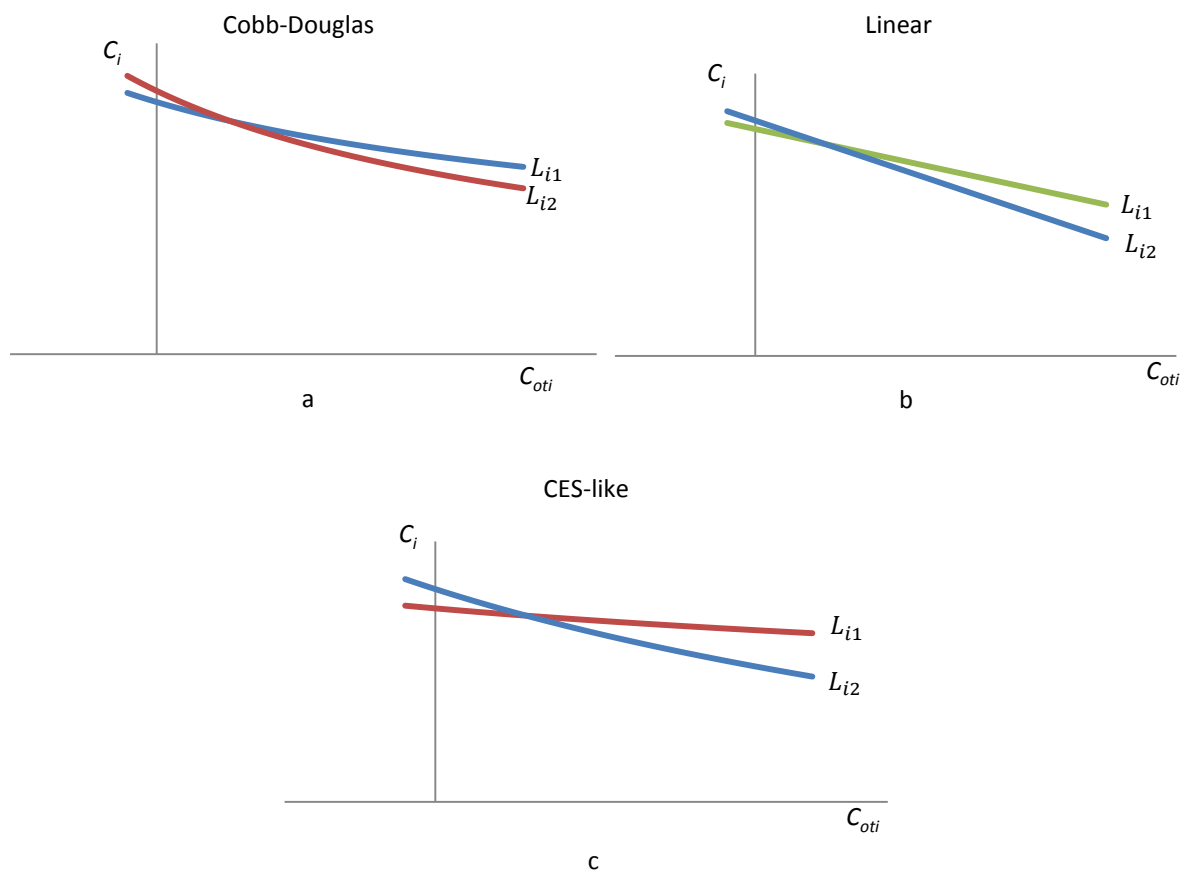


Figure 2.2: Indifference Curves with $\alpha + \beta = 1$ Restriction and Different Levels of Psychological Altruism

¹² Property 8 explains this property further, and the implication of this property will be discussed further in Chapter 4.

2.3.7. Property 7: the effect of a change in the level of psychological altruism on the indifference curves without $\alpha + \beta = 1$ restriction

For the three functions, without the $\alpha + \beta = 1$ restriction, a change in the level of altruism (L_i) can also make the new indifference curve intersect the initial indifference curve. The existence of this intersection between the two indifference curves depends on the type of changes of L_i . An increase in $L_i = \beta/\alpha$ can be in one of the following forms:

- Increase in β and constant α . This form increases $\alpha + \beta$, which eventually increases U_i .
- Increase in β and α . This form increases $\alpha + \beta$, which eventually increases U_i .
- Increase in β which is greater than the decrease in α . This form increases $\alpha + \beta$, which eventually increases U_i .
- Decrease in β which is less than the increase in α . This form increases $\alpha + \beta$, which eventually increases U_i .
- Constant β and increase in α . This form increases $\alpha + \beta$, which eventually increases U_i .
- Constant β and decrease in α . This form decreases $\alpha + \beta$, which eventually decreases U_i .
- Decrease in β and α . This form decreases $\alpha + \beta$, which eventually decreases U_i .
- Increase in β which is less than the decrease in α . This form decreases $\alpha + \beta$, which eventually decreases U_i .
- Decrease in β which is greater than the increase in α . This form decreases $\alpha + \beta$, which eventually decreases U_i .
- Decrease in β and constant α . This form decreases $\alpha + \beta$, which eventually decreases U_i .

In short, the increase in L_i can either increase or decrease U_i depending on the relative increase and decrease in β and α which causes the increase in L_i . These inconsistencies enable the new indifference curve to intersect the initial indifference curve after a change in the level of psychological altruism. Property 9 explains this further.

2.3.8. Property 8: the effect of a change in the level of psychological altruism on the utility with $\alpha + \beta = 1$ restriction

For the Cobb-Douglas and linear functions, the relationship between utility (U_i) and the level of altruism ($L_i = \beta/\alpha$) shows inconsistencies as the relative value of own consumption (C_i) varies against the perceived average consumption of others (\hat{C}_{oi}). These inconsistencies cause the new indifference curve to intersect the initial indifference curve. As $\alpha + \beta = 1$, the increase in β is always accompanied by a decrease in α . Thus, when $C_i < \hat{C}_{oi}$ or $C_{oti} = 0$ and $M_i < \hat{C}_{ooi}$, utility is positively influenced by the level of psychological altruism; when $C_i = \hat{C}_{oi}$ or $C_{oti} = 0$ and $M_i = \hat{C}_{ooi}$, utility is not influenced by the level of psychological altruism; and when $C_i > \hat{C}_{oi}$ or $C_{oti} = 0$ and $M_i > \hat{C}_{ooi}$, utility is negatively influenced by the level of psychological altruism. Figure 2.3 a and b illustrate the inconsistencies for the three functions. This property implies that being more altruistic is joyful for a subjectively poor individual $C_i < \hat{C}_{oi}$, and hurts a subjectively rich individual¹³.

The CES-like function also shows inconsistency but with a different pattern. At low levels of psychological altruism ($L_i < 1$), utility is negatively influenced by psychological altruism. At high levels of psychological altruism ($L_i > 1$), utility is positively influenced by psychological altruism. When $L_i = 1$, utility is not influenced by psychological altruism. The pattern also shows that lower levels of own consumption enables an individual to experience a change from a negative to a positive relationship between psychological altruism and utility at a lower level of psychological altruism. This property implies that initially being more altruistic is painful because the utility decreases. However, after a certain critical level of psychological altruism, being more altruistic is joyful because the utility increases with altruism. In addition, for a subjectively poor individual ($C_i < \hat{C}_{oi}$) it is easier to enjoy the positive relationship between psychological altruism and happiness, because the critical level of psychological altruism is lower. In contrast, a subjectively richer individual ($C_i > \hat{C}_{oi}$) has to endure more pain before experiencing the joy of being psychologically more altruistic, because the critical level of psychological altruism is higher.

¹³ The implication of this property will be discussed further in Chapter 4.

2.3.9. Property 9: the effect of a change in the level of psychological altruism on the utility without $\alpha + \beta = 1$ restriction

As explained in Property 7, for the three functions the type of relationship between utility and psychological altruism depends on the type of changes in the L_i . When the increase in $L_i = \beta/\alpha$ is mainly caused by an increase in β , utility (U_i) is positively influenced by the level of altruism (L_i). In contrast, when the increase in $L_i = \beta/\alpha$ is mainly caused by a decrease in α , utility (U_i) is negatively influenced by the level of psychological altruism (L_i). As the change in L_i can be caused by various types of relative changes in β and α , the relationship between utility and psychological altruism cannot be generalised into a certain pattern as when the $\alpha + \beta = 1$ restriction is applied. Therefore, the role of the relative value of M_i and \hat{C}_{ooi} in the pattern cannot be generalised either.

2.3.10. Property 10: the effect of restricting to whom an individual is altruistic

In this restriction, individual i is assumed to be altruistic only to others who are relatively worse-off ($\hat{C}_{oi} < C_i$). This restriction cannot be applied in the three functions. When others who were previously worse-off ($\hat{C}_{oi} < C_i$) become more prosperous than individual i ($\hat{C}_{oi} > C_i$), the β turn from $\beta > 0$ to $\beta = 0$. Consequently, when others become more prosperous, individual i 's utility drops. This altruistic person ($\beta > 0$) is not really happy to see the people to whom s/he is altruistic moving up from less wealthy to relatively wealthier than s/he is. A problematic property also arises when others, who were previously better-off ($\hat{C}_{oi} > C_i$), become less prosperous than individual i ($\hat{C}_{oi} < C_i$). This change turns β from $\beta = 0$ to $\beta > 0$. As a result, individual i 's utility increases. An altruistic individual becomes happier when others are moving down from a better-off class to a worse-off class. This property is unlikely to be accepted as a plausible assumption.

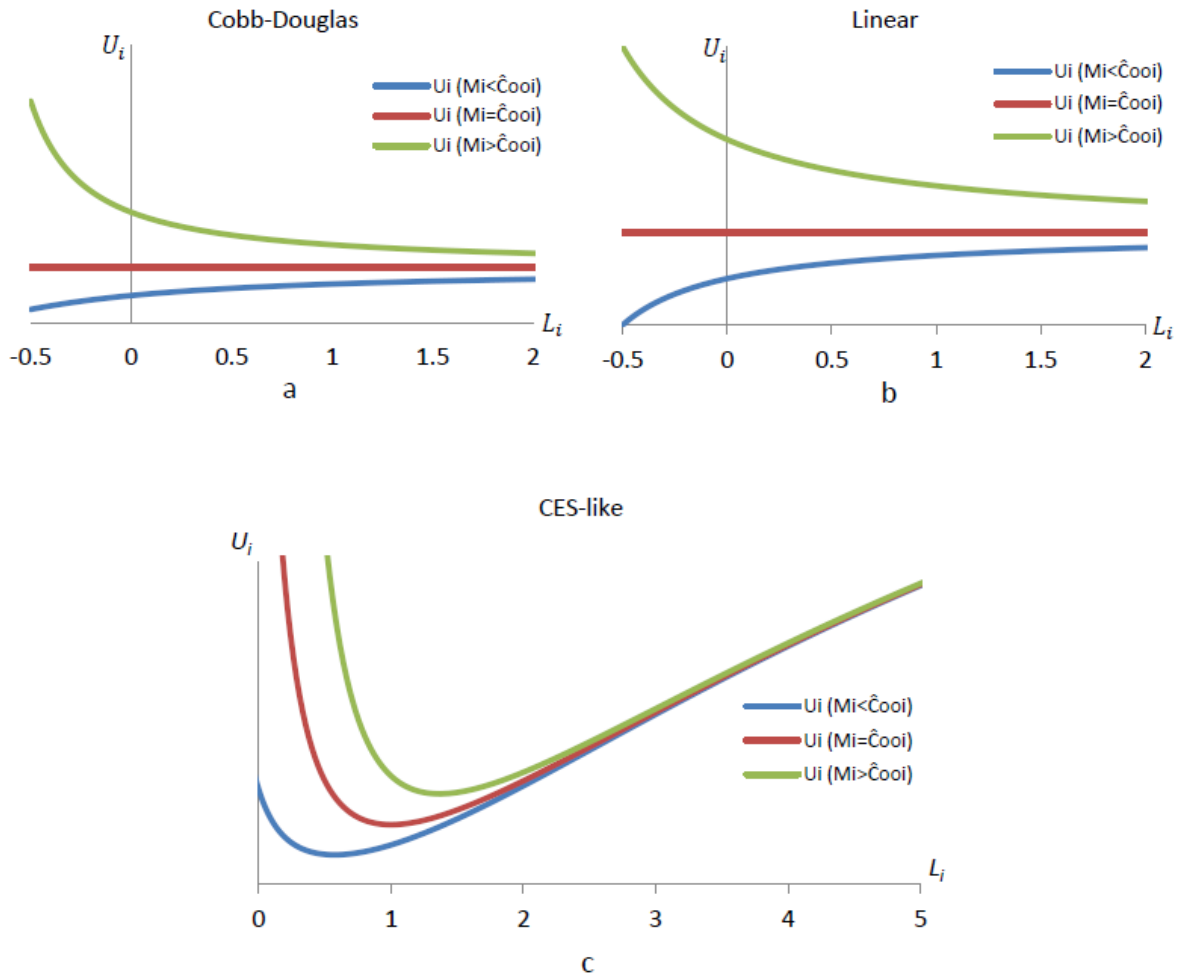


Figure 2.3: Utility as a Function of the Level of Psychological Altruism with $\alpha + \beta = 1$ Restriction

2.3.11. Summary of the properties

The properties of the three functions above show that the Cobb-Douglas is less problematic when compared to the other two. As an altruism model, the Cobb-Douglas function needs careful consideration in interpreting the implications of Properties 6 through 9 (Chapter 4 provides an analysis). Meanwhile, the other two functions also need careful consideration in interpreting the implications of Properties 6 through 9, but these two functions are at their most problematic in the other properties. Table 2.2 summarises the properties.

Table 2.2: Summary of the Properties of Three Utility Functions

Property	Cobb-Douglas	Linear	CES-like
1	Plausible	Problematic	Problematic
2	Plausible	Problematic	Problematic
3	Plausible	Problematic	Problematic
4	Plausible	Plausible	Problematic
5	Plausible	Problematic	Problematic
6	Requires careful consideration in interpreting the implications		
7			
8			
9			
10	Plausible	Plausible	Plausible

2.4. Psychological Altruism and Transfer Behaviour

2.4.1. Resources constraint

In this study, behavioural altruism is defined as the transfer of resources from an individual to others that is motivated by feeling of selfless. The motivational state of mind that is altruism, to some extent, has the capability to induce transfer of resources to others. The higher the level of psychological altruism, the greater the possibility of sacrificing one's own resources for the benefit of others. Kitcher (2010) explains the process by mentioning that a certain level of psychological altruism can lead to altruistic behaviour or behavioural altruism. This process is visually illustrated by Frank (2006) using utility and indifference curves to show the optimal choice of an altruistic individual. The procedure can be formalised by maximising the utility in equation (2.8) with individual i 's resources constraint of

$$M_i = p_i C_i + p_{oti} C_{oti} \quad (2.13)$$

where M_i is the resources constraint endowed in individual i , p_i is the price of resources consumed by i , and p_{oti} is the price of resources transferred from i to other members of the society.

Resources consist of natural, physical, human, and financial resources. In neo-classical economic theory, resources are generally assumed to consist of land, capital, and labour. Land is associated with natural capital, which also includes other non-biotic and biotic natural resources such as fresh water, air, minerals, forests, and animals. Capital includes man-made goods such as machinery, buildings, and automobiles. Labour is human effort or capability in producing goods and services. The benefit of technology can thus be stored in capital and labour. The difference between a typewriter and a personal computer is the technology that is being applied. The main difference between skilled and unskilled workers is the difference in levels of understanding of technology. In addition, since the resources owned by an individual can also be stored in the form of liquid means of exchange, money possession can be classified separately as financial resources. A special characteristic of financial capital is in its liquidity. Financial capital can be easily converted or exchanged into other forms of capital. Machinery and land, for example, can be obtained by sacrificing the possession of certain amounts of financial capital. Therefore, the resources used in this study consist of natural resources, physical or man-made resources, labour or human resources, and financial resources.

In equation (2.13), $p_i C_i$ and $p_{oti} C_{oti}$ are the monetary value or opportunity cost of consuming resources for individual i and others respectively. For convenience, assuming that $p_i = p_{oti} = 1$, equation (2.13) becomes similar to the budget constraint of an altruist in Becker (1976) and can be rewritten as

$$M_i = C_i + C_{oti} \quad (2.14)$$

In this equation an individual's resources (M_i) are directly consumed for own consumption (C_i) and for others (C_{oti}). Combined with the fact that the utility function in equation (2.8) leads to an assumption of a single commodity, the underlying assumption of equation (2.13) is that the production function of the single commodity produced by i will be $X_i = m(M_i)$. Considering M_i as one entity of resources and using a constant return-to-scale assumption to the resources implies that $X_i = M_i$ and thus $X_i = M_i = C_i + C_{oti}$. Therefore, C_i can also be interpreted as the individual's own consumption of a

commodity produced by the resources owned by individual i , and C_{oti} is the commodity produced by i 's resources which is given to be added to another's consumption.

2.4.2. Behavioural altruism

The relationship between psychological altruism and transfer behaviour is obtained by maximising the utility function in equation (2.8) with the resources constraint in equation (2.14). While some previous literature on altruism (such as Becker, 1976 and Frank, 2006) discusses the optimal choice of an altruist based on a general function, this study finds further features of altruism by maximising a more specific utility function. The Lagrange function for maximising utility in equation (2.8) with respect to C_i and C_{oti} , using the resources constraint of equation (2.14), is

$$F(C_i, C_{oti}) = C_i^\alpha (\hat{C}_{ooi} + C_{oti})^\beta + \lambda(M_i - C_i - C_{oti}) \quad (2.15)$$

where λ is the Lagrange multiplier. Thus, the optimal C_i and C_{oti} which maximise utility are as follows.

$$F'_{C_i}(C_i, C_{oti}) = \alpha C_i^{\alpha-1} (\hat{C}_{ooi} + C_{oti})^\beta - \lambda = 0 \quad (2.16)$$

$$F'_{C_{oti}}(C_i, C_{oti}) = \beta C_i^\alpha (\hat{C}_{ooi} + C_{oti})^{\beta-1} - \lambda = 0 \quad (2.17)$$

So

$$\alpha C_i^{\alpha-1} (\hat{C}_{ooi} + C_{oti})^\beta = \beta C_i^\alpha (\hat{C}_{ooi} + C_{oti})^{\beta-1} \quad (2.18)$$

$$(\hat{C}_{ooi} + C_{oti})^\beta (\hat{C}_{ooi} + C_{oti})^{1-\beta} = \frac{\beta}{\alpha} C_i^\alpha C_i^{1-\alpha} \quad (2.19)$$

$$\hat{C}_{ooi} + C_{oti} = \frac{\beta}{\alpha} C_i \quad (2.20)$$

$$C_i = \frac{\alpha}{\beta} (\hat{C}_{ooi} + C_{oti}) \quad (2.21)$$

or

$$C_{oti} = \frac{\beta}{\alpha} C_i - \hat{C}_{ooi} \quad (2.22)$$

Equations (2.20), (2.21), and (2.22) imply that the level of psychological altruism $\left(\frac{\beta}{\alpha}\right)$ has a positive influence on the transfer of resources from individual i to other members of the society. Accordingly, total consumption of goods and services by the rest of the society is also positively influenced by the level of psychological altruism. Although, in equation (2.22), the perceived initial average consumption of others is applied instead of its actual value; in fact a rise in C_{oti} still makes the actual consumption of others (C_{oi}) increase.

A clearer view of the relationship between the level of psychological altruism and transfer behaviour in the model above can be given by simulating some values on α, β, M, n , and C_{ooi} . Consider a society of ten people ($n = 10$) with its distribution of resources among individuals as described in Table 2.3.

Table 2.3: Numerical Example of Resources Distribution for Behavioural Altruism Simulation

Individual	1	2	3	4	5	6	7	8	9	10
Money value of resources	10	7	8	20	11	40	5	2	3	4

The money value of resources (natural, physical, financial, and human) reflects the opportunity cost of using them in consumption. The total resources available in this society becomes 110 and the mean is 11 (\bar{M}).

Consider individual 3, as the first case, whose resources (M_3) are worth 8 money value, which is below the average level of 11 in the society. The remaining resources available for the other society members are $110 - 8 = 102$, being the initial amount of resources available for the consumption of others (C_{ooi}). Assuming that $\hat{C}_{ooi} = \bar{C}_{ooi}$, attaching all possible values for α and β based on the eight range of values in Table 2.1, and then substituting them into equation (2.14), (2.20), (2.21), and (2.22), the values for C_i , C_{oti} , and C_{oi} which maximise individual 3's utility are listed in Table 2.4.

Table 2.4: Numerical Example of Possible Values of C_i , C_{oti} , and C_{oi} for Individual 3

α	β	L_3	Attribute of L_3	C_3	C_{ot3}	$C_{oi} = C_{ooi} + C_{ot3}$
0	1	∞	Extremely high	0	8	110
0.3	0.7	2.33	Very High	5.8	2.2	104.2
0.5	0.5	1	Balanced	9.67	-1.67	100.33
0.55	0.45	0.82	High	10.63	-2.63	99.37
0.7	0.3	0.43	Moderate	13.53	-5.53	96.47
0.8	0.2	0.25	Low	15.47	-7.47	94.53
1	0	0	Zero	19.33	-11.33	90.67
1.1	-0.1	-0.09	Extremely low	21.27	-13.27	88.73

In this case, it is obvious that being psychologically altruistic alone does not guarantee that someone will show altruistic behaviour. This might be the reason why Samuelson (2001) asserts that the quantum of altruism in human nature is sufficiently limited for its most important uses. Individual 3 will only transfer part of her or his resources to others if her or his level of psychological altruism is ‘very high’, which is shown by positive C_{ot3} (or only when the level of psychological altruism is greater than one). If individual 3’s level of psychological altruism is equal to one or lower (balanced, low, zero, and so on), this individual needs to transfer resources from other members of the society for her or his own consumption. The methods required to conduct this act in real life could vary from begging, forcing others to do so, stealing, free-riding, or even being corrupt. Moreover, government and private efforts to direct people to choose one or other of the abovementioned methods may impose costs such as costs in making regulations, enforcing laws, and encouraging charity. In these circumstances, factors that will modify the method required to maximise the utility depends on the current informal and formal ‘rules of the game’ in the society, or institution. When, for example, the enforcement of anti-corruption regulation is strong, corruption will not be available as an option, therefore other options must then be chosen.

The effect of relative income or resources on the relationship between transfer behaviour and psychological altruism will be apparent by conducting additional cases of this simulation for other individuals with higher levels of resources. Individuals 5, 4, and 6 represent members of the society with average, higher than average, and the highest level of endowment of resources respectively. Together, individuals 3, 5, 4, and 6 can also be labelled as the poor, the middle class, the rich, and the richest respectively. Applying

the same simulation to these four people as has been applied to individual 3 above, the values of the transfer of resources are as summarised in Table 2.5.

Table 2.5: Numerical Example of Possible Values of C_{oti} for Individual 3, 5, 4, and 6

α	β	L_i	Attribute of L_i	C_{ot3} ($M_3 < M_{\text{Mean}}$)	C_{ot5} ($M_5 = M_{\text{Mean}}$)	C_{ot4} ($M_4 > M_{\text{Mean}}$)	C_{ot6} ($M_6 >> M_{\text{mean}}$)
0	1	∞	Extremely high	8	11	20	40
0.3	0.7	2,33	Very High	2.2	4.4	11	25.67
0.5	0.5	1	Balanced	-1.67	0	5	16.11
0.55	0.45	0.82	High	-2.63	-1.1	3.5	13.72
0.7	0.3	0.43	Moderate	-5.53	-4.4	-1	6.56
0.8	0.2	0.25	Low	-7.47	-6.6	-4	1.78
1	0	0	Zero	-11.33	-11	-10	-7.78
1.1	-0.1	-0.09	Extremely low	-13.27	-13.2	-13	-12.56

The results show that, at the same level of altruism, an individual with relatively greater endowment is more likely to perform altruistic behaviour. This is shown by higher transfers to other members of the society. If individuals 3 and 4 have the same level of psychological altruism ($L_i = 1$), individual 4 is willing to sacrifice 5 units of her or his resources to maximise utility while individual 3 is eager to grab 1.67 units from others to do the same. Even if, for example, individual 6's level of psychological altruism is 'low', s/he is willing to give 1.78 units of resources to others, but positive transfer behaviour will only happen on individual 3 if her or his level of psychological altruism is 'very high', because individual 6 is the richest while individual 3 is poor. In other words, not performing transfer behaviour does not necessarily mean that an individual's level of psychological altruism is low. Her or his relatively poor position in the society's endowment of resources could be the cause of resources not transferring to others.

Table 2.5 shows another important characteristic of how transfer behaviour is related to an individual's level of psychological altruism and relative resources endowment. If an individual's level of psychological altruism is zero, or equivalent to the assumption of self-interest in neoclassical economic theory, this individual must be willing to transfer others' resources to become her or his own resources regardless of how rich this individual is in the society. In other words, without psychological altruism there is no

possibility of giving resources voluntarily to others. Hence, labelling the assumption of self-interest in neoclassical economic theory as a ‘neutral’ assumption (Collard, 1978) should be interpreted with extra precaution. Assumption of self-interest ($L_i = 0$) does not necessarily mean envy, malice, or hatred which might be more comfortably named after the assumption of a negative level of altruism ($L_i < 0$). However, self-interest can influence an individual to transfer others’ resources to be her or his own.

Solving equation (2.14) for C_i and substituting it into (2.22) yields¹⁴

$$C_{oti} = \frac{\beta}{\alpha}(M_i - C_{oti}) - \hat{\bar{C}}_{ooi} \quad (2.23)$$

$$= \frac{(\beta/\alpha)M_i - \hat{\bar{C}}_{ooi}}{1 + \beta/\alpha} \quad (2.24)$$

This equation indicates that the same amount of transfer of resources to others found in several individuals in a society does not necessarily mean that they have the same level of psychological altruism. The level of psychological altruism $\left(\frac{\beta}{\alpha}\right)$, the quantity of resources each individual has (M_i), and the perceived initial average level of consumption of others $\left(\hat{\bar{C}}_{ooi}\right)$ altogether determine the amount of transfer of an individual to the rest of society. Consider Table 2.5 above again as an example. When the level of psychological altruism of individual 5 is ‘extremely high’, the transfer of this individual to others is 11. The same amount of transfer is carried out by individual 4 when the level of psychological altruism is ‘very high’. Besides their differences in levels of psychological altruism, individuals 4 and 5 have the same amount of transfer because they have different amounts of resources.

¹⁴ In equation (2.23): $C_{oti} = \frac{\beta}{\alpha}(M_i - C_{oti}) - \hat{\bar{C}}_{ooi}$, then

$$C_{oti} = \frac{\beta}{\alpha}M_i - \frac{\beta}{\alpha}C_{oti} - \hat{\bar{C}}_{ooi}$$

$$C_{oti} + \frac{\beta}{\alpha}C_{oti} = \frac{\beta}{\alpha}M_i - \hat{\bar{C}}_{ooi}$$

$$C_{oti} = \frac{\frac{\beta}{\alpha}M_i - \hat{\bar{C}}_{ooi}}{1 + \frac{\beta}{\alpha}}$$

As equation (2.24) formulates the transfer of resources to others based on altruistic motives, this equation can also be considered as the nominal behavioural altruism. Transfer to others is expressed in its nominal value in the equation. Hence, the relative value of this transfer can serve as the level of behavioural altruism. When both sides of equation (2.24) is divided by the quantity of resources owned by individual i , the level of behavioural altruism of this individual is formulated as

$$\Lambda_i = \frac{C_{oti}}{M_i} = \frac{L_i M_i - \hat{\bar{C}}_{ooi}}{M_i(1 + L_i)} \quad (2.25)$$

To find further how transfer behaviour is determined, equation (2.24) can be rewritten as

$$C_{oti} = \frac{L_i M_i - \hat{\bar{C}}_{ooi}}{1 + L_i} \quad (2.26)$$

Equation (2.26) demonstrates that a positive level of psychological altruism (L_i) alone will not guarantee a positive transfer of resources from an individual to others. The difference between own resources and the perceived average initial consumption of others ($M_i - \hat{\bar{C}}_{ooi}$) also determines behavioural altruism. A positive level of psychological altruism combined with a relatively low level of own resources ($M_i < \hat{\bar{C}}_{ooi}$) can cause an individual to transfer resources from others to her- or himself (negative C_{oti}). In other words, relatively richer people ($M_i > \hat{\bar{C}}_{ooi}$) need a lower level of psychological altruism to elicit altruistic behaviour.

Equation (2.26) becomes the foundation for this thesis to emphasize psychological altruism more than behavioural altruism regarding their role in social interaction, culture, social capital, institution, and well-being. Because transfer of resources to others is induced by the feeling of selfless,¹⁵ discussing the role of altruism in well-being comprehensively should focus on the importance of psychological altruism instead of only on behavioural altruism. Moreover, equation (2.26) also implies that emphasizing the role

¹⁵ This idea conforms to Kitcher (2010).

of psychological altruism in well-being can automatically include behavioural altruism in the discussion. In contrast, when the focus was on behavioural altruism, the psychological altruism could be overlooked.

It turns out that provided $M_i > 0$ and $\hat{C}_{ooi} > 0$, nominal behavioural altruism (C_{oti}) and the level of behavioural altruism (A_i) is an increasing function of the level of psychological altruism (L_i) of an individual. It means

$$\frac{\partial C_{oti}}{\partial L_i} = \frac{M_i + \hat{C}_{ooi}}{(1 + L_i)^2} > 0 \quad (2.27)^{16}$$

and

$$\frac{\partial A_i}{\partial L_i} = \frac{M_i^2 + M_i \hat{C}_{ooi}}{[M_i(1 + L_i)]^2} > 0 \quad (2.28)^{17}$$

Where there is psychological altruism, either strong or weak, an increase in the psychological altruism always impacts on increasing the transfer of resources to others. The increase of behavioural altruism is found both in its nominal (∂C_{oti}) and relative (∂A_i) values. This positive impact on transfer behaviour also holds when the level of psychological altruism is extremely low or L_i is negative, regardless of whether the individual is rich or poor. In general, the result of this section is summarised in Proposition 2.1.

¹⁶ In equation (2.26): $C_{oti} = \frac{L_i M_i - \hat{C}_{ooi}}{1 + L_i}$, so

$$\begin{aligned} \frac{\partial C_{oti}}{\partial L_i} &= \frac{M_i(1 + L_i) - (L_i M_i - \hat{C}_{ooi})}{(1 + L_i)^2} \\ \frac{\partial C_{oti}}{\partial L_i} &= \frac{M_i + M_i L_i - M_i L_i + \hat{C}_{ooi}}{(1 + L_i)^2} \\ \frac{\partial C_{oti}}{\partial L_i} &= \frac{M_i + \hat{C}_{ooi}}{(1 + L_i)^2} \end{aligned}$$

¹⁷ In equation (2.25), $A_i = \frac{C_{oti}}{M_i} = \frac{L_i M_i - \hat{C}_{ooi}}{M_i(1 + L_i)}$, so

$$\begin{aligned} \frac{\partial A_i}{\partial L_i} &= \frac{M_i(M_i(1 + L_i)) - (L_i M_i - \hat{C}_{ooi})M_i}{(M_i(1 + L_i))^2} \\ \frac{\partial A_i}{\partial L_i} &= \frac{M_i^2 + M_i^2 L_i - (M_i^2 L_i - M_i \hat{C}_{ooi})}{(M_i(1 + L_i))^2} \\ \frac{\partial A_i}{\partial L_i} &= \frac{M_i^2 + \cancel{M_i^2 L_i} - \cancel{M_i^2 L_i} + M_i \hat{C}_{ooi}}{(M_i(1 + L_i))^2} \\ \frac{\partial A_i}{\partial L_i} &= \frac{M_i^2 + M_i \hat{C}_{ooi}}{(M_i(1 + L_i))^2} > 0 \text{ for } M_i > 0 \text{ and } \hat{C}_{ooi} > 0 \end{aligned}$$

PROPOSITION 2.1.

Psychological altruism has a positive influence on behavioural altruism when

- (1) an individual is psychologically altruistic to other members of a society, and thus faces imperfect information regarding the consumption of others, and*
- (2) impure altruism is excluded from the definition of altruism.*

The formulation of the relationship between the level of psychological altruism and behavioural altruism from the utility function in Equation (2.8) can also be summarised as shown in Figure 2.4.

2.5. Measuring Psychological Altruism

In equation (2.10), the level of altruism is defined by α and β , where both are very difficult to measure empirically. However, when equation (2.23) is solved for $\frac{\beta}{\alpha}$, a set of measurable variables can be used for calculating the level of altruism as follows¹⁸.

$$L_i = \frac{\beta}{\alpha} = \frac{C_{oti} + \hat{C}_{ooi}}{M_i - C_{oti}} \quad (2.29)$$

Equation (2.29) enables the estimating of the level of altruism of an individual empirically when the data of the resources available for the individual, the transfer for others from

¹⁸ In equation (2.23): $C_{oti} = \frac{\beta}{\alpha}(M_i - C_{oti}) - \hat{C}_{ooi}$, then

$$\begin{aligned} C_{oti} + \hat{C}_{ooi} &= \frac{\beta}{\alpha}(M_i - C_{oti}) \\ \frac{\beta}{\alpha} &= \frac{C_{oti} + \hat{C}_{ooi}}{M_i - C_{oti}} \end{aligned}$$

Section 2.6 explains that because some resources are not readily measurable (especially human resources) an individual also faces imperfect information regarding her or his own resources. Thus, a further application of an imperfect information assumption to an individual's own resources will imply that the actual own resources of individual i (M_i) should be replaced by the perceived resources of the individual (\hat{M}_i). As a result, the level of psychological altruism can also be written as

$$\frac{\beta}{\alpha} = \frac{C_{oti} + \hat{C}_{ooi}}{\hat{M}_i - C_{oti}}$$

this individual, and the perceived initial average consumption of others in the society are provided.

However, the resulting level of psychological altruism using equation (2.29) can be directly interpreted as the level of psychological altruism only if there is no cost in conducting transfer, both to and from others. The cost involved in conducting transfer includes those imposed on acquiring information, managing risk, transportation, and so on. The existence of cost creates a moderating effect on the quantity of the transfer actually made by an individual in a society. For example, difficulties in knowing which people are willing to receive donations can decrease the motivation for giving. Strong anti-corruption law enforcement prevents un-altruistic people from being corrupt.

Equation (2.29) infers that by merely consuming below average, one can automatically be considered as psychologically altruistic. However, a broader perspective is possible when simulating the equation on several imaginary individuals of a society as follows. An example of the psychological altruism levels of 11 people in a 22.7 million population society will be examined. A per capita monetary value of resources in this society is \$55,600, while the monetary value of resources for individuals 1 through 11 are successively \$17,000; \$18,889; \$34,000; \$55,600; \$61,778; \$111,200; \$200,000; \$222,222; \$400,000; \$400,000; and \$400,000. Their transfers to others are \$0; \$1,889; \$17,000; \$0; \$6,148; \$55,600; \$0; \$22,222; \$200,000; \$248,133; and \$313,548 respectively. Assuming that $\hat{C}_{ooi} = \bar{C}_{ooi}$ and employing equation (2.29) to calculate the average level of altruism of each of the nine individuals above yield their levels of psychological altruism as listed in Table 2.6.

The important implication to be drawn from Table 2.6 is that individuals with the same level of psychological altruism show different proportions of transfer to resources since their resources are also different. Individuals with higher resources show higher transfer to resources ratios. Individual 11, for example, has the same level of psychological altruism as individual 3, but because individual 11 is much richer, her or his transfer to resources ratio is 78% while the ratio for individual 3 is only 50%. A comparison between individual 10 and 6 provides the same example. Individual 11 gives more than individual 3 not because s/he is psychologically more altruistic but rather because s/he has more abundant resources to offer. Put differently, individual 3's surplus of resources after being consumed for her or his own necessity is less than individual 11's

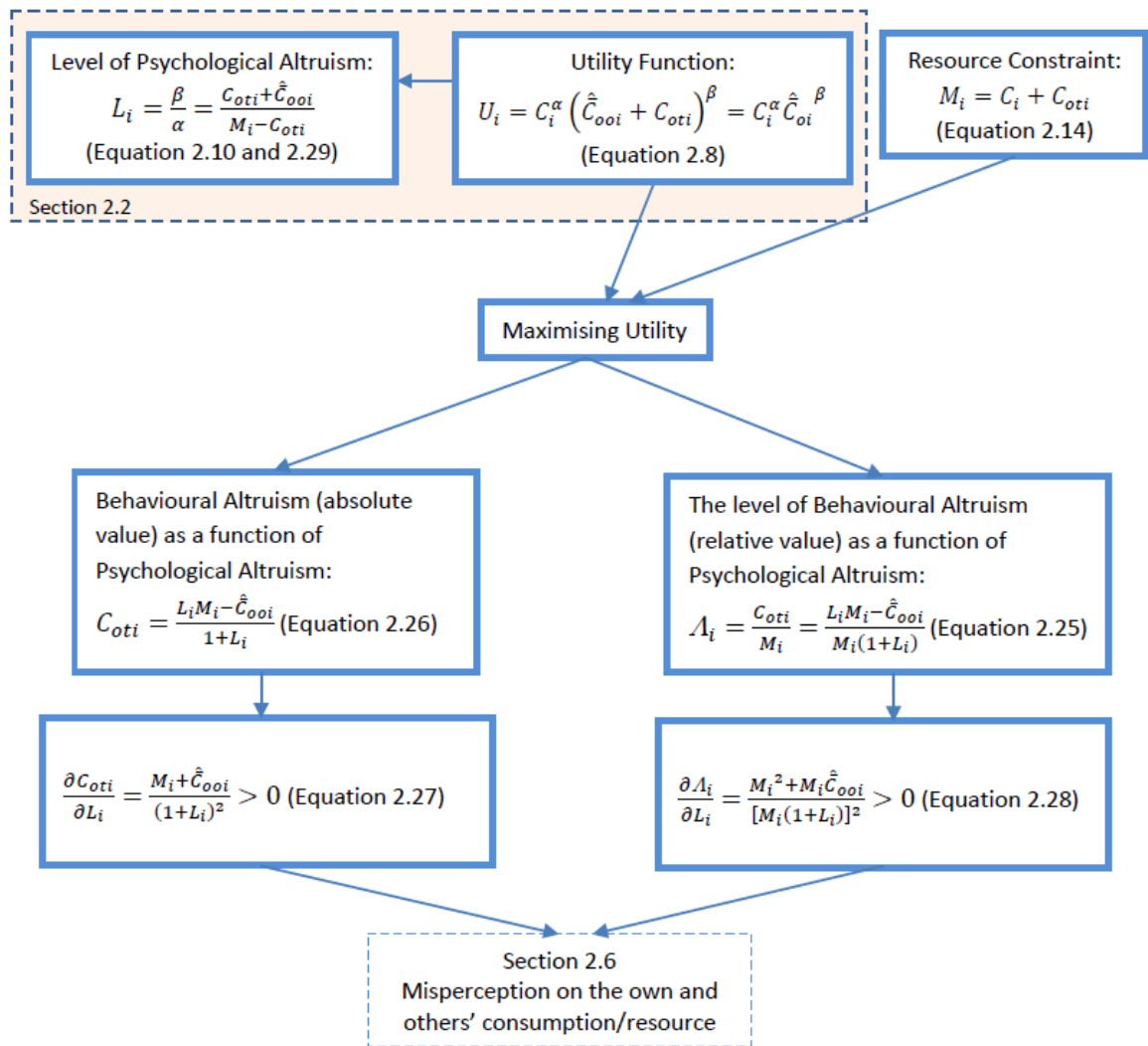


Figure 2.4: The Relationship between the Level of Psychological Altruism and Behavioural Altruism

and that, although s/he is psychologically as altruistic as individual 11, s/he can only give less to others.

However, the implication above does not suggest that the same level of psychological altruism means the same level of own consumption. For instance, although individuals 1, 2, and 3 have the same value of own consumption (\$17,000), they have different levels of psychological altruism. Although individual 3 has higher resources than individual 1, s/he is willing to sacrifice 50% of her or his resources for others because s/he is psychologically more altruistic than either individual 2 or 1. The same kind of example can be obtained from comparing individuals 4, 5, and 6, as well as 7, 8, and 9. Additionally, individual 11's consumption is far above individual 3 (\$86,452 >

\$17,000), yet they have the same level of psychological altruism, the reason being that individual 11 gives more than does individual 3.

Table 2.6: Numerical Example for Altruism Measurement

Individual	Resources (M_i)	Transfer (C_{oti})	<u>Transfer</u> Resources ($\frac{C_{oti}}{M_i}$)	Consumption ($C_i = M_i - C_{oti}$)	Consumption vs. Average Resources (C_i vs \bar{M})	Level of Altruism (L_i)
1	\$17,000	\$0	0%	\$17,000	$C_i < \bar{M}$	3.27
2	\$18,889	\$1,889	10%	\$17,000	$C_i < \bar{M}$	3.38
3	\$34,000	\$17,000	50%	\$17,000	$C_i < \bar{M}$	4.27
4	\$55,600	\$0	0%	\$55,600	$C_i = \bar{M}$	1
5	\$61,778	\$6,178	10%	\$55,600	$C_i = \bar{M}$	1.11
6	\$111,200	\$55,600	50%	\$55,600	$C_i = \bar{M}$	2
7	\$200,000	\$0	0%	\$200,000	$C_i > \bar{M}$	0.28
8	\$222,222	\$22,222	10%	\$200,000	$C_i > \bar{M}$	0.4
9	\$400,000	\$200,000	50%	\$200,000	$C_i > \bar{M}$	1.29
10	\$400,000	\$248,133	62%	\$151,867	$C_i > \bar{M}$	2
11	\$400,000	\$313,548	78%	\$86,452	$C_i > \bar{M}$	4.27

2.6. Further Application of the Imperfect Information Assumption

Relaxing the assumption that \hat{C}_{ooi} is equal to \bar{C}_{ooi} can expound the impact of an individual's misperception about others' consumptions on behavioural altruism. The above conclusion regarding the impact of an individual's resources was based on the assumption that there was no misperception on others' consumption. The perceived initial average consumption of others was assumed to be exactly equal to its actual value ($\hat{C}_{ooi} = \bar{C}_{ooi}$). To accommodate the possibility that the perceived value is not equal to the actual value ($\hat{C}_{ooi} \not\equiv \bar{C}_{ooi}$), the perceived initial average consumption of others can be written as

$$\hat{C}_{ooi} = \bar{C}_{ooi} + \hat{C}_{ooi}^{\varepsilon} \quad (2.30)$$

or

$$\hat{C}_{ooi}^{\varepsilon} = \hat{C}_{ooi} - \bar{C}_{ooi}$$

where $\hat{\bar{C}}_{ooi}^\varepsilon$ is the misperception on the initial average consumption of others such that $\hat{\bar{C}}_{ooi}^\varepsilon \leq 0$. Substituting equation (2.30) into equation (2.26), the transfer to others can be rewritten as

$$C_{oti} = \frac{L_i M_i - (\bar{C}_{ooi} + \hat{\bar{C}}_{ooi}^\varepsilon)}{1 + L_i} \quad (2.31)$$

and the derivative of transfer to others with respect to the misperception is

$$\frac{\partial C_{oti}}{\partial \hat{\bar{C}}_{ooi}^\varepsilon} = -\frac{1}{1 + L_i} < 0$$

The higher the misperception (or the higher the perceived initial average consumption of others above its actual value), the lower the transfer to others from an individual.

Further, the assumption of imperfect information is also applied to an individual's own resources in equation (2.26). As previously described, the resources of an individual (M_i) consist of natural, physical, human, and financial resources. In general, natural, physical, and financial resources are easily measured and quantified by any individual. It is easy to know the area of land, what and how many machines, and how much money owned by an individual is in banks. However, to some extent, uncertainty can also exist regarding the value of these resources. To measure accurately the economic value of assets requires sufficient information about the attributes of the assets. A lack of information about the attributes can lead to a miscalculation of the asset's value. However, having sufficient information alone does not necessarily mean that its accurate economic value can be obtained. This is because calculating the economic value can also involve sophisticated valuation methods and comprehension of some theoretical terms such as benefit–cost analysis, marketed and non-marketed goods, contingent valuation, and intangible assets (see for example Kopp & Pease, 1997; Buigues, Jacquemin, & Marchipont, 2000; Bateman, et al., 2002; and Haab & McConnell, 2002).

The difficulty in measuring resources is even greater in regard to human capital. Human capital can be measured by the time or hours of employment. However, the

potential marginal quantity and quality of outputs that can be produced by each hour of labour is unlikely to be recognised by any individual. Indeed, information on the degree of education acquired, medical records, and work experience can be accessed, yet the potential marginal product of those indicators very much depend on each individual's self-perception. Persons with the same educational and health backgrounds can perceive themselves as differently in different situations and times. The difficulty in measuring the value of human resources lies especially on adjusting labour input for quality (Jeong, 2002). Technically, this subjectivity in perceiving one's own human resource as well as other resources makes the information on the actual resources of an individual (M_i) almost impossible to be obtained. What can be revealed then is only the perceived resources (\hat{M}_i) which consists of the measurable resources (mostly natural, physical, and financial resources M_{mi}) and the perceived non-measurable resources (mostly human resources \hat{M}_{ni}). The perceived resources of individual i can thus be expressed as

$$\hat{M}_i = M_{mi} + \hat{M}_{ni} \quad (2.32)$$

Replacing M_i with \hat{M}_i in equation (2.29) and (2.26) yields

$$L_i = \frac{\beta}{\alpha} = \frac{C_{oti} + \hat{\bar{C}}_{ooi}}{\hat{M}_i - C_{oti}} \quad (2.33)$$

and

$$C_{oti} = \frac{L_i \hat{M}_i - \hat{\bar{C}}_{ooi}}{1 + L_i} = \frac{L_i (M_i + \hat{M}_i^\varepsilon) - (\bar{C}_{ooi} + \hat{\bar{C}}_{ooi}^\varepsilon)}{1 + L_i} \quad (2.34)$$

where

$$\frac{\partial C_{oti}}{\partial \hat{M}_i^\varepsilon} = \frac{L_i}{1 + L_i} \text{ and } \frac{\partial C_{oti}}{\partial \hat{\bar{C}}_{ooi}^\varepsilon} = -\frac{1}{1 + L_i} \quad (2.35)$$

The perceived own resources (\hat{M}_i) in equation (2.33) and (2.34) is equal to the actual own resources with certain misperception or

$$\hat{M}_i = M_i + \hat{M}_i^\varepsilon \quad (2.36)$$

where \hat{M}_i^ε is the misperception of own resources or $\hat{M}_i^\varepsilon = \hat{M}_i - M_i$.

The imperfect information assumption has thus been completely applied in equation (2.33) and (2.34). An individual does not only face difficulty in knowing others' resources but also her or his own. In order to distinguish this assumption from the previously applied assumption, hereafter this later assumption is referred to as the *double-sided imperfect-information* assumption. Meanwhile, the *single-sided imperfect information* assumption equation has been applied in (2.26) and (2.29). On one hand, these equations assume that information on own resources is accessible. On the other hand, others' resources are not perfectly known. Each individual faces asymmetric information that implies 'I know exactly what I have but I am not sure about what others have.' In contrast, the *double-sided imperfect-information* assumption implies 'I do not even know exactly what I have, how can I know about others?' The summary regarding the impact of an individual's misperception on others' consumptions towards behavioural altruism is presented in Proposition 2.2 and in Figure 2.5.

PROPOSITION 2.2.

Nominal behavioural altruism (C_{oti}) is negatively influenced by the misperception regarding the initial average consumption of others ($\hat{\bar{C}}_{ooi} - \bar{C}_{ooi}$) and positively influenced by the misperception regarding own resources ($\hat{M}_i - M_i$) when

- (1) an individual is psychologically altruistic to other members of a society, and thus faces imperfect information regarding the consumption of others;*
- (2) this individual also faces imperfect information regarding own resources;*
- (3) this individual's level of psychological altruism is greater than zero; and*
- (4) impure altruism is excluded from the definition of altruism.*

2.7. Other Factors Influencing Altruistic Behaviour

In psychology, biology, and economics literature, there are many other factors that influence behavioural altruism. Those factors include resources, age, information, relatedness, gratitude, good mood, gene, bystander, disaster, norm, model, and gender (Douty, 1972; Kenneth, 1980a, b; Piliavin & Charng, 1990; Andreoni & Vesterlund, 2001; McCullough, Emmons, & Tsang, 2002; Bartlett & DeSteno, 2006; Fountaine, 2007; and DeSteno *et al.*, 2010). How these factors influence altruistic behaviour can now be explained using equation (2.34). The explanation is made by considering the possible effect of each factor on L_i , M_i , \hat{M}_i , \bar{C}_{ooi} and \hat{C}_{ooi} . In general, the way all of those factors influence altruistic behaviour are summarised in Figure 2.6.

2.7.1. Resources factor

Other things held constant, resources owned by an individual increases the transfer to others (Piliavin & Charng, 1990). Table 2.6 demonstrates how an increase in actual resources as compared to the perceived consumption of others causes an increase in the transfer to others. Individual 10, for example, has the same level of psychological altruism as individual 6, but because individual 10 is much richer, the transfer to others is \$248,133 while the transfer from individual 3 is only \$55,600. Individual 10 gives more than individual 6 not because s/he is psychologically more altruistic but rather because s/he has more abundant resources compared to his perceived consumption of others. A comparison between individual 11 and 3 provides the same example. Under the new formulation of transfer in equation (2.34), a similar relationship still holds true because what matters now is the perceived resources of an individual. The actual resources are part of the perceived ($\hat{M}_i = M_i + \hat{M}_i^\varepsilon$). From this equation, it is clear that $\frac{\partial C_{oti}}{\partial \hat{M}_i} = \frac{L_i}{1+L_i} > 0$ (provided $L_i > 0$). The higher the perceived resources (measurable and non-measurable) owned by an individual, the greater the resources given to others.

The perceived resources owned by an individual can also be related to gratitude as another factor which influences altruistic behaviour. An individual that perceives her or himself as having greater \hat{M}_i means that s/he positions herself as a relatively richer person. This perception is mainly caused by an inability to acquire actual information. As described before, only a fraction of the resources owned by an individual is measurable.

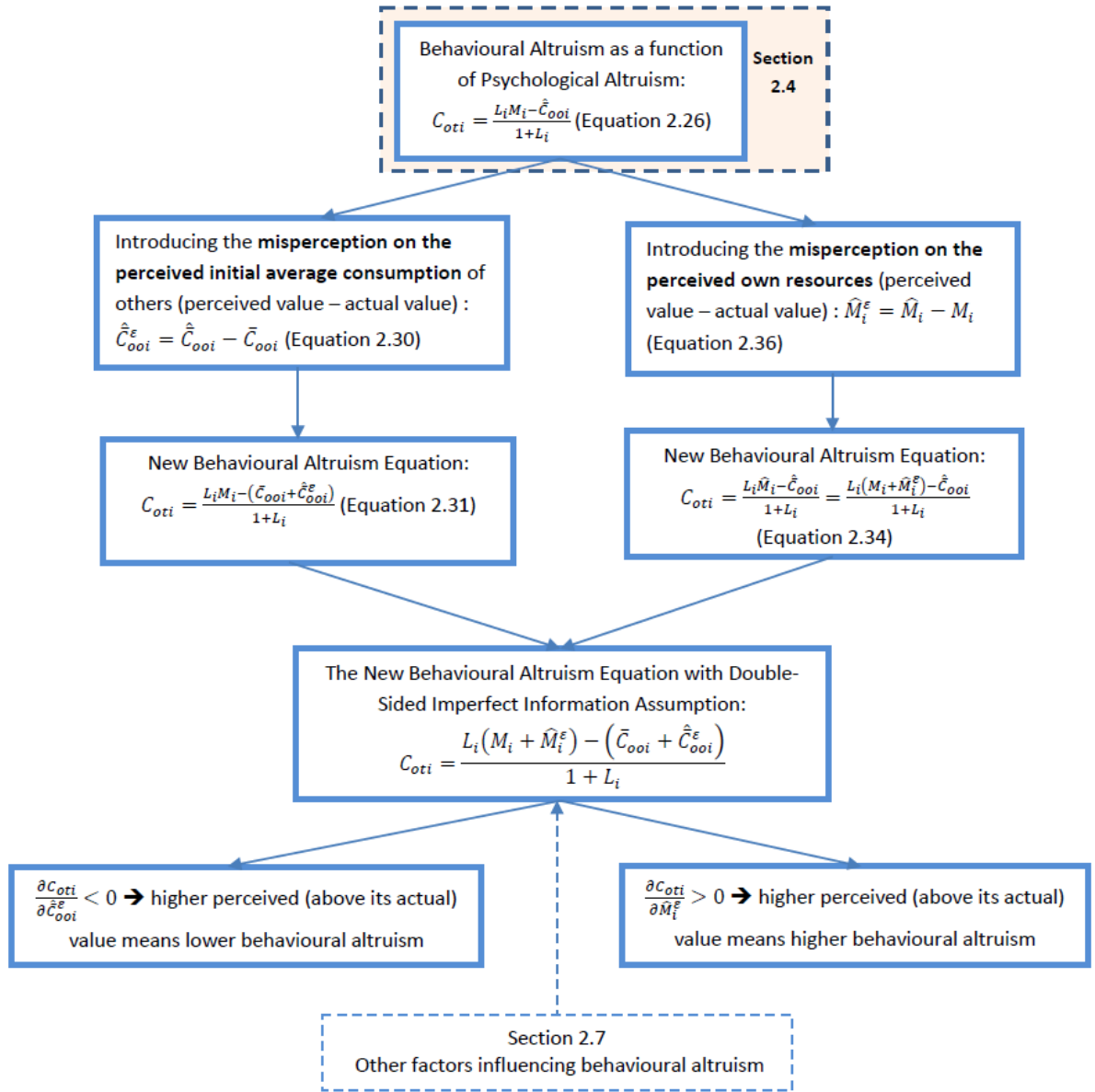


Figure 2.5: The Double-Sided Imperfect Information Assumption Model

Nevertheless, wherever an information gap exists, the gap will be filled with values. Beliefs are then required to confirm the values to be accepted by individuals. In short, culture modifies that which will fill the information gap (Casson & Godley, 2000). Because social interaction is the instrument of culture, the type of social interaction experienced by an individual can influence how high this perception on her or his own resources. Certain types of social interaction (such as religious groups, occupancy, and neighbourhoods) can lead a person to values and beliefs which direct one's perception about her or his own resources. Grateful feelings or values of gratitude of what (resources or consumption) has been received can create a feeling of abundance. The greater the

gratitude, the higher the own resources will be perceived, and, of course, vice versa. This feeling about the level of recognition of what has been received is the general definition of gratitude in psychological parlance (Emmons, 2004). Further, tendencies to experience positive emotions and subjective well-being are the implications of grateful people (McCullough, Emmons, & Tsang, 2002). In empirical studies, gratitude can be measured using self-expressions and questions to reveal a subject's general positivity or happiness such as 'I feel thankful for what I have received in life'; 'I sometimes feel grateful for the smallest things'; 'How happy do you feel?'; 'How amused do you feel?'; and 'How grateful do you feel toward the other participant?' (McCullough, Emmons, & Tsang, 2002; Bartlett & DeSteno, 2006; and DeSteno *et al.*, 2010). Considering that $\frac{\partial C_{oti}}{\partial \hat{M}_i} > 0$ (provided $L_i > 0$), the higher the level of gratitude, other things held constant, the greater the resources given to others from an individual.

2.7.2. Age factor

In development psychology, one's level of altruism increases from infancy to young adulthood and then peaks at middle adulthood, 34 to 60 years of age (Erikson, 1978; 1997; and Newman & Newman, 2006). Because the psychological development from young to old age is correlated with an increase in psychological altruism (L_i), the transfer to others also grows with this pattern as $\frac{\partial C_{oti}}{\partial L_i} = \frac{\hat{M}_i}{1+L_i} > 0$. Infancy and younger age can also be characterised as the time when an individual's resources have not been developed as much as in older age-groups. As age increases, the capability to accumulate resources also increases and of course this capability can peak before a person reaches very old age. This pattern on the accumulation of the resources of an individual is also in line with perceived own resources. Since $\frac{\partial C_{oti}}{\partial \hat{M}_i} > 0$ (provided $L_i > 0$), the transfer behaviour also shows a similar pattern. In conclusion, age has a positive influence on the transfer to others through two channels; the level of altruism (L_i) and perceived own resources (\hat{M}_i).

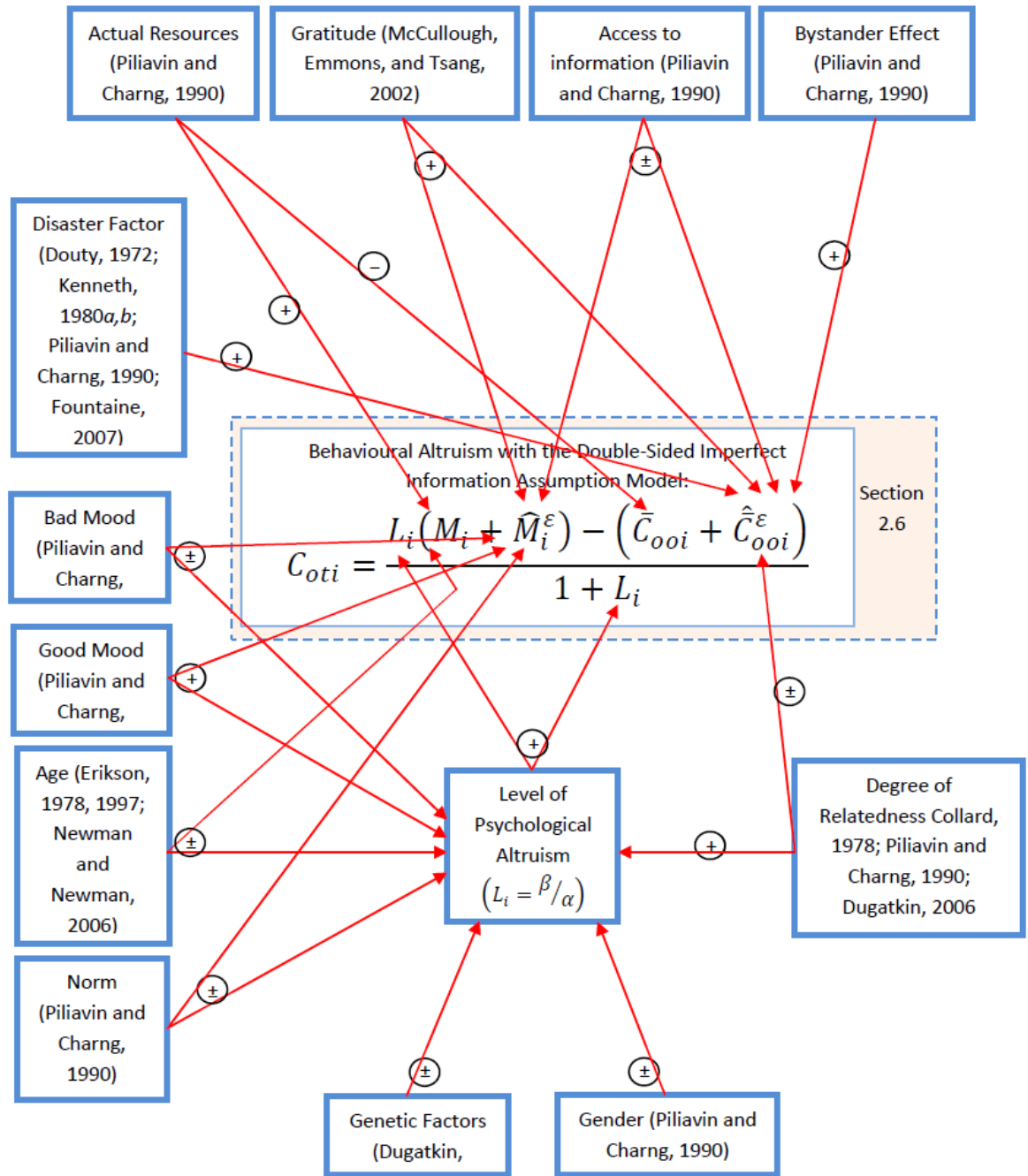


Figure 2.6: Factors Influencing Behavioural Altruism

2.7.3. Access to information factor

Access to information can influence transfer behaviour both via perceived own resources (\hat{M}_i) and misperception about the consumption of others ($\hat{\hat{C}}_{ooi}^\varepsilon$). Higher access to information has an ambiguous effect on \hat{M}_i . The direction of change in \hat{M}_i depends on previous information on an individual's measurable own resources (M_{mi}). If the previous

information on the measure of own resources is greater than the new measure of own resources after better information is obtained, then better information means lower M_{mi} . Lower M_{mi} causes a decrease in \hat{M}_i , and less transfer to others ($\frac{\partial C_{oti}}{\partial \hat{M}_i} > 0$, provided $L_i > 0$). Better information yields lower misperception of others' consumption. However, a similar ambiguous effect also happens in regard to the impact on perceived others' consumption. If previously $\hat{\bar{C}}_{ooi}^\varepsilon > 0$ or $\hat{\bar{C}}_{ooi} > \bar{C}_{ooi}$, better access to information causes \bar{C}_{ooi} to decline, and the opposite will happen if previously $\hat{\bar{C}}_{ooi}^\varepsilon < 0$ or $\hat{\bar{C}}_{ooi} < \bar{C}_{ooi}$. For instance, getting new information that someone has experienced a disaster causes the perceived consumption of others to decline. Despite the fact that it is clear that $\frac{\partial C_{oti}}{\partial \hat{\bar{C}}_{ooi}} = -\frac{1}{1+L_i} < 0$, this ambiguous relationship between access to information and $\hat{\bar{C}}_{ooi}$ means that better access to information can cause C_{oti} to either increase or decrease.

2.7.4. Degree of relatedness factor

There are two channels that show how the degree of relatedness can influence transfer to others. The first channel is the misperception about others' consumption. The degree of relatedness has a negative influence misperception on the perceived consumption of others. The closer the relationship between two individuals, the lower the misperception. As has been discussed in the access to information factor above, better access to information causes \bar{C}_{ooi} to either increase or decrease. Thus, through this channel, the degree of relatedness has an ambiguous impact on the transfer to others.

The second channel is psychological altruism. The level of altruism is likely to be higher among small groups of people, where higher degrees of relatedness are possible, than in larger populations where social interaction is less intensive (Collard, 1978; Piliavin & Charng, 1990; and Dugatkin, 2006). Since the level of psychological altruism has a positive impact on altruistic behaviour ($\frac{\partial C_{oti}}{\partial L_i} > 0$), through this second channel, relatedness increases transfer to others. Therefore, the second channel can have the opposite tendency compared to the first when $\hat{\bar{C}}_{ooi}^\varepsilon < 0$ or $\hat{\bar{C}}_{ooi} < \bar{C}_{ooi}$. Hence, in this situation, the net effect of the degree of relatedness depends on the relative magnitude

of the first channel compared to the second. However, when $\hat{\bar{C}}_{ooi}^{\varepsilon} > 0$ or $\hat{\bar{C}}_{ooi} > \bar{C}_{ooi}$, the first and the second channels will reinforce each other.

2.7.5. Mood factor

Piliavin & Charng (1990) mention that altruistic behaviour is also positively influenced by 'good mood', but 'bad mood' has an ambiguous effect on giving. Bad mood sometimes causes someone to give more but at other times the opposite behaviour occurs. When in a good mood, a person can perceive things positively. Therefore, good mood can increase both the psychological altruism and the perceived own resources. When good mood increases psychological altruism, the altruistic behaviour will increase too (because $\frac{\partial C_{oti}}{\partial L_i} > 0$). Moreover, the possible increase in perceived own resources caused by perceiving things positively also causes more giving. As a result, the total effect on transfer behaviour from an increase in the level of psychological altruism is strengthened by the effect of more highly perceived own resources. In short, good mood has a positive impact on the transfer to others.

2.7.6. Genetic factors

Genetic factors which favour psychological altruism increase the chances of an individual indulging in altruistic behaviour. Because genetically altruistic individuals are basically psychologically altruistic, these individuals are more likely to transfer resources to others $\frac{\partial C_{oti}}{\partial L_i} > 0$. At one time evolutionary biologists were puzzled by the contradiction between the survival of the fittest theorem and the facts that some behaviourally altruistic individuals could actually survive in certain species. The social life in bee hives is among the most discussed examples of this notion. Despite the fact that worker bees often sacrificed their lives for the queen, this class of bee had always survived to the next generations. The puzzle was finally solved after realising that, by sacrificing their lives, worker bees increased the well-being of others, including the queen, who had the ability to reproduce genetically similar altruistic individuals in the future. The altruistic behaviour of the worker bees enhanced the inclusive fitness of the society in the bee hive so that the altruistic genes are inherited by the next generations (Dugatkin, 2006).

2.7.7. Bystander-effect factor

One of the well-known factors in psychology which also influences altruistic behaviour is the bystander effect. The existence of bystanders in the vicinity of someone who is desperate for help can hinder an individual from providing help to the victim¹⁹. This individual is tempted to rely on the bystanders to provide assistance. The possibility that the victim might have been helped by others increases the perceived well-being of the victim. In equation (2.34), the existence of bystanders increases the perceived resources of others (\hat{C}_{ooi}). As a result, the existence of bystanders makes the transfer to others decline because $\frac{\partial C_{oti}}{\partial \hat{C}_{ooi}} < 0$.

2.7.8. Disaster factor

Many theoretical and empirical studies show a correlation between benevolent behaviour and some kinds of disaster (Douty, 1972; Kenneth, 1980a, b; Piliavin & Charng, 1990; and Fountaine, 2007). Higher-helping individuals are found in societies that have experienced circumstances of disaster. In general, being informed that others are experiencing a disaster causes an individual to lower her or his perceived consumption of others²⁰. Since the derivative of transfer to others with respect to the perceived consumption of others is negative ($\frac{\partial C_{oti}}{\partial \hat{C}_{ooi}} < 0$), the transfer to others increases as a response to the knowledge that others are experiencing a disaster.

2.7.9. Norm factor

Norm, as an informal institution, and the existence of role models that support altruism, increases altruistic behaviour²¹. Social norms or implicit social contracts can increase the willingness to consider others and the sense of obligation to help. Generosity

¹⁹ Government spending can also create a bystander effect for private contributions to charity (Garrett & Rhine, 2010).

²⁰ For example, Wolff, Spilerman, & Attias-Donfunt (2007) find that children in poor circumstances are more likely to receive transfers from their parents.

²¹ Norms also impose internal constraints that individuals do not behave opportunistically (Buchanan, 1994).

can be learned from observing others conducting the same behaviour. In short, psychological altruism (L_i) and the way people perceive the potential of their own resources (\hat{M}_i) can be influenced by norms and role models. Hence, the higher the capability of norms and models increase psychological altruism and perceived own resources, the greater the altruistic behaviour ($\frac{\partial C_{oti}}{\partial L_i} > 0$ and $\frac{\partial C_{oti}}{\partial \hat{M}_i} > 0$).

2.7.10. Gender factor

Both empirical and theoretical studies provide support for the influence of gender in psychological altruism. For example, Fox, Gibbs, & Aurbach (1985) and Piliavin & Charng (1990) provide empirical studies on the differences between men and women in showing empathy and altruism, while Eswaran & Kotwal (2004) offer a theory on the role of gender in parental altruism.

2.8. Altruism and Public Goods

Instead of explicitly separating consumption into private and public goods as applied in Margolis (1982) or Andreoni (1990), the model in this study treats public goods implicitly as one of the sources of goods and services available for individuals. Both C_i and C_{oi} in equation (2.8) consist of the consumption of privately and publicly provided goods and services, so that

$$\begin{aligned} C_i &= C_{ipv} + C_{ipb} \\ C_{oi} &= C_{oipv} + C_{oipb} \end{aligned}$$

where C_{ipv} is individual i 's own consumption of privately provided goods and services, C_{ipb} is individual i 's own consumption of publicly provided goods and services, C_{oipv} is others' consumption of privately provided goods and services, and C_{oipb} is others' consumption of publicly provided goods and services.

The implicit inclusion of public goods is also applied to the resources constraint of equation (2.14). The resources available to individual i (M_i) comes from two sources, i.e. individual i and the public. The resources provided by the public are principally the

resources generated by others in individual i 's society that are accessible to this individual. Thus,

$$M_{ipv} + M_{ipb} = M_i = C_i + C_{oti}$$

where M_{ipv} is the resources self-provided by individual i , and M_{ipb} is the resources provided by others which are accessible to individual i .

Preventing explicit separation between private and public goods gives an advantage of conforming to the fact that pure private and pure public goods are rare in reality. Another advantage of this model is that only pure altruism is dealt with throughout the following equations because transfer is not treated separately as an independent variable but rather is included in the consumption of others. Impure altruistic usage of resources has already been included in C_i . Therefore, motives which can be categorised into this aspect of own consumption (C_i), includes transfer for the sake of warm-glow, transfer based on coercion (such as tax) in order to obtain freedom, and of course pure private consumption such as food and clothes for the individual her/himself.

Figure 2.7 gives detailed illustration of various goods utilised by an altruist. Individual i 's consumption comes from resources privately provided by individual i (Box 1) and from publicly provided resources that are accessible to this individual (Box 2). Because in general only a fraction of public goods available in a society is accessible to an individual, Box 1 or arrow 'a' is of course less than the total public goods produced in individual i 's society.

These resources are then consumed in such proportions as maximises this individual's utility. The first type of consumption is that of directly using the resources to fulfil individual i 's own need for goods and services (Box 4). Food, clothing, housing, entertainment, and education for individual i are among the examples of pure self/private consumption. This consumption is included as a certain proportion of C_i in equation (2.8). The second type of consumption is based purely on individual i 's altruism, so that part of this individual's resources is transferred to and then consumed by others (Box 3). In equation (2.8) this consumption appears as C_{oti} . By transferring resources to others, this individual sacrifices some of the resources' potential for own consumption,

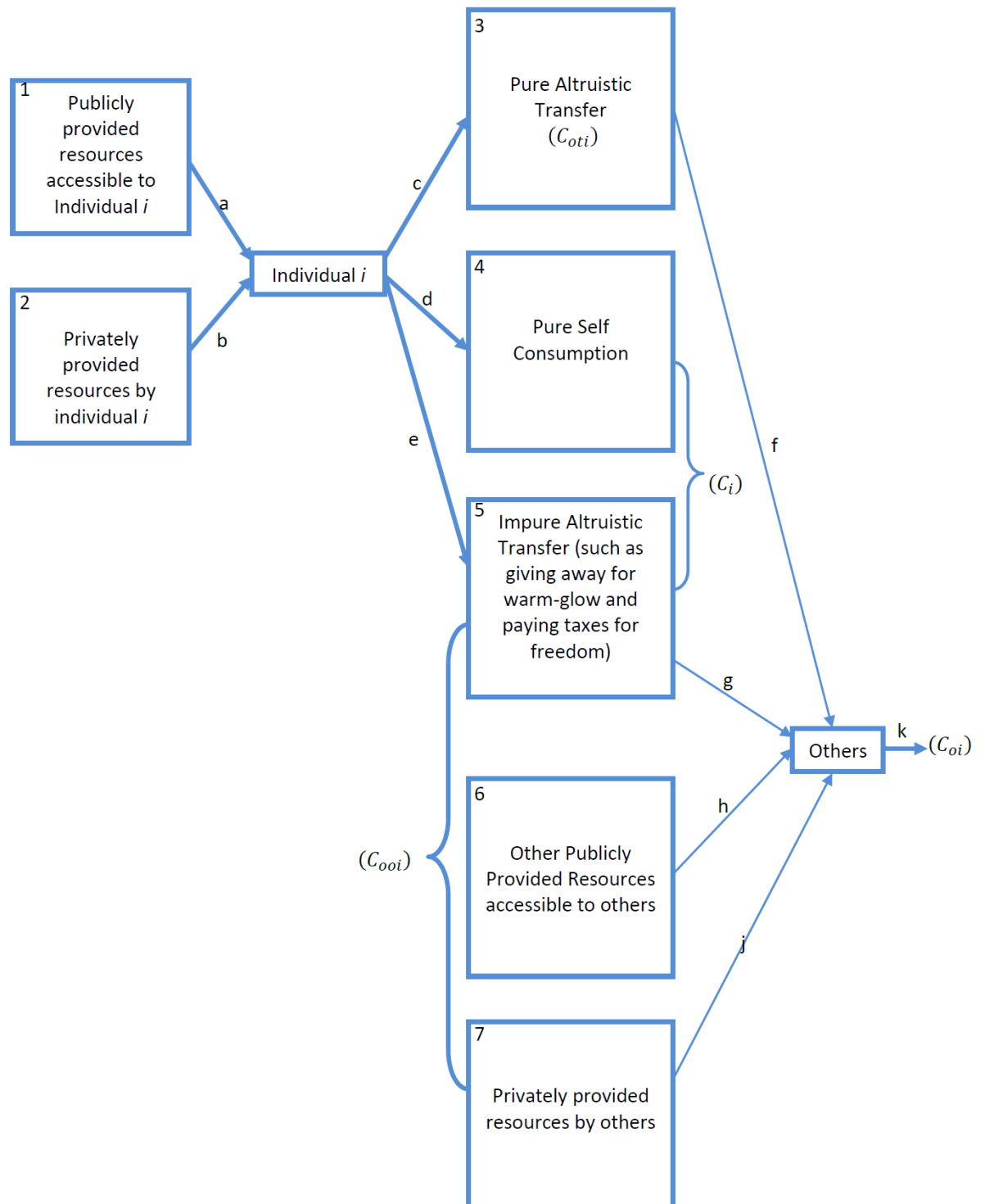


Figure 2.7: Consumption Decomposition of an Altruist

but at the same time additional utility is obtained. The third type of consumption also involves transferring resources to others yet it is not based on altruism (Box 5). This consumption could appear to be like altruistic behaviour but truly non-altruistic

motivation can induce this action. Giving away based on warm-glow or paying taxes to get freedom from being fined or pursued by the government are among the examples. This impure altruistic transfer (Box 5) and the pure self-consumption (Box 4) appear as C_i in equation (2.8).

Both pure altruistic transfer to others (Box 3) and impure altruistic transfer (Box 5) contribute to the total public goods available in the society²². Thus, the resources available for other people in the society (C_{oi}) consist of individual i 's pure altruistic transfer (Box 3), individual i 's impure altruistic transfer (Box 5), other publicly provided resources accessible to others (Box 6), and privately provided resources by others (Box 7). Therefore, without individual i 's pure altruistic transfer to others, the initial resources available to other people in the society (C_{ooi}) include individual i 's impure altruistic transfer (Box 5), other publicly provided resources accessible to others (Box 6), and privately provided resources by others (Box 7).

It is obvious then that impure altruistic transfer (Box 5) enters in the utility function (equation (2.8)), as an element of C_i . In fact, this impure altruistic transfer also contributes to C_{oi} . But because, in transferring these resources, this individual does not intend to increase others' well-being, of course this consumption is not perceived as increasing the well-being of others. This explains why impure altruistic transfer (Box 5) is consciously not included in C_{oti} of the model. Pure altruism assumption then can be kept in the model and, at the same time, perceived consumption of others in the model is consistent with the pure altruism assumption.

2.9. Conclusion

Contributions of this chapter to the literature have been generated by applying an imperfect information assumption to altruism models. Relaxing the assumption of perfect information enables the development of models that accommodate altruism beyond family boundaries. Further research on the role of altruism in well-being becomes possible because the relationship between altruism and transfer behaviour can now be precisely defined. When it is possible for an individual to be psychologically altruistic to other members of a society, this individual faces imperfect information regarding the

²² These two categories of transfers can be classified as the voluntary contributions for public goods in Sugden (1982, 1984).

consumption of others. Considering that some resources are not readily measurable, especially human resources, an individual also faces imperfect information regarding her or his own resources. Applying the imperfect information assumption allows an analysis to explain the relationship between psychological and behavioural altruism when altruism is not limited among nuclear family members only.

The main findings can be summarised as follows:

- The application of an imperfect information assumption regarding others' consumption in the altruism models implies that the models should apply goods altruism instead of participation altruism; commodity related altruism instead utility related altruism; the average instead of the total of others' consumption; and the perceived instead of the actual consumption by others.²³
- Psychological altruism can be defined as the relative importance of own consumption against others' consumption on an individual's utility function (equation (2.10)).
- The Cobb-Douglas utility function is less problematic as an altruism model when compared to the other two utility functions examined in this chapter (the linear and the CES-like utility functions).²⁴
- The level of psychological altruism has a positive influence on the transfer of resources from an individual to other members of the society. However, being psychologically altruistic alone does not guarantee that someone will perform altruistic behaviour, and likewise, demonstrating transfer to others is not always caused by a high level of psychological altruism. Only when the combination of levels of psychological altruism and resources ownership are sufficiently high can an individual reflect her or his altruism in transfer behaviour (equation (2.26)).
- Estimating the level of psychological altruism in an individual empirically is possible only when the data of the individual's perceived own resources, the transfer to others from this individual, and the perceived initial average consumption of other individuals in the society are accessible (equation (2.29)).

²³ See Figure 2.1 for the summary.

²⁴ See Table 2.2 for the summary.

- Behavioural altruism is negatively influenced by misperceptions regarding the initial average consumption of others and positively influenced by the misperception of own resources (equation (2.34)).
- The other factors in psychology, biology, and economics literature (age, information, relatedness, gratitude, good mood, gene, bystander, disaster, norm, model, and gender) influence altruistic behaviour can also be explained using the behavioural altruism model in this chapter (equation (2.34)).

This chapter has identified a utility function which is capable of explaining altruism beyond family boundaries. As a result, the relationship between psychological altruism and behavioural altruism becomes clear in the models. These models will serve as the foundation in Chapter 3 for explaining the role of altruism in social interaction, culture, and social capital.

CHAPTER 3. ALTRUISM, SOCIAL INTERACTION, CULTURE, AND SOCIAL CAPITAL

3.1. Introduction

We turn now to the next step in researching the role of altruism in well-being. This chapter explores the inter-relationships among altruism, social interaction, culture, and social capital²⁴. The mathematical equations developed for psychological and behavioural altruism in Chapter 2 serve as the foundation for the models. While in Chapter 2 the level of altruism, both psychological and behavioural, was mainly discussed in relation to each individual of a society, this chapter enhances the discussion to the societal level. Arriving at this point of view is a consequence of searching the role of altruism in culture and social capital. Defining culture in this study as the shared values and beliefs of a society (Casson & Godley, 2000) brings a focus on the general level of altruism in a society rather than on an individual level of altruism. The role of altruism in social capital or on the internal social and cultural coherence of a society (Hoff & Stiglitz, 2001; Meier, 2001; and Collier, 2002) can then also be made clear. Chapter 5 will use the findings from this chapter to further study how altruism influences well-being through institution.

Section 3.2 starts the discussion by exploring the relationship between psychological altruism and social interaction. This relationship is an important one in the models because culture, social capital, and institution cannot exist without social interaction. As social interaction enables individuals from different backgrounds to form a society, Section 3.3 provides the rationale for assuming a society has different levels of psychological altruism. This assumption is placed in contrast to one of self-interest in the society. Section 3.4 demonstrates that cultural processes allow the level of psychological altruism to flow to some extent from the leaders to the other members of a society. Section 3.5 describes how the results of cultural processes discussed in the previous section affect social capital. In the final section of the chapter, the models show the

²⁴ An earlier version of this chapter was included in a paper presented at the Happiness Economics and Interpersonal Relations (HEIRS) Public Happiness 2013 conference in Rome, Italy.

relationships among psychological altruism, social interaction, culture, and social capital. These relationships are useful in an explanation of the role of altruism in multidimensional well-being as discussed further in Chapter 4 and 5.

3.2. Altruism and Social Interaction

3.2.1. The importance of social interaction

Social interaction is an integral part of culture and social capital (Hoff & Stiglitz, 2001; Meier, 2001; and Collier, 2002), for without social interaction both do not exist. Through social interaction, both culture and social capital are capable of transforming and augmenting the altruism within a society to influence well-being. When culture is defined as shared values and beliefs, and social capital is defined as the coherence of a society, one individual alone cannot form either a culture or social capital. A similar situation exists when there is a group of individuals with no interactions at all among them. At least two prerequisites are necessary for culture and social capital to exist; more than one individual and social interaction. There are two types of social interaction; one-way and reciprocal interaction (Collier, 2002). One-way interaction occurs when an individual observes the behaviours of others, so one-way interaction can also be regarded as 'observation'. In contrast, the second type, reciprocal interaction, only occurs where a network and/or organisation exist and as a consequence at least two individuals are involved in a communication.

The utility function developed in Chapter 2 considers the importance of social interaction in altruism. Becker (1974) and Fountaine (2007) both show a utility function that can explain altruism with the 'social interaction approach'. In the 'usual theory of consumer choice', the utility of an altruist is a function of an individual's own consumption and the transfer given to others ($U_i = U_i(C_i, C_{oti})$). With the 'social interaction approach', the transfer given to others is replaced by the consumption by others ($U_i = U_i(C_i, C_{oi})$). The consumption by others consists of the initial consumption and the transfer given by the altruist to others ($U_i = U_i(C_i, C_{ooi} + C_{oti})$). In Andreoni (1990), pure altruism also requires the same type of utility function. The utility function developed in Chapter 2 ($U_i = C_i^\alpha (\hat{C}_{ooi} + C_{oti})^\beta = C_i^\alpha \hat{C}_{oi}^\beta$) follows exactly the same

type of utility function as suggested by the ‘social interaction approach’ in Becker (1974) and Fountaine (2007). Thus, both social interaction and pure altruism have been included in the utility function chosen in this study.

3.2.2. The level of psychological altruism in a society before social interaction

The relationship between altruism and social interaction is construed in the following example of a society of only three people. Based on equation (2.8), the utility function of each member of this society can be written as

$$\begin{aligned} U_1 &= C_1^{\alpha_1} \left(\hat{C}_{oo1} + C_{ot1} \right)^{\beta_1} \\ U_2 &= C_2^{\alpha_2} \left(\hat{C}_{oo2} + C_{ot2} \right)^{\beta_2} \\ U_3 &= C_3^{\alpha_3} \left(\hat{C}_{oo3} + C_{ot3} \right)^{\beta_3} \end{aligned} \quad (3.1)$$

Where U_1 is the utility of individual 1, C_1 is the consumption of goods and services by individual 1, α_1 is individual 1's utility elasticity with respect to own consumption, \hat{C}_{oo1} is the initial average consumption of other members of the society perceived by individual 1, C_{ot1} is the transfer of resources from individual 1 to others, and β_1 is individual 1's utility elasticity with respect to the perceived consumption of others. The corresponding level of psychological altruism of each member of the society is thus

$$L_1 = \frac{\beta_1}{\alpha_1}; L_2 = \frac{\beta_2}{\alpha_2}; L_3 = \frac{\beta_3}{\alpha_3} \quad (3.2)$$

These levels of psychological altruism are determined by internal factors, including genetic factors, and external factors from previous social interactions (Piliavin & Charng, 1990). The current level of psychological altruism is determined by previous social interaction, the next level of psychological altruism is then formed by the next social interaction, and so on. By assuming that every individual has a unique combination of internal and external factors, the level of psychological altruism of each individual is also unique in that

$$L_1 \neq L_2 \neq L_3 \quad (3.3)$$

it is then assumed in this example that

$$L_1 > L_2 > L_3 \quad (3.4)$$

Before the next social interaction, the general level of psychological altruism in the society as a whole can be expressed as a simple average of members of the society, that

$$L_s = \frac{\sum_{i=1}^{n(=3)} L_i}{n(=3)} \quad (3.5)$$

where L_s is the general or average level of psychological altruism in the society before social interaction. When, for example, $L_1 = 0.9$, $L_2 = 0.5$, and $L_3 = 0.1$, then $L_s = 0.5$, the level of psychological altruism in the society is only a rough description of the existence of psychological altruism within it, but the actual level of psychological altruism in each member remains constant; individual 1 is fixed with the highest level of 0.9, individual 2 with 0.5 level, and individual 3 remains the lowest.

3.2.3. The motives for social interaction

Social interaction as a human being's activity, may be conducted either consciously or unconsciously. Assuming that social interaction is intentionally done and considering that being involved in social interaction needs resources (at least the opportunity cost of limited time), social interaction must be effected for a reason or for some benefit expected to be gained after the interaction.

A society in which people have different levels of well-being, engagement in social interaction can be motivated subject to their relative well-being position in the society. People below the average level of well-being have motives that could be different from

those whose levels of well-being are higher than the average, and people with an average level of well-being may have different motives again.

People with high levels of psychological altruism and abundant resources

For people with relatively high levels of psychological altruism, especially when coincidentally they also live with more resources than the average people in their society, their involvement in social interaction is more likely induced by their motivation to transfer resources to others as the outcome of their psychological altruism. This is not to say that motivation to transfer resources to others is the only possible reason, or to overrule the possibility of the opposite direction of transfer as the motivation, rather this kind of person – altruistic and also rich – does not tend to expect direct material benefit from social interaction. An exception is of course easily found in altruistic and also rich people whose business or work depends on social interaction (sales agent, merchant, etc.).

As illustrated in Tables 2.3, 2.4, and 2.5 at the same level of psychological altruism people with relatively higher levels of economic well-being than those of other members of a society, demonstrate a stronger intention to transfer resources to other people. They consciously get involved in social interactions, such as networks or organisations, because they see opportunities to transfer some of their resources to other members with lower levels of well-being. Giving cannot be done without social interaction. By helping others, people with higher levels of well-being can increase their utility. Of course, this is not the only possible motive for giving, especially for people with low levels of psychological altruism or high levels of self-interest. Wealthier people with better education and information can also exercise power and subsequently gain some economic benefit by dominating an organisation or network. Running for positions as formal leaders of an organisation is one of the ways in which un-altruistic wealthier people transfer sources of well-being from other members to their own pockets.

People with low levels of psychological altruism who lack sufficient resources

Conversely, people with relatively low levels of psychological altruism, especially when coincidentally they have below average levels of resources, tend to engage in social interaction with the purpose of gaining an opportunity to be beneficiaries from a transfer of resources from others. Equation (2.26) explains this possibility of taking others'

resources to be one's own resources. Consequently, because these kinds of people expect a transfer of resources from others to them, they will not be interested in effecting social interaction if they think that others are not altruistic, *ceteris paribus*.

Therefore, the poor are more influenced by others' level of psychological altruism because poorer people want to transfer more resources from others for their own sake (clearer illustration is found in Tables 2.3, 2.4, and 2.5). Hence, with the same level of psychological altruism, accepting transfer from altruistic wealthier members of the interaction is a stronger motive for people below the average level of well-being to join in a social interaction. Implicitly, people with lower levels of well-being assume that there are some altruistic and wealthier people in the organisation or network. Without this knowledge, less-wealthy people will not be easily motivated to be involved in social interactions, because their time could be better spent producing additional sources of well-being.

This assumption about the general level of psychological altruism in a society comes from previous cultural processes. Social interaction (or the cultural process²⁵) that occurred previously gives information about the general level of psychological altruism among members of a society. The higher the perception about the level of psychological altruism, the higher the expectation of benefit from being involved in the social interaction.

However, someone that is poor but with a very high level of psychological altruism may join in a social interaction despite being unaware of any altruistic people in the society. This would explain the fact that there are many volunteers in pro-social activities (charity organisations, fire brigades, the Red Cross, etc.) who are poor people.

3.2.4. The importance of altruistic and non-altruistic factors in social interaction

In summary, when social interaction is done intentionally, there are three possible dominant motives which encourage an individual to interact with others: (1) an individual's level of psychological altruism; (2) the expected level of psychological altruism in other people; and (3) the individual's quantity of resources.

²⁵ Section 3.4 describes the 'cultural process' in detail.

Psychological altruism is not the only factor which induces social interaction. Non-altruistic factors can also motivate people to engage in social interaction. This can be either one's own level of psychological altruism or the expected level of others' psychological altruism. If one is altruistic, giving will be the motive. Conversely, if one is un-altruistic, receiving is more likely to be the motive for engaging in social interaction, so the expected level of others' psychological altruism is important. For that reason, an individual's involvement in social interaction is not solely induced by the level of psychological altruism; it is also motivated by the expected benefit. Someone whose level of psychological altruism is zero will still get involved in social interaction as long as non-altruistic factors – including the expected benefit from social interaction, the infrastructure for social interaction such as telecommunication and transportation facilities, as well as organisations and networks – are present.

In summary, focusing on social interaction which is induced by psychological altruism, the level of psychological altruism in the society determines the social interaction of all of the people in the society, or

$$SI_s = f(L_s) \quad (3.6)$$

where SI_s is the social interaction at society level. Because at the individual level, social interaction is influenced by one's own level of psychological altruism, the perceived level of psychological altruism in the society, the individual's resources, and others' initial resources so

$$SI_i = f(L_i, \hat{L}_{si}, M_i, C_{ooi}) \quad (3.7)$$

where SI_i is individual i 's level of social interaction, and \hat{L}_{si} is individual i 's expected level of psychological altruism of the society. If the cultural process enables perfect information in the society, then $\hat{L}_{si} = L_s$, but less than perfect information would make

$$\hat{L}_{si} = L_s + L_{si}^e \quad (3.8)$$

where L_{si}^e is individual i 's error in estimating society's level of psychological altruism caused by imperfect information and $L_{si}^e \neq 0$. Thus, $L_{si}^e > 0$ implies that $\hat{L}_{si} > L_s$, and $\hat{L}_{si} < L_s$ for $L_{si}^e < 0$.

3.2.5. The role of transfer in social interaction

In shaping social interaction as a function of the level of psychological altruism in the society in detail, M or the monetary value of resources in equation (2.14), needs to be re-clarified. As has been described earlier, resources consist of natural, physical, financial, and human resources. Natural and physical resources can also be labelled as in-kind resources. Many forms of money or other relatively liquid assets are classified as financial resources. Human resources, as discussed in Chapter 2, are related to the capacity of an individual to be involved in producing goods and services for consumption. Genetic factors, experience, and education are among the variables which influence this capacity. Knowledge and technology are inevitably included within those resources. Machines and people, for example, are not merely about quantity but also about quality. One unit of the latest new computer may be worth hundreds or even thousands of the old one. One well-educated and experienced manager can be relied on to manage a company to produce many more products than someone who is poorly educated and inexperienced. Better quality means higher productivity²⁶.

Thus, the transfer of resources from an individual to other members of the society can also be as one or more types of those resources, or

$$C_{oti} = C_{oti}^N + C_{oti}^P + C_{oti}^F + C_{oti}^H \quad (3.9)$$

where C_{oti}^N is the transfer of natural resources, C_{oti}^P is the transfer of physical resources, C_{oti}^F is the transfer of financial resources, and C_{oti}^H is the transfer of human resources from individual i . Therefore, behavioural altruism includes monetary transfer, in-kind transfer

²⁶ Time becomes more valuable for better quality resources. When these transfers are intended for social interaction, time plays a central role in non-price 'allocative-mechanisms' such as social interaction (Spence, 1973), because time is scarce and almost any activity takes time. Those resources can be measured according to their monetary value or opportunity cost. In equation (2.14), the opportunity cost of transfer to others is assumed to be uniformly equal to one.

(Bruce & Waldman, 1991), and also service offered voluntarily (Carpenter & Myers, 2010). Transferring resources to others means sacrificing the productive of capacity of those resources for the well-being of others.

Some of this transfer to others contributes one part of the resources devoted to social interaction. The sacrificing of valuable time from an individual to others does not always initiate social interaction. Voluntarily picking up fallen leaves lying on a park and then putting them into a rubbish bin is an example of rendering time for others, but without the presence of other individuals on site, social interaction is not created. Thus in this regard, transfer to others can be put into two classifications: devoted to social interaction and not-devoted to social interaction, or

$$C_{oti} = C_{oti}^{SI} + C_{oti}^{NSI} \quad (3.10)$$

where C_{oti}^{SI} is the transfer which initiates social interaction and C_{oti}^{NSI} the transfer that does not induce social interaction from individual i . When C_{oti}^{SI} is expressed as a proportion of C_{oti} , equation (3.10) can also be written as²⁷

$$g_i = \frac{C_{oti}^{SI}}{C_{oti}} = 1 - \frac{C_{oti}^{NSI}}{C_{oti}} \quad (3.11)$$

where g_i is the individual i 's proportion of resources transfer that supports social interaction.

3.2.6. The role of own consumption in social interaction

However, as has been discussed earlier, one's involvement in social interaction is not only motivated by an intention to increase others' well-being. Sometimes, social

²⁷ In equation (3.10): $C_{oti} = C_{oti}^{SI} + C_{oti}^{NSI}$, so

$$\frac{C_{oti}}{C_{oti}} = \frac{C_{oti}^{SI}}{C_{oti}} + \frac{C_{oti}^{NSI}}{C_{oti}}$$

$$\frac{C_{oti}^{SI}}{C_{oti}} = 1 - \frac{C_{oti}^{NSI}}{C_{oti}} = g_i$$

interaction is also intended for the sake of one's own well-being. Hence, there are two types of resources devoted to social interaction, from a certain fraction of resources for the transfer to others (C_{oti}) and a certain fraction of resources for one's own consumption (C_i). Hence, the resources for one's own consumption can also be classified into two types: one that is in favour of social interaction, and one that is not, or

$$C_i = C_i^{SI} + C_i^{NSI} \quad (3.12)$$

where C_i^{SI} are the resources for individual i 's own consumption which support social interaction, and C_i^{NSI} are the resources for own consumption which do not support social interaction. When C_i^{SI} is expressed as a proportion of C_i , equation (3.12) can also be written as²⁸

$$q_i = \frac{C_i^{SI}}{C_i} = 1 - \frac{C_i^{NSI}}{C_i} \quad (3.13)$$

where q_i is the individual i 's proportion of one's own consumption which supports social interaction.

3.2.7. Social interaction measured by the resources sacrificed

When social interaction is measured by the resources sacrificed, the identity of social interaction is thus²⁹

²⁸ In equation (3.12) $C_i = C_i^{SI} + C_i^{NSI}$, so

$$\frac{C_i}{C_i} = \frac{C_i^{SI}}{C_i} + \frac{C_i^{NSI}}{C_i}$$

$$\frac{C_i^{SI}}{C_i} = 1 - \frac{C_i^{NSI}}{C_i} = q_i$$

²⁹ Equation (3.14) can also be stated as $SI_i = C_i^{SI} + C_{oti}^{SI}$.

Substituting equation (3.10) and (3.12) for C_i^{SI} and C_{oti}^{SI} , social interaction identity becomes

$$\begin{aligned} SI_i &= C_i - C_i^{NSI} + C_{oti} - C_{oti}^{NSI} \\ &= M_i - C_i^{NSI} - C_{oti}^{NSI} \end{aligned}$$

or alternatively

$$\begin{aligned} SI_i &= q_i C_i + g_i C_{oti} = q_i (M_i - C_{oti}) + g_i C_{oti} \\ &= q_i M_i - q_i C_{oti} + g_i C_{oti} \\ &= q_i M_i + C_{oti} (g_i - q_i) \end{aligned}$$

$$SI_i = q_i C_i + g_i C_{oti} = q_i M_i + C_{oti}(g_i - q_i) \quad (3.14)$$

where q_i is the proportion of resources for individual i 's own consumption that support social interaction, and g_i is the proportion of resources transfer from individual i to others that supports social interaction. The average level of social interaction in a society can thus be formulated as

$$\bar{SI} = \frac{1}{n} \sum_{i=1}^n (q_i C_i + g_i C_{oti}) = \bar{q} \bar{C}_i + \bar{g} \bar{C}_{oti} = \bar{q} \bar{M} + \bar{C}_{oti}(\bar{g} - \bar{q}) \quad (3.15)$$

where \bar{q} is the average proportion of resources for own consumption that support social interaction, \bar{g} is the average proportion of resources transfer from each individual to others that supports social interaction, \bar{C} is the average own consumption ($\bar{C}_i = \frac{1}{n} \sum_{i=1}^n C_i$), and \bar{C}_{oti} is the average transfer of resources from each individual to others in the society ($\bar{C}_{oti} = \frac{1}{n} \sum_{i=1}^n C_{oti}$). Since by definition C_{oti} is based on altruism, whereas C_i is based on own interest, the proportion of C_{oti} which supports social interaction (g_i) will consequently be greater than the proportion of C_i which supports social interaction (q_i). Hence, $g_i > q_i$.

The influence of psychological altruism on social interaction can now be described. Substituting (2.26) into for C_{oti} (3.15) yields³⁰

$$\bar{SI} = \bar{q} \bar{C} + \bar{g} \frac{L_S \bar{M} - \hat{C}_{ooi}}{1 + L_S} = \bar{q} \bar{M} + \frac{L_S \bar{M} - \hat{C}_{ooi}}{1 + L_S} (\bar{g} - \bar{q}) \quad (3.16)$$

³⁰ In equation (3.15): $\bar{SI} = \bar{q} \bar{C}_i + \bar{g} \bar{C}_{oti} = \bar{q} \bar{M} + \bar{C}_{oti}(\bar{g} - \bar{q})$
 $= \bar{q} \bar{C}_i + \bar{g} \frac{1}{n} \sum_{i=1}^n C_{oti} = \bar{q} \bar{M} + \frac{1}{n} \sum_{i=1}^n C_{oti} (\bar{g} - \bar{q})$

Substituting equation (2.26) for C_{oti} creates

$$\begin{aligned} \bar{SI} &= \bar{q} \bar{C}_i + \bar{g} \frac{1}{n} \sum_{i=1}^n \frac{L_i M_i - \hat{C}_{ooi}}{1 + L_i} = \bar{q} \bar{M} + \frac{1}{n} \sum_{i=1}^n \frac{L_i M_i - \hat{C}_{ooi}}{1 + L_i} (\bar{g} - \bar{q}) \\ &= \bar{q} \bar{C}_i + \frac{L_S \bar{M} - \hat{C}_{ooi}}{1 + L_S} = \bar{q} \bar{M} + \frac{L_S \bar{M} - \hat{C}_{ooi}}{1 + L_S} (\bar{g} - \bar{q}) \end{aligned}$$

3.2.8. The role of external factors in social interaction

The main assumption behind the social interaction component in equations (3.15) and (3.16) is that social interaction is mainly determined by internal factors. This means that external factors are excluded from the equations. External factors are also important in creating interaction between this individual and other members of the society. The external factors are, for example, the existence of available organisations; road as a means of transportation for social interaction; any expected benefit from social interaction; and a telecommunications network. In brief, there is a fraction of social interaction that is induced by the altruist's own factors, while another fraction is shaped by external factors. These external factors can make the actual social interaction smaller or higher, or

$$SI_i = SI_{ia} + SI_{ie} = \left(q_i M_i + \frac{L_i M_i - \hat{C}_{ooi}}{1 + L_i} (g_i - q_i) \right) + SI_{ie} \quad (3.17)$$

and

$$\bar{SI} = \left(\bar{q} \bar{M} + \frac{L_S \bar{M} - \hat{C}_{ooi}}{1 + L_S} (\bar{g} - \bar{q}) \right) + \bar{SI}_e \quad (3.18)$$

where SI_{ie} is the social interaction of individual i which is induced by external factors, and \bar{SI}_e is the average social interaction in a society which is induced by external factors.

3.2.9. Summary

The derivative of average social interaction with respect to the average level of psychological altruism in the society is then³¹

³¹ In equation (3.18): $\bar{SI} = \bar{SI} = \left(\bar{q} \bar{M} + \frac{L_S \bar{M} - \hat{C}_{ooi}}{1 + L_S} (\bar{g} - \bar{q}) \right) + \bar{SI}_e$, so

$$\begin{aligned} \frac{\partial \bar{SI}}{\partial L_S} &= \frac{(\bar{M}(\bar{g} - \bar{q})(1 + L_S)) - ((\bar{g} - \bar{q})(L_S \bar{M} - \hat{C}_{ooi}))}{(1 + L_S)^2} \\ &= \frac{(\bar{g} \bar{M} - \bar{M} \bar{q})(1 + L_S) - (\bar{g} L_S \bar{M} - \hat{C}_{ooi} \bar{g} - L_S \bar{M} \bar{q} + \hat{C}_{ooi} \bar{q})}{(1 + L_S)^2} \\ &= \frac{\bar{g} \bar{M} + \bar{g} L_S \bar{M} - \bar{M} \bar{q} - L_S \bar{M} \bar{q} - \bar{g} L_S \bar{M} + \hat{C}_{ooi} \bar{g} + L_S \bar{M} \bar{q} - \hat{C}_{ooi} \bar{q}}{(1 + L_S)^2} \\ &= \frac{\bar{M}(\bar{g} - \bar{q}) + \hat{C}_{ooi}(\bar{g} - \bar{q})}{(1 + L_S)^2} \\ &= \frac{(\bar{M} + \hat{C}_{ooi})(\bar{g} - \bar{q})}{(1 + L_S)^2} > 0 \text{ provided } \bar{M} > 0, \hat{C}_{ooi} > 0, \text{ and } \bar{g} - \bar{q} > 0 \end{aligned}$$

$$\frac{\partial \bar{SI}}{\partial L_S} = \frac{(\bar{M} + \hat{C}_{ooi})(\bar{g} - \bar{q})}{(1 + L_S)^2} > 0 \text{ provided } \bar{M} > 0, \hat{C}_{ooi} > 0, \text{ and } \bar{g} - \bar{q} > 0 \quad (3.19)$$

An increase in the average level of psychological altruism in the society always creates a positive effect on social interaction. A summary of how the level of psychological altruism influences social interaction is presented in Proposition 3.1.

PROPOSITION 3.1.

The average level of psychological altruism in a society (L_S) has a positive influence on the average social interaction in the society (\bar{SI}) when

- (1) an individual is psychologically altruistic to other members of a society;*
- (2) impure altruism is excluded from the definition of altruism; and*
- (3) social interaction is measured by the quantity and quality of resources which support social interaction.*

The relationship between psychological altruism and social interaction as well as its importance for culture and social capital is summarised in Figure 3.1.

3.3. Self-interest versus Altruism Assumption

The self-interest assumption in neo-classical economics is problematic. Equations (2.8), (2.10), and (3.5) imply that the self-interest assumption means $U_i = f(C_i)$; $L_i = 0$; and $L_S = 0$ provided $\alpha = 1$ and $\beta = 0$. In the case of certain individuals, assuming $U_i = f(C_i)$ and $L_i = 0$ is acceptable. However, generalising this assumption into $L_S = 0$ would require the assumption that³² $L_1 = L_2 = L_3 = \dots = L_n = 0$ or $L_S = \frac{\sum_{i=1}^n L_i}{n} = 0$. The problem comes from these two requirements.

³² $(L_1 = L_2 = L_3 = \dots = L_n = 0) \vee \left(\frac{\sum_{i=1}^n L_i}{n} = 0 \right) \Rightarrow (L_S = 0)$.

The first alternative requirement is problematic because $L_1 = L_2 = L_3 = \dots = L_n = 0$ needs a society where the level of psychological altruism of its members is uniform and constant. This unvarying behavioural assumption can be easily rejected by an axiom that self-interest is not the only motive in human beings' behaviour (Nagel, 1970 and Simon, 1993); between the two extremes there must be an indefinite quantity of impure altruism (Collard, 1975); and altruism can prevail in an evolutionary environment (Bergstorm & Stark, 1993; Stark & Wang, 2004; and Kahana, 2005)³³. Nonetheless, much of the literature in philosophy, development psychology, and evolutionary biology supports the more likely axiom that one's level of psychological altruism can be different from that of another person or $\neg(L_1 = L_2 = L_3 = \dots = L_n)$.

The second alternative requirement is equally problematic. Unlike the first, this second requirement does not need $L_1 = L_2 = L_3 = \dots = L_n$. One's level of psychological altruism can be different from that of another person, but the average is always zero. When the level of psychological altruism of some members of a society may be higher than zero, and at the same time the average is assumed to be always zero, there must be at least one person in the society whose level of psychological altruism is less than zero³⁴. The problem arises as maintaining $L_s = 0$ constantly means every change of the level of psychological altruism in some members is always fully offset by the change in other members without a time lag. Because such a perfect offsetting mechanism is unlikely to be the case, assuming the average level of psychological altruism in a society to be always zero all the time is also problematic³⁵.

In contrast, assuming both the level of psychological altruism of an individual and of the society will vary is less problematic. One's level of psychological altruism is allowed to be different from another person's. At the same time, a change of the level of one individual does not necessarily need to be offset by the change of others. Moreover, the average level is permitted to vary. This assumption does not need to reject the possibility

³³ Empirical studies that support this axiom are, for example: Holmes (1990) shows that altruistic motivations influence political choices; Smith, Kehoe, & Cremer (1995) find that altruism is one of the motives in the private provision of public goods; and Frohlich, Oppenheimer & Moore (2001) show that dictator experiments may have led researchers to systematically overstate the role of self-interest in individuals' motivations.

³⁴ $(\sum_{i=m}^n L_i < 0) \Rightarrow (\sum_{i=1}^m L_i > 0) \wedge (L_s = \frac{\sum_{i=1}^n L_i}{n} = 0)$ provided $(m < n)$.

³⁵ $(\sum_{i=1}^n \Delta L_i = 0) \Rightarrow (\Delta L_s = 0)$ provided $\Delta n = 0$.

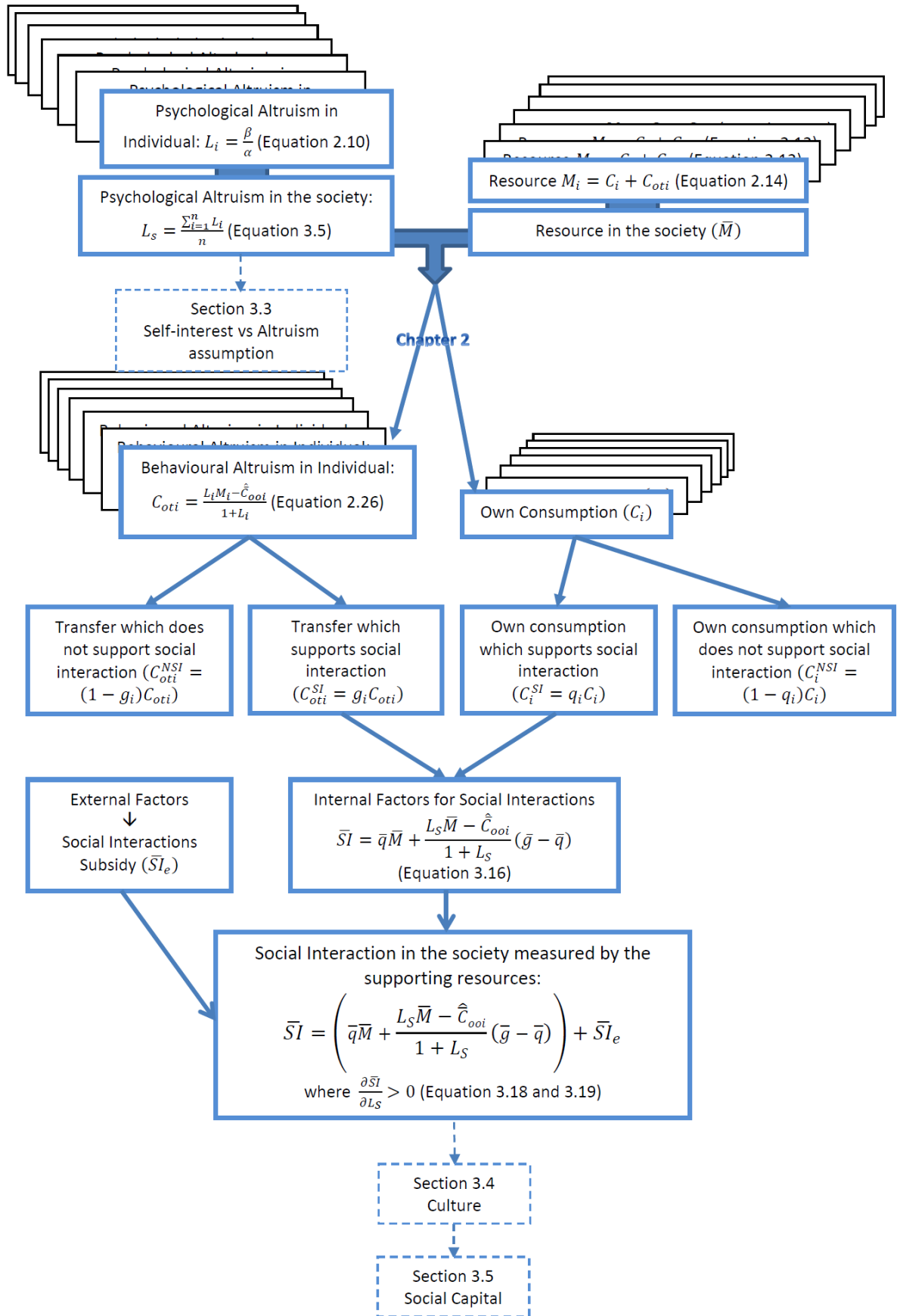


Figure 3.1: The Relationship between Psychological Altruism and Social Interaction

that the average level can be zero. However, the possibility for a change in the level is accepted.

In summary, the problem of generalising the self-interest assumption in a society is formalised as the following:

$$\begin{aligned}
 &\neg\left(\frac{\sum_{i=1}^n L_i}{n} = L_i\right) \Rightarrow \neg(L_1 = L_2 = L_3 = \dots = L_n = 0) \\
 &\neg\left(\sum_{i=1}^n \Delta L_i = 0\right) \Rightarrow \neg(\Delta L_s = 0) \Rightarrow \neg\left(\frac{\sum_{i=1}^n L_i}{n} = 0\right) \text{ provided } \Delta n = 0 \\
 &\neg(L_1 = L_2 = L_3 = \dots = L_n = 0) \vee \neg\left(\frac{\sum_{i=1}^n L_i}{n} = 0\right) \Rightarrow \neg(L_s = 0) \\
 &\therefore \neg(L_s = 0) \tag{3.20}
 \end{aligned}$$

PROPOSITION 3.2.

The average level of psychological altruism in a society (L_s) is not always equal to zero

where

- (1) *an individual may be psychologically altruistic to other members of a society;*
- (2) *the level of psychological altruism in an individual can be different from another individual in the society; and*
- (3) *a change in the level of psychological altruism in an individual is not always fully offset by the change in the level of psychological altruism of the other members of the society.*

The logic for this proposition is summarised in Figure 3.2.

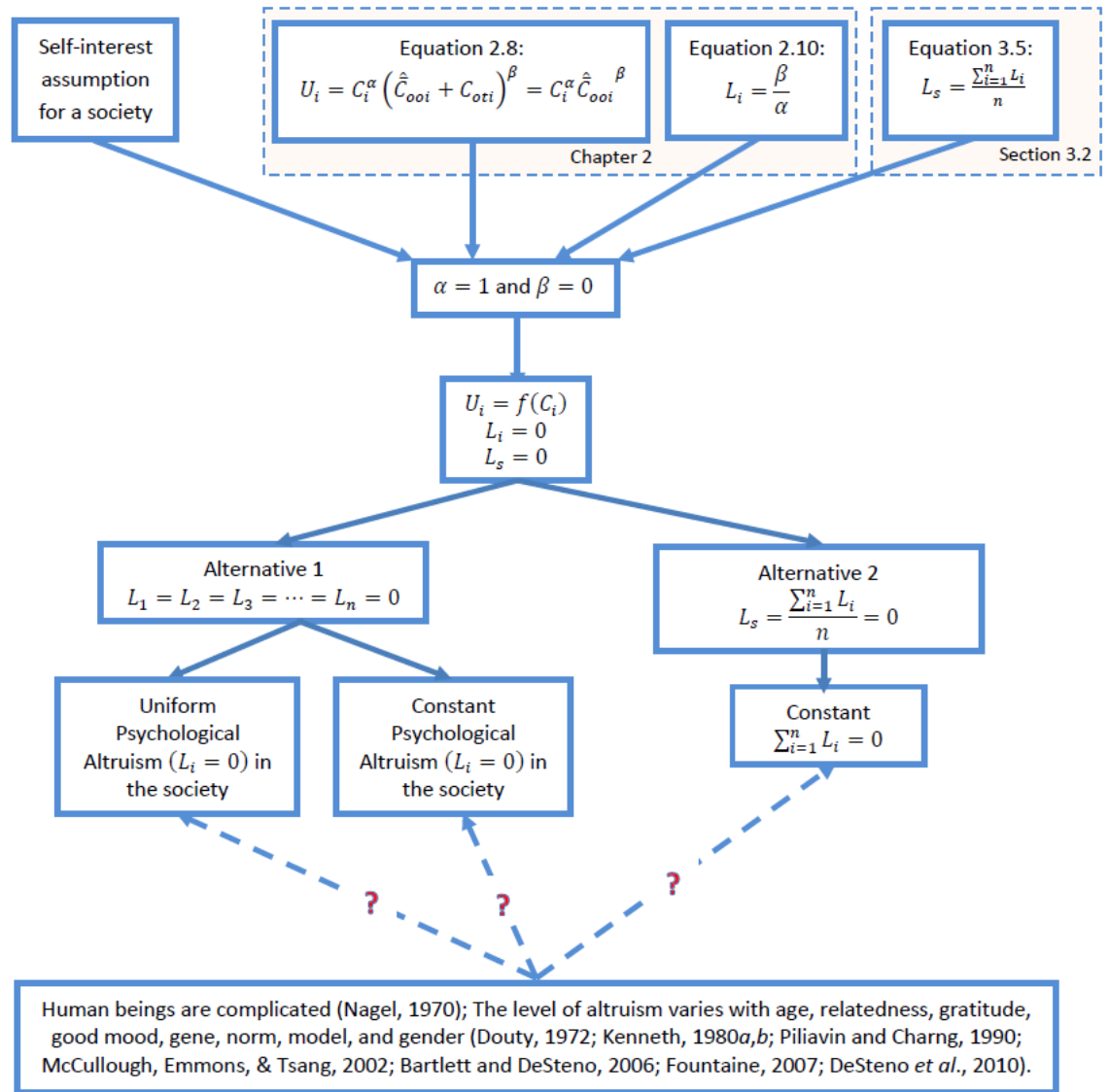


Figure 3.2: The Problem of Self-Interest Assumption

3.4. Altruism, Social Interaction, and Culture

3.4.1. The supply of altruistic values and beliefs

Because culture is shared values and beliefs (Casson & Godley, 2000), it needs social interaction in its process. The cultural process through social interaction starts with the division of labour. Division of labour, as the result of this social interaction process, enables specialisation and repetition. As part of the division of labour mechanism, values and beliefs specialists also emerge who act as a sources of supply of the values and beliefs in the society.

Values specialists do not necessarily become the values leaders³⁶ in the society. On one hand, the level of altruism which is actually offered to a society depends on the ability of the 'rules of the game' or institution, both formal and informal, in delivering altruistic values to the society. These 'rules of the game' are the result of previous social interactions. Better institution enables society members with higher levels of altruism to be chosen as the values leaders, so that their higher levels of altruism can be offered to the society as a whole. On the other hand, such a process of supplying altruistic values to the society also involves some costs. These costs mainly arise from the resources sacrificed to undergo the institutional process in supplying the altruistic values. These resources could have been utilised to supply values other than altruism. Finally, the optimal level of altruism offered to the society is reached as the ratio of the marginal product of the resources equals the costs ratios. Based on this process, the actual level of altruistic values offered to the society can be lower than the highest level of altruistic values available in the society. In this study, the ratio between the level of altruism offered by the values leaders and the highest level of altruism in a society is labelled as 'adherence to culture' (*ac*).

Adherence to culture is one of the results of an ongoing cultural process. Many factors are involved in this process. Social interaction provides the instrument. The quality of the interaction is influenced by the method or elements of interaction (Argyle, 1969); current social culture (Eisenstadt, 1986); forces of natural environments and forces of humans (Hofstede & Hofstede, 2005); as well as formal and informal institutions in the society. Psychologically, Argyle (1969) explains, the frequency of interaction is important but there are five elements of interaction which influence the effectivity of social interaction, i.e. olfactory, tactile, visible, auditory, and combinations of signals. Meanwhile in sociology, Eisenstadt (1986) remarks that social interaction is effected through social structure, and Hofstede & Hofstede (2005) mention forces of natural environments – such as climate change and natural disasters – and forces of human endeavour – such as missionary zeal, scientific discoveries, and military conquest – as factors which can change culture. Moreover, because the development of a culture is an ongoing process, the length of time or period of social interaction also influences the results.

³⁶ That is, the people who become the source of values for the rest of the members of a society.

When adherence to culture is perfect ($ac = 1$), values specialists become values leaders. How perfect this adherence to culture is depends on the 'rules of the game' or institution and the costs involved in the process. In a society less influenced by modern life, such as villages in remote areas, the society's leaders and religious leaders may be the values leaders. Words spoken and deeds performed by these leaders are treated as reference points for the values of the rest of the people in the society. Adherence to culture constructs these people as the society and religious leaders in altruism. A modern society, on the other hand, has more kinds of values leaders. Besides religious leaders and formal society leaders from executive, legislative, and judicative bodies, modern public media offers other public figures – such as movie stars, famous singers, and sports champions – as values leaders. Reference points for values standards, including altruism, also come from these people. This cultural process ends with absorbing, to a certain degree, the values and beliefs offered by the values and beliefs leaders.

In the example of a society that includes three such members as listed in Section 3.2.2 above, when adherence to culture is perfect ($ac = 1$), the value of altruism offered by the values and beliefs specialists would be the highest level of psychological altruism available in this society, which is individual 1's value with $L_1 = 0.9$. Nevertheless, individual 2, whose level of psychological altruism is only 0.5 has an opportunity to become a values leader in a society with less than perfect adherence to culture. If the highest level of psychological altruism in the society is labelled as L_L , the actual level of psychological altruism offered to the society can be expressed as

$$L_o = acL_L \quad (3.21)$$

where ac represents the adherence to culture. Perfect adherence to culture is indicated by $ac = 1$ which makes $L_o = L_L$.

3.4.2. The market for altruistic values and beliefs

This supply of values and beliefs then interacts with the demand for values and beliefs, of course through social interaction. Shared values and beliefs are demanded by the members of the society because they can simplify decision-making especially in a

situation where information is not perfect. The gap between perfect information and real information obtained by the members of the society is filled by shared values and beliefs. Values provide information about what to do for the benefit of the actor and also the society as a whole, and beliefs provide information for the legitimacy of the values. The whole cultural process cannot occur without social interaction.

The interaction between the supply and demand for altruistic values creates the market for these values. The equilibrium level reflects the actual level of psychological altruism adopted by members of the society. This actual level of psychological altruism can be, and is likely to be, lower than the level offered. Through social interaction, all of the factors behind the supply and demand for altruistic values altogether determine how close the actual values adopted by each member of a society are to the ideal values offered by the values and beliefs specialists. In this study, the capacity of these factors are accommodated in a constant as 'market efficiency', which will modify the capability of social interaction in shaping values. Higher efficiency in the market for values enables members of the society to be closer to the level of psychological altruism offered by the values and beliefs leaders. Furthermore, since altruism is only one aspect of culture, efficiency in the market for values does not only take a role in modifying the level of psychological altruism, but also in other aspects in the culture. In this model, market efficiency (ω) is treated as an index or constant and its range is

$$0 \leq \omega \leq 1 \quad (3.22)$$

3.4.3. The level of psychological altruism after the cultural process

Perfect market efficiency ($\omega = 1$) is the situation where the members of a society are completely obedient to the level of psychological altruism offered by the values leaders. After social interaction, the average level of psychological altruism in the society (L_{SC}) will be exactly equal to the level offered by their values leaders or $L_{SC} = L_o = acL_L$. As long as $L_o > L_S$, the resulting level of psychological altruism will be higher than the level before social interaction ($L_{SC} > L_S$). $\omega = 0$ is the situation at the other extreme where, instead of following what is offered by their values leaders, the members of a society ignore the offered level of psychological altruism. This means that each individual

stays with her or his own level of psychological altruism before social interaction. The average level of psychological altruism after social interaction remains the same as before ($L_{SC} = L_S$).

When $\omega = 1$, but of course this is unlikely to be the case, all members of the society will exactly adopt the level of psychological altruism offered. In the example above, the condition will be $L_1 = L_2 = L_3 = 0.9 = L_S$ as $\omega = 1$. However, when ω is less than one, or in this case is assumed to be 0.8 for example, the level of psychological altruism of individual 1 after the cultural process will be

$$\begin{aligned}
 L_{1c} &= L_1 + \Delta L_1 & (3.23) \\
 &= 0.9 + \omega(L_o - L_1) \\
 &= 0.9 + 0.8(0.9 - 0.9) \\
 &= 0.9
 \end{aligned}$$

where L_o is the level of psychological altruism offered by values leaders, and L_{1c} is the level of psychological altruism of individual 1 after the cultural process. Before and after the cultural process, individual 1's level of psychological altruism is the same because, in this case, individual 1 is the values specialist whose level of psychological altruism has been picked up and offered to all members of the society. By applying a similar process and assuming that market efficiency (ω) is 0.8, the level of psychological altruism of the other members of the society will be

$$\begin{aligned}
 L_{2c} &= L_2 + \Delta L_2 & (3.24) \\
 &= 0.5 + \omega(L_o - L_2) \\
 &= 0.5 + 0.8(0.9 - 0.5) \\
 &= 0.82
 \end{aligned}$$

and

$$\begin{aligned}
 L_{3c} &= L_3 + \Delta L_3 & (3.25) \\
 &= 0.1 + \omega(L_o - L_3) \\
 &= 0.1 + 0.8(0.9 - 0.1) \\
 &= 0.74
 \end{aligned}$$

After the cultural process, the average level of psychological altruism in the society of this example becomes 0.82. This shows that the cultural process increases the level of psychological altruism of each member of the society, and of course, at the same time it also increases the average level of psychological altruism of the society as a whole. This higher level of psychological altruism after the cultural process is in line with the contagion principle from David Hume's *Treatise of Human Nature* in 1736, R. M. Titmuss's *The Gift Relationship*, and H. Spencer's *Principles of Ethics* (Collard, 1978). In general, the level of psychological altruism after social interaction can be expressed as³⁷

$$L_{ic} = L_i + \omega(L_o - L_i) \quad (3.26)$$

$$L_{sc} = L_s + \omega(L_o - L_s) \quad (3.27)$$

Substituting equation (3.21) into (3.26) and (3.27) yields another formulation for L_{ic} and L_{sc} such that

$$L_{ic} = L_i + \omega(acL_L - L_i) \quad (3.28)$$

$$L_{sc} = L_s + \omega(acL_L - L_s) \quad (3.29)$$

where L_{ic} is the level of psychological altruism in individual i after the cultural process through social interaction, and L_{sc} is the general or average level of psychological altruism in the society after the cultural process through social interaction. Equation (3.26) infers that ω can also be stated as

$$\omega = \frac{L_{ic} - L_i}{L_o - L_i} = \frac{L_{sc} - L_s}{L_o - L_s} \quad (3.30)$$

³⁷ Because in equation (3.26) the individual level of psychological altruism after social interaction is $L_{ic} = L_i + \omega(L_o - L_i)$, the average level of psychological altruism in a society after social interaction becomes

$$\begin{aligned} L_{sc} &= \frac{\sum_{i=1}^n (L_i + \omega(L_o - L_i))}{n} \\ &= L_s + \omega(L_o - L_s) \end{aligned}$$

Market efficiency can be measured by calculating the ratio between a change of the level of psychological altruism in individuals after social interaction and how far does the offered level of psychological altruism by values leaders differ from the level before social interaction.

3.4.4. The higher level of psychological altruism after cultural process

The level of psychological altruism after cultural process will likely be higher than before the process³⁸. The difference between the level after and before social interaction is³⁹

$$L_{SC} - L_S = \omega(acL_L - L_S) > 0 \quad (3.31)$$

Assuming a positive ω in equation (3.26) and (3.27) implies that $L_{SC} - L_S$ will be positive only if $acL_L - L_S > 0$. Consequently, the requirement for $L_{SC} - L_S > 0$ is $ac > \frac{L_S}{L_L}$. When (1) market efficiency is positive and (2) the adherence to culture is greater than the ratio between the average level of psychological altruism in the society before social interaction and the highest level of psychological altruism available in the society, the average level of psychological altruism in the society after social interaction is higher than before social interaction. $ac > \frac{L_S}{L_L}$ causes $(L_o - L_i) > 0$, and as it is assumed that $\omega > 0$, the result is $L_{SC} > L_S$. Thus, for most cases, a perfectly efficient market for altruistic values and beliefs ($\omega = 1$) and perfect adherence to culture ($ac = 1$) are not required for the cultural process through social interaction to increase the average level of psychological altruism in a society. Only if all members of a society have exactly the same level of psychological altruism ($L_L = L_S$), would the society need perfect adherence to culture to increase their average level of psychological altruism through the cultural

³⁸ Kurz (1978) offers an alternative approach to show the influence of social interaction on altruism through though the repetitive nature of the economy.

³⁹ $L_{SC} - L_S = \frac{L_S}{L_L} + \omega(acL_L - L_S) - \frac{L_S}{L_L}$

process. However, this is not likely to be the case in the real world, for each human being is genetically and phenotypically unique. The relationship between the average level of psychological altruism in a society and the cultural process through social interaction is summarised in Proposition 3.3.

PROPOSITION 3.3.

- a. The average level of psychological altruism in a society (L_{SC}) after the cultural process through social interaction is higher than before the process (L_S); and*
- b. unless all members of a society have exactly the same level of psychological altruism ($L_S = L_i$ for each i .), the society would not need perfect adherence to culture and a perfectly efficient market for values and beliefs to increase their average level of psychological altruism through the cultural process,*

when (1) an individual is psychologically altruistic to other members of a society; (2) impure altruism is excluded from the definition of altruism; (3) social interaction is measured by the quantity and quality of resources which support social interaction; (4) culture is defined as shared values and beliefs within a society; (5) the efficiency of the market for altruistic values is positive; and (5) the adherence to culture is greater than the ratio between the average level of psychological altruism in the society before social interaction and the highest level of psychological altruism available in the society ($ac > \frac{L_S}{L_L}$).

3.4.5. The lower variability of the level of psychological altruism after cultural process

Another property of the effect of the cultural process appears on the variability of the level of psychological altruism. Before the cultural process, the standard deviation⁴⁰ of the level of psychological altruism is 0.33 and after the cultural process it decreases to only 0.07. In a general context, the standard deviation of the level of psychological altruism in a society after social interaction is smaller than before social interaction if

$$\sigma_{SC} - \sigma_S < 0$$

$$\left(\sqrt{\frac{\sum_{i=1}^n (L_{SC} - L_{ic})^2}{n}} \right) - \left(\sqrt{\frac{\sum_{i=1}^n (L_S - L_i)^2}{n}} \right) < 0 \quad (3.32)$$

Simplifying equation (3.32) and then substituting equations (3.26) and (3.27) into (3.32) yields⁴¹

$$\sum_{i=1}^n (L_S - L_i)^2 ((1 - \omega)^2 - 1) < 0 \quad (3.33)$$

It is obvious that $((1 - \omega)^2 - 1)$ in equation (3.33) must be negative. Thus, the standard deviation after social interaction will be smaller than before if $\sum_{i=1}^n (L_S - L_i)^2$ is greater than zero. $\sum_{i=1}^n (L_S - L_i)^2 > 0$ is likely to be case, because it can never be less than zero.

⁴⁰ Before social interaction $L_1 = 0.9; L_2 = 0.5; L_3 = 0.1; L_S = 0.5; \sigma_S = \sqrt{\frac{\sum_{i=1}^3 (0.5 - L_i)^2}{3}} = 0.3266$ and after social interaction $L_{1c} = 0.9; L_2 = 0.82; L_3 = 0.74; L_{SC} = 0.82; \sigma_S = \sqrt{\frac{\sum_{i=1}^3 (0.82 - L_{ic})^2}{3}} = 0.0653$.

⁴¹ $\left(\sqrt{\frac{\sum_{i=1}^n (L_{SC} - L_{ic})^2}{n}} \right) - \left(\sqrt{\frac{\sum_{i=1}^n (L_S - L_i)^2}{n}} \right) < 0$
 $\sum_{i=1}^n (L_{SC} - L_{ic})^2 - \sum_{i=1}^n (L_S - L_i)^2 < 0$
 $\sum_{i=1}^n (L_{SC} - L_{ic})^2 - (L_S - L_i)^2 < 0$
 $\sum_{i=1}^n ((L_S + \omega(L_o - L_S)) - (L_i + \omega(L_o - L_i)))^2 - (L_S - L_i)^2 < 0$
 $\sum_{i=1}^n ((L_S + \omega L_o - \omega L_S) - (L_i + \omega L_o - \omega L_i))^2 - (L_S - L_i)^2 < 0$
 $\sum_{i=1}^n (L_S + \omega L_o - \omega L_S - L_i - \omega L_o + \omega L_i)^2 - (L_S - L_i)^2 < 0$
 $\sum_{i=1}^n (L_S(1 - \omega) - L_i(1 - \omega))^2 - (L_S - L_i)^2 < 0$
 $\sum_{i=1}^n ((1 - \omega)(L_S - L_i))^2 - (L_S - L_i)^2 < 0$
 $\sum_{i=1}^n (L_S - L_i)^2 ((1 - \omega)^2 - 1) < 0$

However, there is one possibility which can make $\sum_i^n (L_S - L_i)^2 = 0$ and consequently mean that the standard deviations after and before social interaction are equal. This is only possible when all members of the society have exactly the same level of psychological altruism or $L_S = L_i$ for each i . The chance of this situation to occur is of course extremely small as each individual is unique. This means that the cultural process does not only enable an increase in the level of psychological altruism in each member of a society, but it also creates a more uniform level of psychological altruism. People with different genetic and phenotypic backgrounds converge to a certain level of psychological altruism facilitated by the process of culture and social interaction. Moreover, it is also important to note here that both a perfectly efficient market and perfect adherence to culture are not required for the standard deviation of the level of psychological altruism to increase after social interaction.

When the market efficiency is lower, let's say it is only 0.4, the resulting level of psychological altruism of the members in the example above will be: $L_1 = 0.9, L_2 = 0.66, L_3 = 0.42$, and the average level of psychological altruism in the society becomes $L_S = 0.66$. A lower market efficiency creates a lower level of psychological altruism after the cultural process and a higher standard deviation, now 0.2⁴² compared to only 0.07 when the market efficiency is 0.8. This is in line with literature in sociology and economics that states whenever social interaction exists, uniformity or convergence also exists in behaviour as well as economic well-being effects (Jameson, 1945; Topa, 2001; and Horst & Scheinkman, 2009). The relationship between the variability of the average level of psychological altruism in a society and the cultural process through social interaction is summarised in Proposition 3.4.

PROPOSITION 3.4.

- a. Unless all members of a society have exactly the same level of psychological altruism ($L_S = L_i$ for each i .), the variability of the level of psychological altruism in a society*

⁴² $L_{1C} = 0.9; L_2 = 0.66; L_3 = 0.42; L_{SC} = 0.66; \sigma_S = \sqrt{\frac{\sum_{i=1}^3 (0.66 - L_{iC})^2}{3}} = 0.1959$.

after the cultural process through social interaction (σ_{SC}) would be less than before the process (σ_S); and

b. a perfectly efficient market and perfect adherence to culture are not required for the variability of the average level of psychological altruism to decrease after social interaction,

when (1) an individual is psychologically altruistic to other members of a society; (2) impure altruism is excluded from the definition of altruism; (3) social interaction is measured by the quantity and quality of resources which support social interaction; and (4) culture is defined as shared values and beliefs within a society.

3.4.6. Uniformity and well-being

Uniformity or convergence becomes one of the key factors supporting better well-being in the rest of the models in this study. The unavoidable question that emerges is how an increase in uniformity (or at the same time a decrease in diversity) can be conducive in increasing well-being. This question is usually based on the thesis that diversity – through the complementary skills of individuals from different backgrounds translated into increased productivity (Alesina & Ferrara, 2005); the emergence of a creative class (Florida, 2002 and Florida & Gates, 2002); and increases in productivity (Ottaviano & Peri, 2006) – is beneficial for development. However, empirical studies provide ambiguous evidence that diversity can create both positive and negative effects. Dincer & Wang (2011) find a negative relationship between ethnic diversity and economic growth across Chinese provinces. Sparber (2010) indicates that diversity only enhances the productivity of United States cities in fixed-effects analysis, while on state level the result is more ambiguous. Lee (2011) concludes that neither diversity by country of birth nor ethnic diversity is significant for employment growth in 53 English cities in the United Kingdom.

The impact of diversity on development is more apparent when both variables – diversity and development – are related by trust. On the one hand, there is a significant

association between diversity and trust (Dincer, 2011 and Sturgis et al., 2011), and on the other hand, trust is important for development in social capital theories (such as in Coleman, 1988; 1990; Putnam, 1993; and Collier, 2002). Therefore, diversity which is accompanied by trust, can induce the higher productivity needed for development. Conversely, when diversity causes people to socialise with and trust only people similar to them (Delhey & Newton, 2005 and Putnam, 2007), higher productivity will not be gained. Put differently, taking into consideration that trust resembles the expected levels of psychological altruism of others and their reliability, uniformity in psychological altruism as one of values in culture holds a meaningful role in improving well-being.

Nevertheless, the higher level and uniformity of psychological altruism in a society does not impair the capacity of the society to maintain other forms of diversity, such as ethnicity, country of birth, religion, and specialities. As its definition implies, a higher level of psychological altruism means others' interests begin to have more influence on one's own utility, thus altruism renders greater opportunity for diversity. Uniformity in psychological altruism does not undermine division of labour. On the contrary, uniformity in the level of psychological altruism combined with a higher level of psychological altruism enable each individual to accept people who have different attributes, as one's utility is also influenced by others' well-being.

The relationship between psychological altruism and culture in this section can be summarised as shown in Figure 3.3.

3.5. Altruism, Social Interaction, and Social Capital

Social interaction does not only facilitate shared values and beliefs, but at the same time it also creates coherence in a society – technically called social capital. Social capital is the internal social and cultural coherence of a society through which social interactions generate durable effects in the form of externalities (Hoff & Stiglitz, 2001; Meier, 2001; Collier, 2002; Grootaert & Narayan, 2004; and Han, Kim, & Lee, 2013). This definition implies that social interaction is the instrument which creates the coherence among members of a society. Due to limitations in survey data, in some empirical studies social interaction is commonly used as a proxy for social capital (see, for example, Grootaert, 1999; Miguel, Gertler, & Levine, 2003; 2005; Miller et al., 2006; Wetterberg,

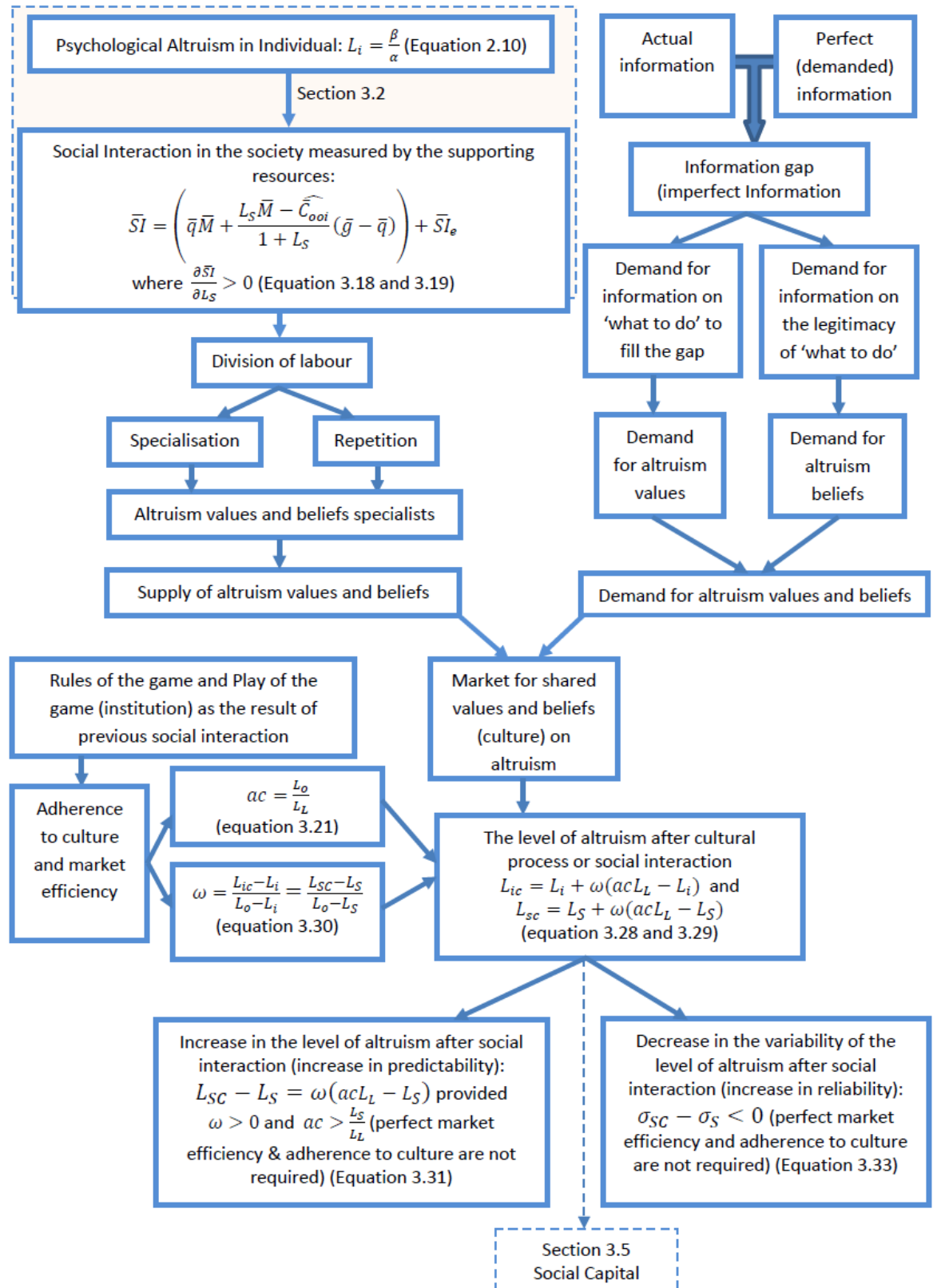


Figure 3.3: Psychological Altruism, Social Interaction, and Culture

2007; and Yamamura, 2010; 2012). However, social interaction is not social capital. The coherence produced by social interaction is the social capital that is formalised in a reduced form by Collier (2002) as a function of social interaction or

$$V = V(SI_o, SI_n, SI_c, SI_h)$$

where V is the externalities created by social capital and SI is the social interaction that takes place through observation (o), network (n), club (c), and hierarchy (h).

Therefore, this coherence, or sense of being related to each other among the members of a society, can also be expressed as a situation where every society member's utility function is not only influenced by the bundle of goods and services that s/he consumes, but also the bundle of goods and services of the rest of the members of the society. Mathematically, this definition is the same as psychological altruism at society level that

$$\begin{aligned} S_{sc} &= L_{sc} = L_s + \omega(L_o - L_s) \\ &= L_s + (\omega(acL_L - L_s)) \end{aligned} \quad (3.34)$$

where S_{sc} is the level of coherence in the society after social interaction or the cultural process. This coherence, as the definition implies, is basically the social capital. As noted in Collier (2002) that social capital – such as trust and knowledge – can be stored in an individual human being, the level of coherence of social capital in an individual thus can be expressed as

$$\begin{aligned} S_{ic} &= L_{ic} = L_i + \omega(L_o - L_i) \\ &= L_i + (\omega(acL_L - L_i)) \end{aligned} \quad (3.35)$$

where S_{ic} is the level coherence endowed in individual i regarding her or his relationship with the rest of society after social interaction. Put differently, S_{ic} is the social capital stored within individual i .

Equations (3.34) and (3.35) reflect the whole process from psychological altruism to social capital. Psychological altruism in each individual member of a society is influenced by genetic factors and previous social interaction. This psychological altruism is then increased by the cultural process, the result of which is not just an increased average level of psychological altruism in the society, but also a lower standard deviation of the level. The degree of relatedness or coherence is expressed by how far each member's utility is influenced by other members' well-being. This is to say that social capital, or the social coherence among the members of a society, is expressed as the average level of psychological altruism in the society. The whole process from the level of psychological altruism in a society in one period that leads to the social capital in the next period cannot occur without social interaction. Social capital can be viewed as the general social coherence of a society ($S_{sc} = L_{sc}$) and as individual's relatedness to others ($S_{ic} = L_{ic}$). A more formal statement regarding the meaning of equations (3.34) and (3.35) is presented in Definition 3.1.

DEFINITION 3.1.

- a. *Social capital or the social coherence of a society can be expressed as the average level of psychological altruism in the society after social interaction ($S_{sc} = L_{sc}$), and*
 - b. *social capital owned by an individual in a society can be expressed as the individual's level of psychological altruism after social interaction ($S_{ic} = L_{ic}$),*
- when (1) an individual is psychologically altruistic to other members of a society, and thus this individual faces imperfect information regarding the consumption of others; and (2) impure altruism is excluded from the definition of altruism.*

How psychological altruism and social interaction influence social capital can thus be derived from equation (3.34). The derivative of social capital with respect to the average level of psychological altruism in a society before social interaction is

$$\frac{\partial S_{SC}}{\partial L_S} = 1 - \omega > 0 \text{ provided } 0 \leq \omega < 1 \quad (3.36)$$

When market efficiency is positive and less than one, social capital is positively influenced by the average level of psychological altruism in a society before social interaction. However, when market efficiency is equal to one⁴³, as this possibility is allowed in equation (3.22), a change in the average level of psychological altruism does not have any impact on social capital. The technical explanation is that when market efficiency is perfect ($\omega = 1$), all members of a society will be completely obedient to any values offered by their values leaders. No matter how low the previous level of psychological altruism one had, each individual's level of psychological altruism after social interaction will be exactly as suggested by the values leaders. The previous level of psychological altruism becomes irrelevant. Nevertheless, when the level of psychological altruism suggested by values leaders is only equal or even less than the average level before social interaction, the level after social interaction cannot be expected to be higher. The effect of the level of psychological altruism on social capital is summarised in Proposition 3.5.

PROPOSITION 3.5.

Social capital is positively influenced by the average level of psychological altruism in a society, provided that market efficiency is not perfect ($0 \leq \omega < 1$), when (1) it is possible for an individual to be psychologically altruistic to other members of a society; (2) impure altruism is excluded from the definition of altruism; (3) social interaction is measured by the quantity and quality of resources which support social interaction; (4) culture is defined as shared values and beliefs within a society; and (5) social capital is defined as the social coherence among members of a society.

The role of psychological altruism in social capital through social interaction and culture is summarised in Figure 3.4.

⁴³ Although the possibility of this occurring can be reasonably assumed to be very small.

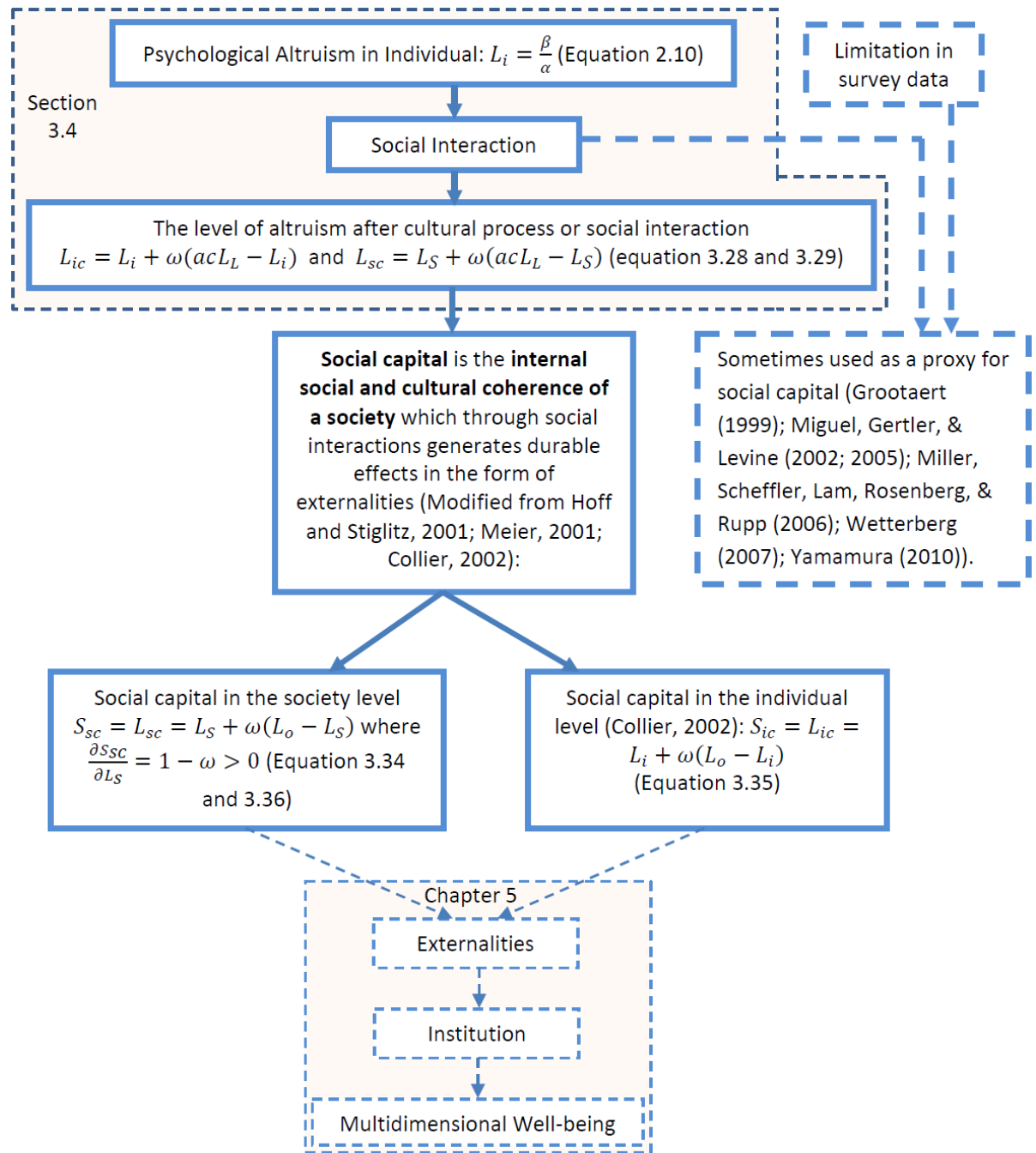


Figure 3.4: The Role of Psychological Altruism in Social Capital through Social Interaction, and Culture

3.6. Conclusion

The cultural process cannot occur without social interaction, and social interaction enables the emergence of values and beliefs leaders through division of labour. These values and beliefs leaders serve as the supply side of altruistic values. The resulting level of psychological altruism depends on the market mechanism where the supply of altruistic values and beliefs interacts with the demand for altruistic values and beliefs.

Altruistic values and beliefs are demanded because there is a gap between the information needed by a society to make economic and social decisions and the actual information available for making the decisions. The process of offering and, to a certain degree, accepting these altruistic values are again facilitated by social interaction. The whole process from one level of psychological altruism in a society to the next period's level cannot occur without social interaction.

In modelling the role of psychological altruism in social interaction, culture, and social capital, the main findings in this chapter can be summarised as follows:

- Social interaction is influenced by the level of psychological altruism in a society (equations (3.18) and (3.19)). Among others, the quantity and quality of resources devoted to social interaction determines the quantity and quality of social interaction. Since the proportion of resources devoted to social interaction is partly influenced by the level of psychological altruism, social interaction is also influenced by the level of psychological altruism. In short, when it is possible for an individual to be psychologically altruistic to other members of a society and impure altruism is excluded from the definition of altruism, the average level of psychological altruism in a society has a positive influence on the average social interaction in the society.
- The cultural process creates two important effects to the average level of altruism in a society. The first effect is a higher average level of psychological altruism in a society (equation (3.31)). When the efficiency of the market for altruistic values and beliefs is positive and the adherence to culture is greater than the ratio between the average level of psychological altruism before social interaction and the highest level, the average level of psychological altruism in the society after social interaction is higher than before social interaction. Nevertheless, unless initially all members of a society had exactly the same level of psychological altruism, the society neither needs perfectly efficient market for values and beliefs or perfect adherence to culture to increase the average level of psychological altruism through the cultural process. The second effect is a lower standard deviation of the level of psychological altruism among the members of a society (equation (3.32)). The cultural process does not only enable an increase in the level of altruism, but it also creates a more uniform level of altruism. Greater uniformity

means an increase in the reliability of behaviours. Regardless of the level of efficiency of values and beliefs market, people from different backgrounds converge to a certain level of altruism facilitated by the cultural process through social interaction. However, an extreme situation where all members of a society have exactly the same level of psychological altruism would make this second effect fail to occur.

- The level of psychological altruism influences social capital. Social capital is the social coherence among members of a society. The sense of being related to each other can also be expressed as a situation where every society member's utility function is not only influenced by the bundle of goods and services that s/he consumes, but also by the rest of the members' goods and services. Put differently, the social capital of a society can be expressed as the average level of psychological altruism in the society (equation (3.34)). Consequently, social capital is positively influenced by the average level of psychological altruism in a society, provided that market efficiency is not perfect.
- Nonetheless, this chapter also shows that the average level of psychological altruism in a society is not always equal to zero (equation (3.20)). Assuming that a society has a constant and uniform level of psychological altruism is problematic. The problems come from two sources. First, the level of psychological altruism in an individual can be different from another individual in the society. Second, a change of the level of psychological altruism of an individual is not always fully offset by the change of the level of the others.

The models showing the role of psychological altruism in culture and social capital in this chapter will be used as the foundation to develop the institutional approach models on the role of psychological altruism in multidimensional well-being in Chapter 5. Meanwhile, the non-institutional approach in Chapter 4 will be mainly based on the models in Chapter 2.

CHAPTER 4. THE NON-INSTITUTIONAL APPROACH TO THE ROLE OF ALTRUISM IN WELL-BEING

4.1. Introduction

This chapter⁴⁴ considers the non-institutional approach to the role of altruism in well-being. As suggested in economics, sociology, and psychology literature, there are generally two approaches to explaining how altruism and social capital affect well-being: the institutional approach and the non-institutional approach. The non-institutional approach allows for the assumption that psychological altruism influences well-being directly through social interaction without depending on the influence of institution. In psychology literature, for example, there is emerging evidence of the positive effect of altruism on mental and physical health (Schwartz et al., 2009). Being altruistic causes an individual to project outward that s/he can disengage from her or his own burden or problems and this leads to better mental health, which eventually influences physical health. Bourdieu's explanation of social capital (in Wetterberg, 2007), which suggests that social interaction benefits an individual by giving her or him access to resources, is another example of how an individual can directly attain well-being from social interaction.

By contrast, the institutional approach allows psychological altruism to influence well-being only after involving social capital and institution in the process. Social capital works through social structure or institution to influence well-being (Coleman, 1988; 1990; Putnam, 1993; Dovey & Onyx, 2001; Collier, 2002; and Wetterberg, 2007). This institutional and also the combined approach will be discussed further in Chapter 5.

The non-institutional approach in this chapter will be examined in two steps. First, Section 4.2 discusses how well-being is influenced by the level of psychological altruism by using the three utility functions explained earlier in Chapter 2. The key instrument in this approach is social interaction; without social interaction, psychological altruism cannot influence well-being. The models used are mainly based on the framework

⁴⁴ An earlier version of this chapter and Chapter 5 were presented as a paper in the 82nd Annual Meeting of the Southern Economic Association 2012 in New Orleans, USA.

developed in Chapter 2. Second, Section 4.3 considers some other approaches to demonstrating the relationship between psychological altruism and well-being.

4.2. Well-being as a Function of the Level of Psychological Altruism

4.2.1. Background

Well-being as a state is characterised by the mental and physical health, education or knowledge, income, and equality of an individual or a society. This definition and also the method used to select these four dimensions (health, knowledge, income, and equality) of well-being are explained in detail in Appendix 3.

This definition avoids using subjective phrases such as ‘a condition of being content with...’, ‘happiness’ or ‘with sufficient...’. Thus, these four dimensions form an objective level of well-being without being relative to the subjective aspiration towards the dimensions by the individual or society. The choice of using objective instead of subjective well-being is based simply on a practical reason; that of isolating the discussion from factors that influence an individual’s or a society’s state of contentment that is characterised by the dimensions. A discussion on these factors could be a separate study which is quite related to psychology.

Nevertheless, the word ‘condition’ has been selected to avoid the problem of choosing a certain approach in a study of well-being. Some alternative approaches in studying well-being discussed in the literature are, for example: capability, freedom, functioning, and autonomy (Doyal & Gough, 1991; Nussbaum, 2000; and Sen, 2008). Thus, the definition of well-being used in this study can be regarded as a generic one that is ready to be applied in any type of approach on the definition of well-being.

A non-institutional approach enables an individual to obtain benefits directly from social interaction. One of the benefits of being altruistic as stated in psychology literature is the health dimension of well-being (Schwartz et al., 2009 and Lozada, D’Adamo, and Fuentes, 2011)⁴⁵. Being altruistic causes an individual to project outward that s/he can disengage from her or his own burden or problems and this leads to better mental health,

⁴⁵ Unlike Abel & Warshawsky (1988) who discusses the joy of giving, in this approach the additional utility comes directly from being psychologically more altruistic.

which eventually influences physical health. Thus, a higher level of psychological altruism creates greater utility and health, which is a source of enhanced well-being.

Furthermore, considering that health is one element of human capital⁴⁶, better health means better capacity to acquire other dimensions of well-being including knowledge, income, education, and equality. The following sections discuss the relationship between the level of psychological altruism and well-being using the three utility functions presented in Chapter 2. Although Chapter 2 shows that the Cobb-Douglas utility function is less problematic in explaining altruism, the two other utility functions are also examined to verify the conclusion produced from the Cobb-Douglas function.

4.2.2. The Cobb-Douglas utility function

Based on the background as discussed above, and using the Cobb-Douglas utility function, the role of psychological altruism in well-being can be seen by substituting equation (2.14) into (2.8). The equation becomes

$$W_{U_i} = w_{u_i}(U_i) = w_{u_i} \left(C_i^\alpha \hat{C}_{oi}^\beta \right) = w_{u_i} \left((M_i - C_{oti})^\alpha (\hat{C}_{ooi} + C_{oti})^\beta \right) \quad (4.1)$$

where W_i is the well-being of individual i . Substituting equations (2.9) and (2.10) into (4.1), yields

$$W_{U_i} = w_{u_i}(U_i) = w_{u_i} \left(C_i^{\frac{1}{1+L_i}} \hat{C}_{oi}^{\frac{L_i}{1+L_i}} \right) = w_{u_i} \left((M_i - C_{oti})^{\frac{1}{1+L_i}} (\hat{C}_{ooi} + C_{oti})^{\frac{L_i}{1+L_i}} \right) \quad (4.2)$$

The process of converting resources into utility resembles the process of how well-being is achieved. Both utility and well-being are the results of using resources (human, natural, physical, and financial) to satisfy human or societal needs. Moreover, well-being and utility are used interchangeably in many examples in the literature (see, for example, Howarth, 1991; Nordhaus, 1993; and Korpi, 1997). Humans create goods and services

⁴⁶ See, for example, Florida (2002) and Florida, Mellander, & Stolarick (2008).

from these resources for consumption, and well-being or utility comes from this consumption. Each consumption activity can add to one or more dimensions (income, health, knowledge, and equality) of well-being or utility. Assuming that $\frac{\partial W_{U_i}}{\partial U_i} = 1$, the derivative of well-being with respect to the level of psychological altruism can be written as⁴⁷

$$\begin{aligned} \frac{\partial W_{U_i}}{\partial L_i} = \frac{\partial U_i}{\partial L_i} &= \left(\left(\frac{1}{(1+L_i)^2} \right) \left(\log \frac{(\hat{C}_{ooi} + C_{oti})}{(M_i - C_{oti})} \right) \right) U_i \\ &= \left(\left(\frac{1}{(1+L_i)^2} \right) \left(\log \frac{(\hat{C}_{oi})}{(C_i)} \right) \right) U_i, \text{ provided } U_i, L_i > 0 \end{aligned} \quad (4.3)$$

$$= \begin{cases} > 0 & \text{if } |C_i < \hat{C}_{oi}| \vee \begin{cases} C_{oti} = 0 \wedge M_i < \hat{C}_{ooi} \\ C_{oti} > 0 \wedge M_i < \hat{C}_{ooi} + 2C_{oti} \\ C_{oti} < 0 \wedge M_i < \hat{C}_{ooi} - 2C_{oti} \end{cases} \\ = 0 & \text{if } |C_i = \hat{C}_{oi}| \vee \begin{cases} C_{oti} = 0 \wedge M_i = \hat{C}_{ooi} \\ C_{oti} > 0 \wedge M_i = \hat{C}_{ooi} + 2C_{oti} \\ C_{oti} < 0 \wedge M_i = \hat{C}_{ooi} - 2C_{oti} \end{cases} \\ < 0 & \text{if } |C_i > \hat{C}_{oi}| \vee \begin{cases} C_{oti} = 0 \wedge M_i > \hat{C}_{ooi} \\ C_{oti} > 0 \wedge M_i > \hat{C}_{ooi} + 2C_{oti} \\ C_{oti} < 0 \wedge M_i > \hat{C}_{ooi} - 2C_{oti} \end{cases} \end{cases}$$

Figure 4.1 and equations (4.2) and (4.3) illustrate the relationship between psychological altruism and utility in equation (4.1). When $C_i < \hat{C}_{oi}$ or $M_i < \hat{C}_{ooi}$ and $C_{oti} = 0$, utility is positively influenced by psychological altruism. When $C_i = \hat{C}_{oi}$ or $M_i = \hat{C}_{ooi}$ and $C_{oti} = 0$, utility is not influenced by psychological altruism, and when $C_i > \hat{C}_{oi}$ or $M_i > \hat{C}_{ooi}$ and $C_{oti} = 0$, a higher level of altruism creates lower utility.

Considering that \hat{C}_{oi} is individual i 's perception about others' average consumption (and \hat{C}_{ooi} is individual i 's perception about others' average consumption

⁴⁷ $\text{Log } U_i = \frac{1}{1+L_i} \log(M_i - C_{oti}) + \frac{L_i}{1+L_i} \log(\hat{C}_{ooi} + C_{oti})$
 $\frac{1}{U_i} \frac{\partial U_i}{\partial L_i} = \left(-\frac{1}{(1+L_i)^2} \right) \log(M_i - C_{oti}) + \left(\frac{(1+L_i) - (L_i)}{(1+L_i)^2} \right) \log(\hat{C}_{ooi} + C_{oti})$
 $= \left(\frac{1}{(1+L_i)^2} \right) (\log(\hat{C}_{ooi} + C_{oti}) - \log(M_i - C_{oti}))$
 $\frac{\partial U_i}{\partial L_i} = \left(\left(\frac{1}{(1+L_i)^2} \right) (\log(\hat{C}_{ooi} + C_{oti}) - \log(M_i - C_{oti})) \right) \left((M_i - C_{oti})^{\frac{1}{1+L_i}} (\hat{C}_{ooi} + C_{oti})^{\frac{L_i}{1+L_i}} \right)$
 $= \left(\left(\frac{1}{(1+L_i)^2} \right) \left(\log \frac{(\hat{C}_{oi})}{(C_i)} \right) \right) \left(C_i^{\frac{1}{1+L_i}} \hat{C}_{oi}^{\frac{L_i}{1+L_i}} \right)$

before transfer), $C_i < \hat{C}_{oi}$ and $M_i < \hat{C}_{ooi}$ can be interpreted as an individual who subjectively perceives her- or himself as poorer than others. Likewise, $C_i > \hat{C}_{oi}$ and $M_i > \hat{C}_{ooi}$ represent an individual who subjectively perceives her- or himself as richer than others. Thus, equation (4.1) implies that a positive relationship between well-being and altruism is only relevant for people who subjectively perceive themselves as having fewer resources than others.

Figure 4.1 also shows that as the level of psychological altruism continues to increase ($L_i > 1$), utility approaches $\hat{C}_{oi} = \hat{C}_{ooi} + C_{oti}$. This property implies that when the level of altruism is extremely high, an individual's utility is almost equal to the utility of others. Individual i is as happy as her or his perception about others' happiness regardless of her or his subjective perception about the relative value of own consumption compared to others. The difference between the subjectively rich and poor is on the initial level of well-being. The subjectively richer individuals start from a higher level of well-being. As the level of psychological altruism increases, the well-being decreases and eventually approaches others' level of well-being. Meanwhile, the subjectively poorer individuals start from a lower level of well-being, which increases with the level of psychological altruism and eventually approaches others' level of well-being.

The relationship between U_i and L_i above shows that people who perceive themselves as richer than others face a tougher challenge to become more altruistic. Technically, because $M_i > \hat{C}_{ooi}$, being more altruistic makes the utility to be sacrificed from the lower α greater than the gain in utility induced by the higher β or $\left| \frac{\partial U_i}{\partial \alpha} \right| > \frac{\partial U_i}{\partial \beta}$. These self-perceived rich individuals face a greater opportunity cost to become more altruistic. Such a relationship is not unusual in psychology literature. For example, Kraus, Piff, & Keltner's (2011) empirical studies on the influence of subjective self-perceptions about social class rank on other- versus self-oriented behaviour. The subjective lower-class individuals are more pro-social than their upper-class counterparts. Reduced resources among the lower-class increase the sensitivity to social context, greater interpersonal engagement, and enhanced empathic accuracy. Conversely, the subjectively perceived abundance of resources among upper-class individuals prevents them from having more empathy for others. If the utility function in this thesis had shown otherwise regarding the relationship between U_i and L_i for these relative values of M_i

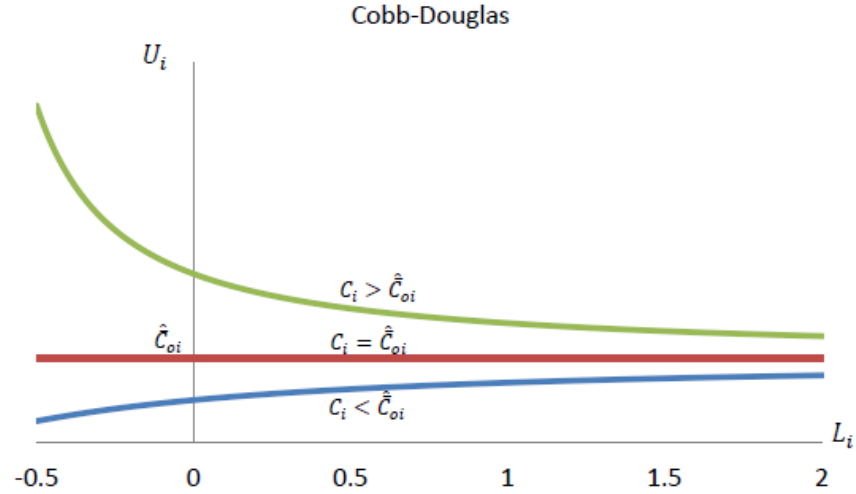


Figure 4.1: Utility as a Function of Psychological Altruism with Cobb-Douglas Utility Function

and \hat{C}_{ooi} , the model could have been unable to explain the findings in the psychology literature.

The pattern of the relationship between U_i and L_i creates an ambiguous relationship between psychological altruism and well-being. People who perceive themselves as relatively poor compared to others ($C_i > \hat{C}_{oi}$) have a positive marginal utility of the level of psychological altruism. A higher level of psychological altruism creates greater happiness. In contrast, the utility of people who perceive themselves as richer than others is negatively influenced by their psychological altruism. Since the composition of a population based on the proportion of the subjectively poor and the subjectively rich cannot be theoretically presumed in this study, the role of psychological altruism in well-being in this non-institutional approach becomes ambiguous.

4.2.3. The linear utility function

The linear utility function developed in Chapter 2 also creates a similar pattern. Substituting equation (2.14) into (2.11) yields

$$W_{u_i} = w_{u_i}(U_i) = w_{u_i}(\alpha C_i + \beta \hat{C}_{oi}) = w_{u_i}(\alpha(M_i - C_{oti}) + \beta(\hat{C}_{ooi} + C_{oti})) \quad (4.4)$$

Substituting equations (2.9) and (2.10) into (4.4), yields

$$W_{u_i} = w_{u_i}(U_i) = w_{u_i} \left(\frac{1}{1+L_i} C_i + \frac{L_i}{1+L_i} \hat{C}_{oi} \right) = w_{u_i} \left(\frac{1}{1+L_i} (M_i - C_{oti}) + \frac{L_i}{1+L_i} (\hat{C}_{ooi} + C_{oti}) \right) \quad (4.5)$$

Assuming that $\frac{\partial W_{u_i}}{\partial U_i} = 1$, the derivative of well-being with respect to the level of psychological altruism can be written as⁴⁸

$$\begin{aligned} \frac{\partial W_{u_i}}{\partial L_i} &= \frac{\partial U_i}{\partial L_i} = \left(\frac{1}{(1+L_i)^2} \right) \left((\hat{C}_{ooi} + C_{oti}) - (M_i - C_{oti}) \right) \\ &= \left(\frac{1}{(1+L_i)^2} \right) (\hat{C}_{oi} - C_i), \text{ provided } L_i > 0 \end{aligned} \quad (4.6)$$

$$\begin{cases} > 0 & \text{if } |C_i - \hat{C}_{oi}| \vee \begin{cases} C_{oti} = 0 \wedge M_i < \hat{C}_{ooi} \\ C_{oti} > 0 \wedge M_i < \hat{C}_{ooi} + 2C_{oti} \\ C_{oti} < 0 \wedge M_i < \hat{C}_{ooi} - 2C_{oti} \end{cases} \\ = 0 & \text{if } |C_i - \hat{C}_{oi}| \vee \begin{cases} C_{oti} = 0 \wedge M_i = \hat{C}_{ooi} \\ C_{oti} > 0 \wedge M_i = \hat{C}_{ooi} + 2C_{oti} \\ C_{oti} < 0 \wedge M_i = \hat{C}_{ooi} - 2C_{oti} \end{cases} \\ < 0 & \text{if } |C_i - \hat{C}_{oi}| \vee \begin{cases} C_{oti} = 0 \wedge M_i > \hat{C}_{ooi} \\ C_{oti} > 0 \wedge M_i > \hat{C}_{ooi} + 2C_{oti} \\ C_{oti} < 0 \wedge M_i > \hat{C}_{ooi} - 2C_{oti} \end{cases} \end{cases}$$

A positive relationship between psychological altruism and well-being is only found for individuals who perceive themselves as poorer than others ($C_i < \hat{C}_{oi}$). This pattern is illustrated in Figure 4.2 as well as in equations (4.5) and (4.6).

4.2.4. The CES-like utility function

Nonetheless, the CES-like utility function described in Chapter 2 creates a slightly different pattern. The subjectively richer individuals also face a tougher challenge to be

⁴⁸ $U_i = \frac{1}{1+L_i} (M_i - C_{oti}) + \frac{L_i}{1+L_i} (\hat{C}_{ooi} + C_{oti})$

$$\frac{\partial U_i}{\partial L_i} = \left(-\frac{1}{(1+L_i)^2} \right) (M_i - C_{oti}) + \left(\frac{1}{(1+L_i)^2} \right) (\hat{C}_{ooi} + C_{oti})$$

$$= \left(\frac{1}{(1+L_i)^2} \right) \left((\hat{C}_{ooi} + C_{oti}) - (M_i - C_{oti}) \right) = \left(\frac{1}{(1+L_i)^2} \right) (\hat{C}_{oi} - C_i)$$

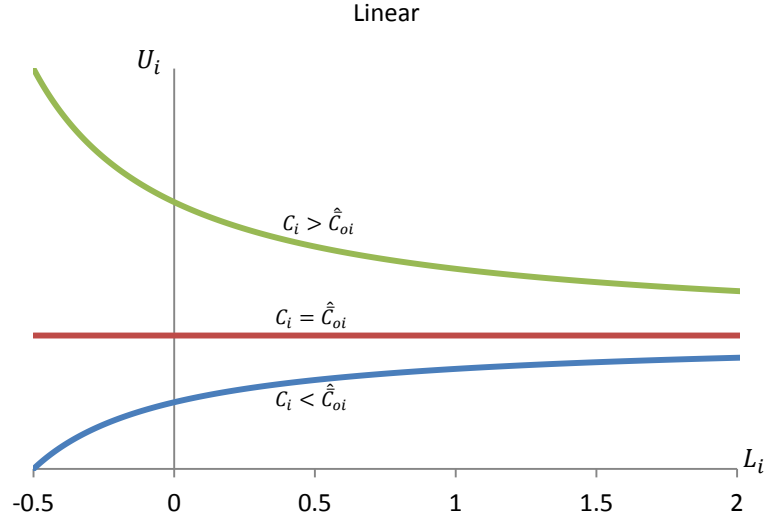


Figure 4.2: Utility as a Function of Psychological Altruism with Linear Utility Function

psychologically more altruistic but the challenge is different. Substituting equation (2.14) into (2.12) yields

$$W_{u_i} = w_{u_i}(U_i) = w_{u_i}\left(C_i^\alpha + \hat{C}_{oi}^\beta\right) = w_{u_i}\left((M_i - C_{oti})^\alpha + \left(\hat{C}_{ooi} + C_{oti}\right)^\beta\right) \quad (4.7)$$

Substituting equations (2.9) and (2.10) into (4.7), yields

$$\begin{aligned} W_{u_i} &= w_i(U_i) = w_{u_i}\left(C_i^{\frac{1}{1+L_i}} + \hat{C}_{oi}^{\frac{L_i}{1+L_i}}\right) \\ &= w_{u_i}\left((M_i - C_{oti})^{\frac{1}{1+L_i}} + \left(\hat{C}_{ooi} + C_{oti}\right)^{\frac{L_i}{1+L_i}}\right) \end{aligned} \quad (4.8)$$

Assuming that $\frac{\partial W_{u_i}}{\partial U_i} = 1$, the derivative of well-being with respect to the level of psychological altruism can be written as⁴⁹

⁴⁹ $U_i = (M_i - C_{oti})^{\frac{1}{1+L_i}} + \left(\hat{C}_{ooi} + C_{oti}\right)^{\frac{L_i}{1+L_i}}$

$$\begin{aligned}
\frac{\partial W_{u_i}}{\partial L_i} &= \frac{\partial U_i}{\partial L_i} = \left(\frac{1}{(1+L_i)^2} \right) \left(\left(\hat{C}_{ooi} + C_{oti} \right)^{\frac{L_i}{1+L_i}} - (M_i - C_{oti})^{\frac{1}{1+L_i}} \right) \\
&= \left(\frac{1}{(1+L_i)^2} \right) \left(\hat{C}_{oi}^{\frac{L_i}{1+L_i}} - C_i^{\frac{1}{1+L_i}} \right), \text{ provided } L_i > 0 \text{ and } C_i = \hat{C}_{oi} \begin{cases} > 0 & \text{if } L_i > 1 \\ = 0 & \text{if } L_i = 1 \\ < 0 & \text{if } L_i < 1 \end{cases}
\end{aligned} \tag{4.9}$$

As illustrated in Figure 4.3 and in equations (4.8) and (4.9), when⁵⁰ $C_i = \hat{C}_{oi}$, well-being will be positively influenced by the level of psychological altruism only if the level of psychological altruism is very high ($L_i > 1$). If the level of psychological altruism is less than one, higher altruism creates lower well-being. The positive effect of psychological altruism on well-being can only be experienced by individuals who are psychologically very altruistic. Human beings have to endure the painful effect of being psychologically more altruistic until they reach a certain critical level of psychological altruism ($L_i = 1$ for $C_i = \hat{C}_{oi}$). Above this level, individuals who perceive themselves to be as rich as others ($C_i = \hat{C}_{oi}$), can start enjoying the pleasant impact of being psychologically more altruistic on their well-being.

When $C_i \neq \hat{C}_{oi}$, the critical level of psychological altruism can be either higher or lower than one. For individuals who subjectively think that they are poorer than others ($C_i < \hat{C}_{oi}$)⁵¹, the critical level of psychological altruism is reached at lower than one. On the other hand, the critical level of psychological altruism is higher than one for

$$\begin{aligned}
\frac{\partial U_i}{\partial L_i} &= \left(-\frac{1}{(1+L_i)^2} \right) (M_i - C_{oti})^{\frac{1}{1+L_i}} + \left(\frac{1}{(1+L_i)^2} \right) \left(\hat{C}_{ooi} + C_{oti} \right)^{\frac{L_i}{1+L_i}} \\
&= \left(\frac{1}{(1+L_i)^2} \right) \left(\left(\hat{C}_{ooi} + C_{oti} \right)^{\frac{L_i}{1+L_i}} - (M_i - C_{oti})^{\frac{1}{1+L_i}} \right) \\
&= \left(\frac{1}{(1+L_i)^2} \right) \left(\hat{C}_{oi}^{\frac{L_i}{1+L_i}} - C_i^{\frac{1}{1+L_i}} \right)
\end{aligned}$$

⁵⁰ $C_i = \hat{C}_{oi}$ happens when $C_{oti} = 0 \wedge M_i = \hat{C}_{ooi}$ or $C_{oti} > 0 \wedge M_i = \hat{C}_{ooi} + 2C_{oti}$ or $C_{oti} < 0 \wedge M_i = \hat{C}_{ooi} - 2C_{oti}$.

⁵¹ $C_i < \hat{C}_{oi}$ happens when $C_{oti} = 0 \wedge M_i < \hat{C}_{ooi}$ or $C_{oti} > 0 \wedge M_i < \hat{C}_{ooi} + 2C_{oti}$ or $C_{oti} < 0 \wedge M_i < \hat{C}_{ooi} - 2C_{oti}$.

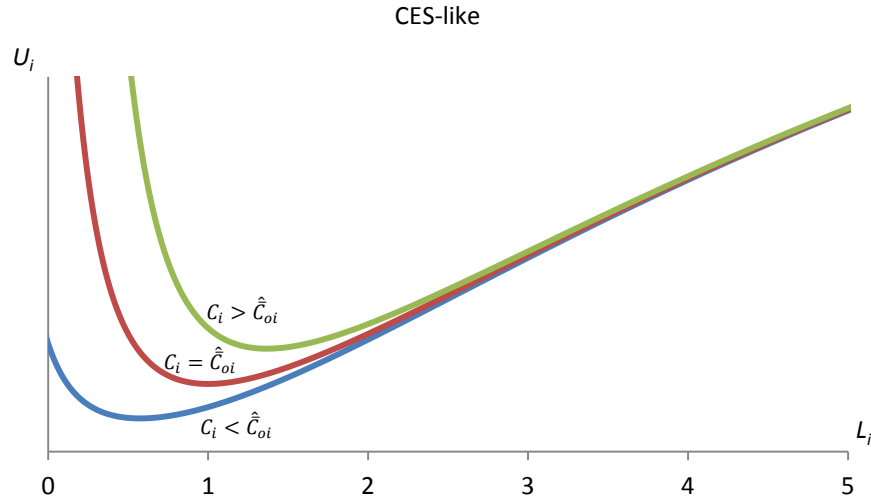


Figure 4.3: Utility as a Function of Psychological Altruism with CES-like Utility Function

individuals who subjectively think that they are richer than others ($C_i > \hat{C}_{oi}$)⁵². The subjectively richer individuals have to endure more pain before being able to experience the joy of being psychological more altruistic.

4.2.5. Summary

In spite of the differences in the pattern of relationships among these three utility functions, these functions share the same general relationship between the level of psychological altruism and well-being. The subjectively richer individuals are less likely to be psychologically altruistic than the subjectively poorer. Considering that behavioural altruism is positively influenced by psychological altruism as shown in equation (2.27), these utility functions also imply that the subjectively richer individuals are less likely to perform altruistic behaviour. This conclusion is supported by empirical studies in psychology that show that the benefit of being altruistic is in greater health well-being (Schwartz et al., 2009) and yet the subjective lower-class individuals are more pro-social than their upper-class counterparts (Kraus, Piff, & Keltner, 2011).

⁵² $C_i > \hat{C}_{oi}$ happens when $C_{oti} = 0 \wedge M_i > \hat{C}_{ooi}$ or $C_{oti} > 0 \wedge M_i > \hat{C}_{ooi} + 2C_{oti}$ or $C_{oti} < 0 \wedge M_i > \hat{C}_{ooi} - 2C_{oti}$

It is important to note that the explanation for the puzzling findings in the psychology literature has been made possible because others' total consumption (C_{oi}) is replaced with the perceived others' average consumption (\hat{C}_{oi}). Chapter 2 shows that because of the adoption of an imperfect information assumption, an individual is no longer capable of acquiring information on the actual total consumption by others (C_{oi}). The actual total consumption should be replaced with the perceived average consumption of others ($\hat{C}_{oi} = \hat{C}_{ooi} + C_{oti}$). Especially in a society where the number of people is large ($n \gg 0$), if the actual total consumption by others had been chosen in the models, own consumption (C_i) would have been unlikely to be greater than C_{oi} in the utility function. Consequently, the models could not have been able to explain why the subjective richer individuals faced a greater challenge to be psychologically altruistic if others' total consumption (C_{oi}) in the utility function in Chapter 2 had not been replaced by the perceived others' average consumption (\hat{C}_{oi}) in the three utility functions .

Health is the main dimension affected by the level of psychological altruism in this non-institutional approach. However, as discussed earlier in Section 4.2.1, the capacity of the health dimension to influence other dimensions of well-being cannot be rejected. Thus, in this non-institutional approach, the level of psychological altruism influences the multidimensional well-being. The relationship between the level of psychological altruism and the well-being of an individual in this section as described in equations (4.2) and (4.3) is summarised in Proposition 4.1 and Figure 4.4.

PROPOSITION 4.1.

- a. *The multidimensional well-being of an individual is positively influenced by the level of psychological altruism of the individual, provided own consumption is less than the perceived average consumption of others ($C_i < \hat{C}_{oi}$);*
- b. *the multidimensional well-being of an individual is not influenced by the level of psychological altruism of the individual, provided own consumption is equal to the perceived average consumption of others ($C_i = \hat{C}_{oi}$); and*

c. the multidimensional well-being of an individual is negatively influenced by the level of psychological altruism of the individual, provided own consumption is greater than the perceived average consumption of others ($C_i > \hat{C}_{oi}$)

when (1) an individual is psychologically altruistic to other members of a society ($L_i > 0$); (2) impure altruism is excluded from the definition of altruism; (3) psychological altruism influences the altruist's individual well-being directly through social interaction $W_{ui} = w_{ui} \left((M_i - C_{oti})^\alpha (\hat{C}_{ooi} + C_{oti})^\beta \right)$; and (4) psychological altruism does not create externalities through institution.

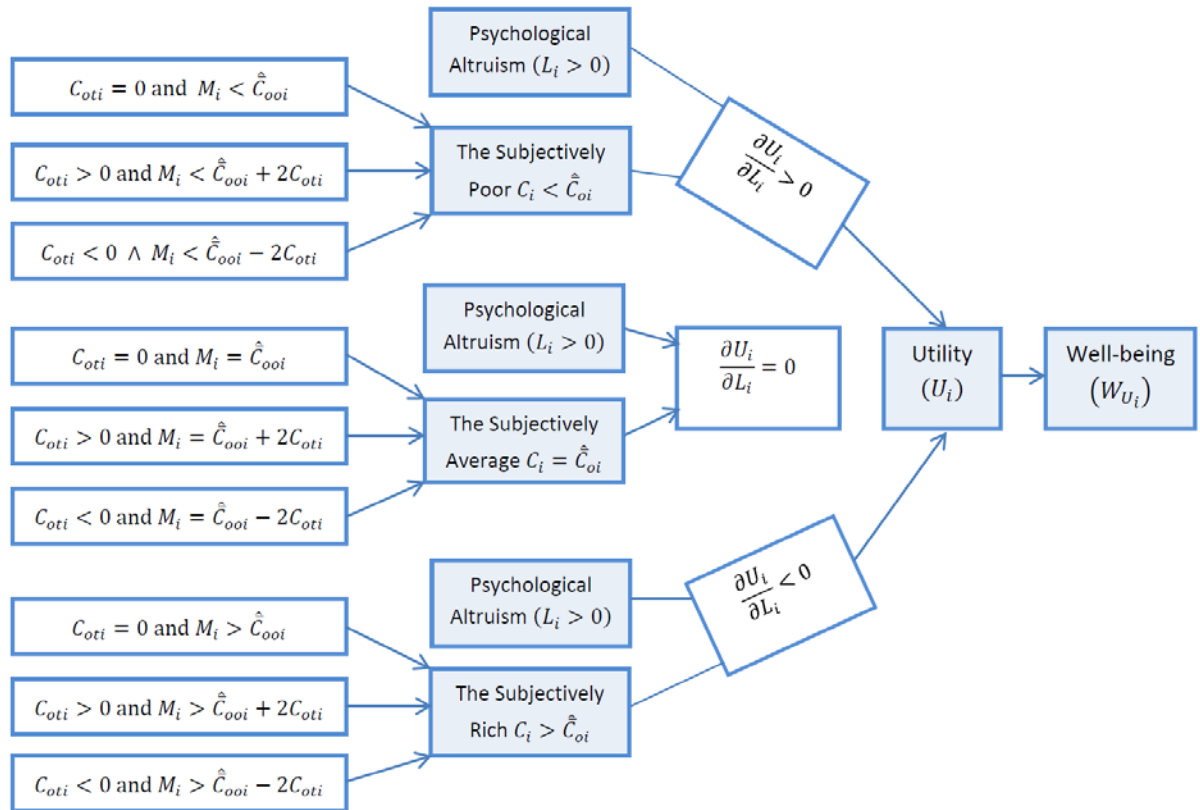


Figure 4.4: The Well-being of an Individual as a Function of Psychological Altruism

4.3. Further Analysis on the Influence of Altruism on Well-being

Section 4.2 shows that, for the subjectively poor individuals, well-being is positively influenced by psychological altruism. The following sections examine other approaches to showing the relationship between psychological altruism and well-being.

4.3.1. An altruist requires less budget to attain the same level of utility

The positive effect of altruism on well-being discussed in the previous section can also be explained in a different way. By being altruistic, an individual can attain the same level of utility with lower budget. Thus, the remaining budget can be utilised in the creation of additional well-being. Figure 4.5.a shows this relationship using the same level of utility ($U_i = k$) at different levels of psychological altruism. The vertical axis is the quantity of own consumption (C_i) and the horizontal axis is for the transfer from individual i to others (C_{oti}). If an individual's level of psychological altruism is zero ($\alpha = 1, \beta = 0 \rightarrow L_i = 0$), the indifference curve will be a horizontal line at $C_i = U_i = k$. If the level altruism is between zero and ∞ , the indifference curves will be hyperbolic curves with a decreasing marginal rate of substitution. Assuming that the price of own consumption is equal to the price of the transfer to others, the slope of the budget line is -1 .

Figure 4.5.a assumes that the perceived initial average consumption by others is higher than the level of utility of an individual ($\hat{C}_{ooi} > k$). Since the perceived initial average consumption by others reflects the perceived average level of utility of others before transfer from individual i , this assumption represents the subjectively poor individual. The figure shows that the higher the level of psychological altruism, the lower the level of budget or resources needed to attain the same level of utility. For example, if the level of psychological altruism is zero ($\alpha = 1$), U_{i1} is the utility curve and the budget needed to attain the utility is $M_{i1} = k$. At the optimum point, the whole budget is spent on own consumption ($C_i = k$) or there is no transfer to others ($C_{oti} = 0$). Meanwhile, $M_{i2} < k$ can attain the same level of utility if the level of psychological altruism is between zero and ∞ ($0 < \alpha < 1$). On this indifference curve, the optimum point is at $C_{i1} < k$ and $C_{oti1} > 0$. The difference between the initial and the new lower budget requirement ($M_{i1} - M_{i2}$) can be utilised by individual i to attain additional well-being. Thus, individual i attains greater well-being.

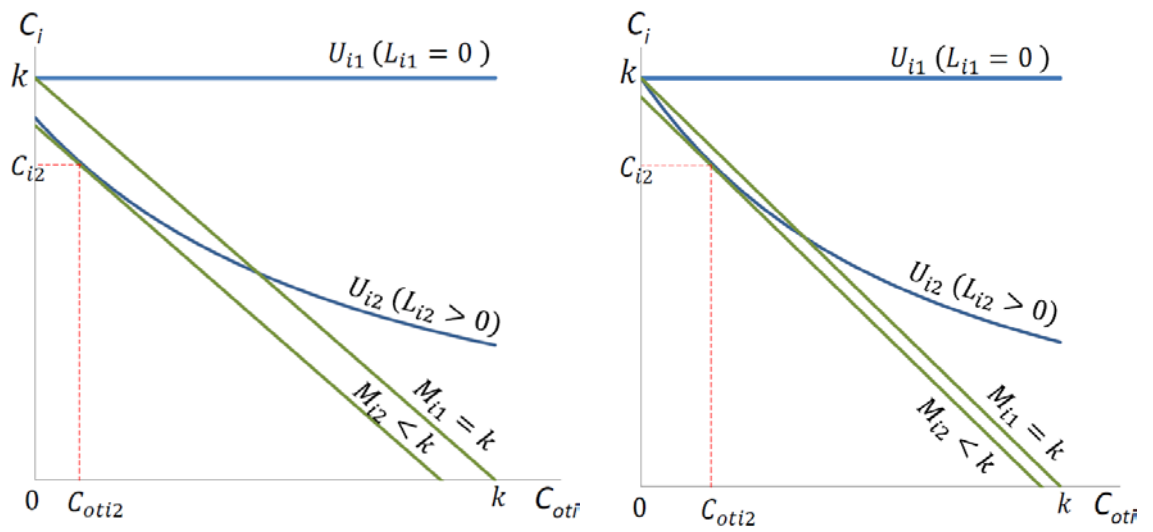
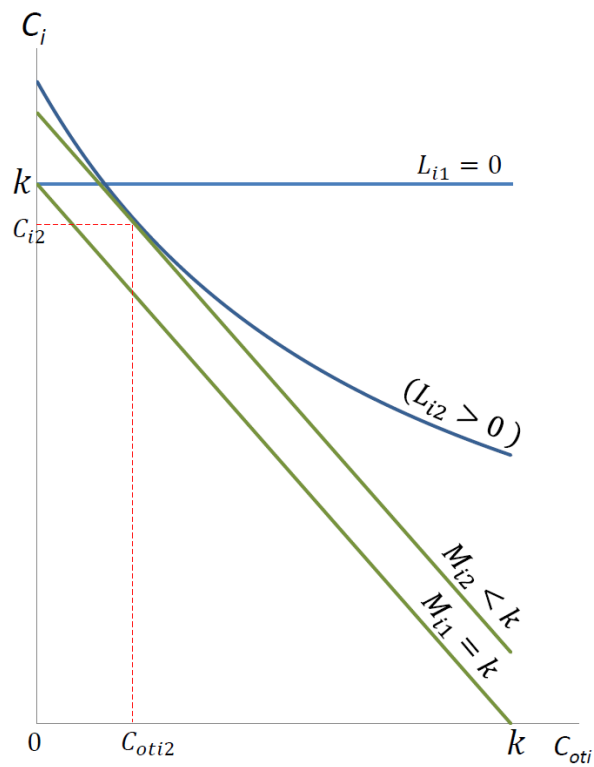
(a) $(\hat{C}_{ooi} > k)$ (b) $(\hat{C}_{ooi} = k)$ (c) $(\hat{C}_{ooi} < k)$ Figure 4.5: The Same Level of Utility ($U_i = k$) at Different Levels of Psychological Altruism

Figure 4.5.b assumes that the perceived initial average consumption by others is equal to the level of individual i 's utility ($\hat{C}_{ooi} = k$). This assumption represents individuals who subjectively perceive themselves as consuming as much as others. For individuals with altruism greater than zero ($\alpha < 1$), as long as the slope of the indifference curve is equal to or less than the slope of the budget line at $C_{oti} = 0$, the maximum utility is always reached with the same budget line at $M_i = k$. The slope of the indifference curve being equal to the slope of the budget line at $C_{oti} = 0$ occurs when⁵³ $\beta/\alpha = 1$ or $\beta = 0.5$ and $\alpha = 0.5$. Accordingly, if the level of psychological altruism is higher than 1 ($\alpha < 0.5$), the same level of utility can be attained by a lower budget line.

Figure 4.5.c assumes that perceived initial average consumption by others is less than the level of individual i 's utility ($\hat{C}_{ooi} < k$). This assumption represents the subjectively richer individuals. With this assumption, greater psychological altruism also enables an individual to attain the same level of utility with lower budget. However, as discussed in Section 4.2, the subjectively richer individuals face a greater challenge to become psychologically more altruistic.

4.3.2. Transaction cost of transfer increases the required level of psychological altruism

The existence of a transaction cost increases the required level of psychological altruism to attain the same level of well-being. The transaction cost of making a transfer can make the price of transfer greater than the price of own consumption ($P_{C_{oti}} > P_{C_i}$). The cost of producing information on where, when, how, what, and to whom to transfer can induce this transaction cost. As a result, the slope of the budget line increases and the budget line rotates from M_{i2} to M_{i3} in Figure 4.6 where $C_i = k$. Initially the optimum point is shown by the point of tangency between M_{i2} and U_{i2} at A . The new optimum point at B requires a higher level of psychological altruism as shown by the indifference

⁵³ Solving $U_i = C_i^\alpha (C_{ooi} + C_{oti})^\beta$ in equation (2.8) for C_i yields $C_i = U_i^{1/\alpha} (C_{ooi} + C_{oti})^{-\beta/\alpha}$. Thus, $\frac{\partial C_i}{\partial C_{oti}} = U_i^{\frac{1}{\alpha}} \left(-\frac{\beta}{\alpha}\right) (C_{ooi} + C_{oti})^{-\frac{\beta}{\alpha}-1}$. As $P_{C_i} = P_{C_{oti}} = 1$, the slope of the budget line is -1 . Figure 4.5.b shows that the slope of the indifference curve is equal to the slope of the budget line when $C_{oti} = 0$ and $\hat{C}_{ooi} = U_i = k$. Accordingly, $\frac{\partial C_i}{\partial C_{oti}} = U_i^{\frac{1}{\alpha}} \left(-\frac{\beta}{\alpha}\right) (C_{ooi} + C_{oti})^{-\frac{\beta}{\alpha}-1} = -1$
 $k^{\frac{1}{\alpha}} \left(-\frac{\beta}{\alpha}\right) k^{-\frac{\beta}{\alpha}-1} = -1$
 $\frac{\beta}{\alpha} = 1$ or $\beta = 0.5$ and $\alpha = 0.5$

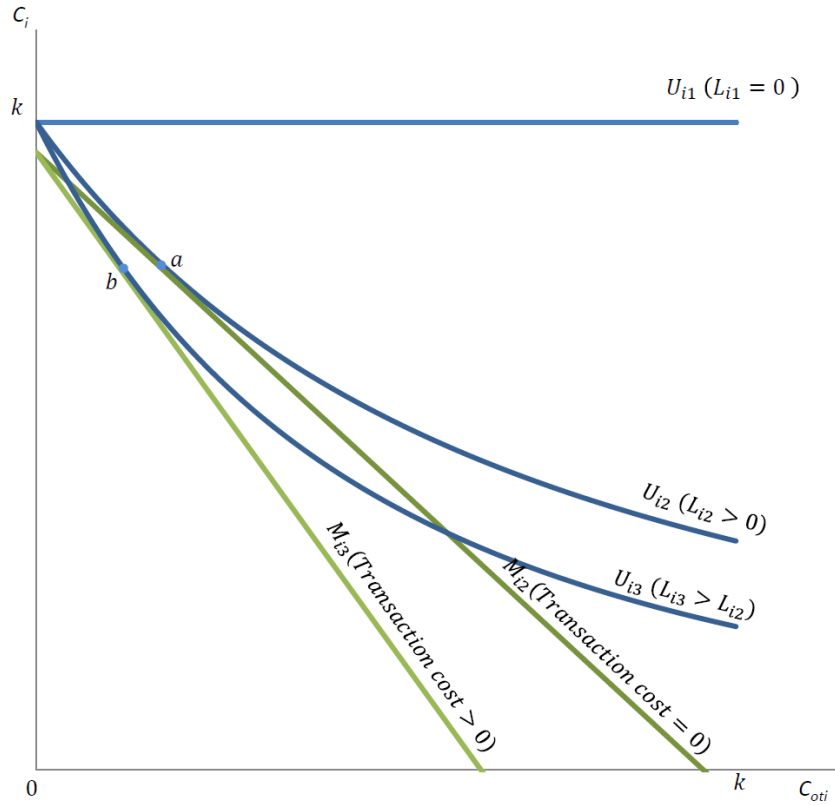


Figure 4.6: The Effect of Transaction Cost of Transfer on the Required Level of Psychological Altruism

curve U_{i3} . Thus, the existence of a transaction cost of transfer causes the need for a higher level of psychological altruism to maintain the same level of utility.

4.3.3. Non-altruist attains lower utility after transfer to others

When transfer behaviour is not based on psychological altruism, the transfer decreases the well-being of the giver. Figure 4.7 shows an individual's initial equilibrium at E_0 , with own consumption of C_i^0 . This individual's level of satisfaction is reflected by the indifference curve U_0 attainable by the budget line $M_i^0 = C_i^0$. The horizontal indifference curve shows that this individual's level of psychological altruism is zero ($\alpha = 1$). If, for example, this individual is forced to give away some of her or his consumption to others, the own consumption will fall to C_i^1 and the transfer is C_{oti}^1 . At this lower level of own consumption, the level of satisfaction is reflected by a lower indifference curve U_1 . The highest indifference curve of U_1 is reached as if the budget line has been shifted to $M_i^1 = C_i^1$. Regardless of the impact of the transfer on others' well-being, the transfer has decreased the level of well-being of this individual. This lower well-

being comes from a lower level of satisfaction, which is reflected by a lower indifference curve, and lower physical well-being, which is reflected by lower own consumption.

4.3.4. Behavioural altruism and the perceived initial average consumption by others

Equation (2.26) can further explain the relationship between behavioural altruism and an individual's subjective self-perception on her or his social class rank. Provided that $L_i > 0$, this equation⁵⁴ implies that people can be classified into three categories based on their critical level of psychological altruism (L_i^*), where

$$L_i^* > \frac{\hat{\bar{C}}_{ooi}}{M_i} \quad (4.10)$$

The critical level shows the minimum level of psychological altruism needed for an individual to have a positive transfer to others ($C_{oti} > 0$). For the subjectively poor individuals ($M_i < \hat{\bar{C}}_{ooi}$), the critical level of psychological altruism is greater than one ($L_i^* > 1$), the critical level is less than one for the subjectively rich ($M_i > \hat{\bar{C}}_{ooi}$), and $L_i^* = 1$ for $M_i = \hat{\bar{C}}_{ooi}$.

Nonetheless, this conclusion does not undermine the conclusion reached in the previous section. The two conclusions combined reflect a 'low behavioural altruism trap'. Section 4.2 shows that subjectively richer individuals face a greater challenge to be psychologically altruistic, while this section shows that the subjectively richer individuals are more likely to transfer to others. The two conclusions simply show the general difficulty of human beings to transfer to others based on pure altruism. On the one hand, subjectively richer individuals require less psychological altruism to transfer, but, unfortunately, they are less likely to be psychologically altruistic. The rich require less psychological altruism to transfer because they think that they have abundant resources. However, they are less likely to be psychologically altruistic because their opportunity cost in being psychologically altruistic is greater. On the other hand, the subjectively poorer are more likely to be psychologically altruistic but unluckily they require greater

⁵⁴ Provided $L_i > 0$, $C_{oti} = \frac{L_i M_i - \hat{\bar{C}}_{ooi}}{1 + L_i} > 0$ if $L_i > \frac{\hat{\bar{C}}_{ooi}}{M_i}$

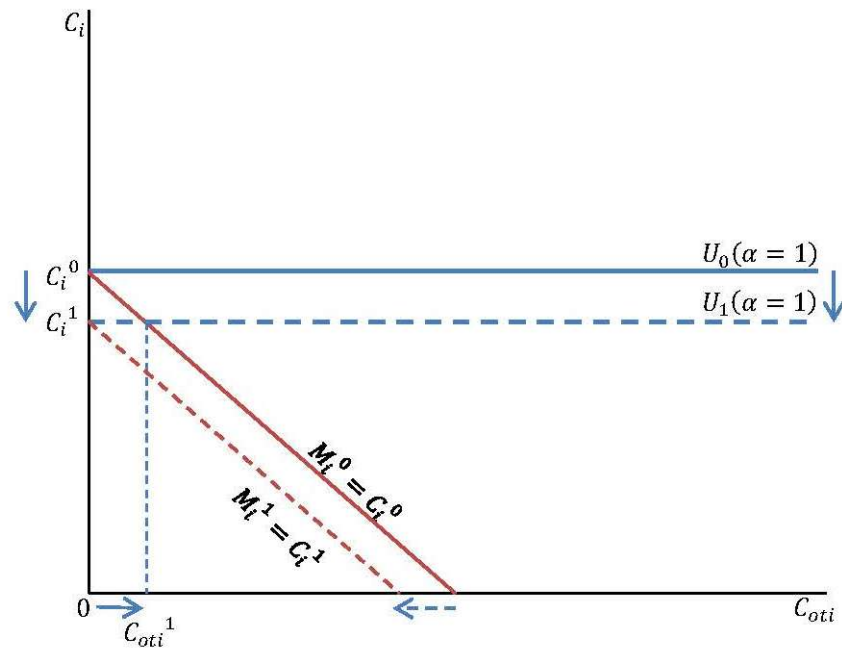


Figure 4.7: Lower Utility after Transfer for Zero Psychological Altruism

psychological altruism to transfer. In contrast to the rich, the poor are less likely to transfer because they are relatively more constrained by their perception of scarce resources. Meanwhile, because they think they consume less than others, they bear a relatively smaller opportunity cost in being psychologically altruistic. Thus the models in this study shows human beings are trapped in low behavioural altruism.

The ‘low behavioural altruism trap’ from the two conclusions above can give an alternative explanation on statements which doubt the existence of altruism. For example, Samuelson (2001) remarks that human nature has a quantum of altruism, but the quantum is sufficiently limited to require rationing. Psychological altruism does exist but pure behavioural altruism is very difficult to perform. In another example, Croson (2007) conducts experiments that give more support on reciprocity motives than altruism in providing public goods⁵⁵.

The relationship between behavioural altruism and the perceived initial average consumption by others is summarised in Proposition 4.2.

⁵⁵ Popp (2001) finds evidence of weak altruism in deciding what level of environmental protection for future generations in the USA, and Samuelson (1993) argues that altruists cannot survive.

PROPOSITION 4.2.

- a. *The minimum level of psychological altruism needed to have a positive transfer to others ($C_{oti} > 0$) is greater than one ($L_i^* > 1$) for an individual whose income is less than the perceived initial average consumption of others ($M_i < \hat{C}_{ooi}$);*
- b. *the minimum level of psychological altruism needed to have a positive transfer to others ($C_{oti} > 0$) is equal to one ($L_i^* = 1$) for an individual whose income is equal to the perceived initial average consumption of others ($M_i = \hat{C}_{ooi}$); and*
- c. *the minimum level of psychological altruism needed to have a positive transfer to others ($C_{oti} > 0$) is less than one ($L_i^* < 1$) for an individual whose income is greater than the perceived initial average consumption of others ($M_i > \hat{C}_{ooi}$)*

when (1) an individual is psychologically altruistic to other members of a society ($L_i > 0$);

(2) impure altruism is excluded from the definition of altruism; (3) psychological altruism

influences the altruist's individual well-being directly through social interaction

$W_i = w_i \left((M_i - C_{oti})^\alpha (\hat{C}_{ooi} + C_{oti})^\beta \right)$; and (4) psychological altruism does not create

externalities through institution.

4.3.5. The level of psychological altruism influences the well-being of both the giver and the receiver

In the non-institutional approach, through social interaction, the well-being of a society is influenced right after the transfer. Both the giver and the receiver experience this change. Related to the four dimensions of well-being discussed in Section 4.2.1. and Appendix 3, the change in the utility or satisfaction of the giver can be best associated with change in the health dimension, especially mental health. Nonetheless, when psychological altruism induces behavioural altruism, the transfer increases the consumption by the receiver. By assuming that the receivers' or others' well-being is positively influenced by their consumption, a greater level of behavioural altruism

increases others' well-being. Because the products to be consumed from the transfer can range from food, clothes, houses, education, and leisure to spiritual activities, the increase in consumption positively influences all dimensions of the well-being of the receivers.

The total effect to the society from this non-institutional approach is unclear. As discussed above, others' well-being is positively influenced by behavioural altruism. However, as shown in Section 4.2, there is an ambiguous effect on society from psychological altruism. Only when most of the members of a society perceive that others' consumption is greater than own consumption is well-being positively influenced by the level of psychological altruism.

Figure 4.8 shows the effect of psychological and behavioural altruism on the well-being of the giver and receiver. Both own consumption and transfer to others consist of product A and B . With the budget line at M_i and the level of psychological altruism L_i , if individual i chooses point E_i^0 , this individual's own consumption will be at C_i^0 and transfer to others at C_{oti}^0 . With this combination, individual i maximises her or his utility. If this individual increases the level of psychological altruism, E_i^0 is no longer the optimum point. To maximise the utility, if this individual sacrifices ΔC_i of her or his own consumption to be able to give away ΔC_{oti} to others, the combination between own consumption and transfer moves to point E_i^1 . Own consumption decreases to C_i^1 and transfer increases to C_{oti}^1 . E_i^1 is the new optimum point. Section 4.2 shows that the increase in the level of psychological altruism which causes the movement from E_i^0 to E_i^1 can either increase or decrease⁵⁶ the utility of individual i .

Before the transfer from individual i , others consume C_{oiA}^0 of product A and C_{oiB}^0 of product B at point E_{oi}^0 . If the proportion of product A in the transfer from individual i is a and b product B , others' consumption of product A will increase by $a\Delta C_{oti}$ and product B will increase by $b\Delta C_{oti}$. After the increase, others' consumption becomes C_{oiA}^1 and C_{oiB}^1 at point E_{oi}^1 . With this new combination, others' satisfaction is

⁵⁶ For individual i , if own consumption and transfer at individual i 's equilibrium are $C_i^1 = C_i^0 - \Delta C_{oti}$ and $C_{oti}^1 = C_{oti}^0 + \Delta C_{oti}$, individual i 's utility at equilibrium will be $U_i^1 = (C_i^0 - \Delta C_{oti})^\alpha (C_{ooi} + C_{oti}^0 + \Delta C_{oti})^\beta$ and the utility when the transfer is less than the equilibrium level ($C_{oti}^0 < C_{oti}^1$) will be $U_i^1 = (C_i^0)^\alpha (C_{ooi} + C_{oti}^0)^\beta$. Section 4.2 shows that $\frac{U_i^1}{U_i^0} = \frac{(C_i^0 - \Delta C_{oti})^\alpha (C_{ooi} + C_{oti}^0 + \Delta C_{oti})^\beta}{(C_i^0)^\alpha (C_{ooi} + C_{oti}^0)^\beta} \gtrless 0$ or $U_i^1 \gtrless U_i^0$.

reflected by a higher indifference curve⁵⁷ at U_{oi}^1 . Therefore, the higher psychological altruism shown by individual i creates an ambiguous effect on individual i 's well-being and an increase on others' well-being. This means that the well-being of the society as a whole can either increase or decrease.

When ΔW_{U_i} is the non-institutional change in the multidimensional well-being of individual i caused by the change in i 's utility, and $\Delta W_{U_{oi}}$ is the non-institutional change in the multidimensional well-being of others caused by a change in others' utility, the total non-institutional effect caused by individual i 's psychological altruism (ΔW_{NSi}) can be expressed as

$$\Delta W_{NSi} = \Delta W_{U_i} + \Delta W_{U_{oi}} \quad (4.11)$$

The non-institutional change in multidimensional well-being with respect to a change in the level of psychological altruism can be expressed as

$$\frac{\partial W_{NSi}}{\partial L_i} = \frac{\partial W_{U_i}}{\partial L_i} + \frac{\partial W_{U_{oi}}}{\partial L_i} \quad (4.12)$$

Provided from the discussion above that $\partial W_{U_i}/\partial U_i > 0$; $\partial W_{U_{oi}}/\partial U_{oi} > 0$; $\partial U_i/\partial L_i \leq 0$; $\partial U_{oi}/\partial C_{oti} > 0$; $\partial C_{oti}/\partial L_i > 0$; and $\partial U_{oi}/\partial L_i > 0$, therefore

$$\frac{\partial W_{U_i}}{\partial L_i} \leq 0 \text{ and } \frac{\partial W_{U_{oi}}}{\partial L_i} > 0 \quad (4.13)$$

Thus

$$\frac{\partial W_{NSi}}{\partial L_i} \leq 0 \quad (4.14)$$

⁵⁷ Others' utility when individual i is at equilibrium is $U_{oi}^1 = (C_{oiA}^0 + a\Delta C_{oti})^\pi (C_{oiB}^0 + b\Delta C_{oti})^\varphi$, and others' utility when individual i 's transfer is less the equilibrium level is $U_{oi}^1 = (C_{oiA}^0)^\pi (C_{oiB}^0)^\varphi$, where π and φ are the elasticity of others' utility with respect to the consumption of product A and B . Because $a, b, \Delta C_{oti} > 0$, therefore $\frac{U_{oi}^1}{U_{oi}^0} = \frac{(C_{oiA}^0 + a\Delta C_{oti})^\pi (C_{oiB}^0 + b\Delta C_{oti})^\varphi}{(C_{oiA}^0)^\pi (C_{oiB}^0)^\varphi} > 0$ or $U_{oi}^1 > U_{oi}^0$.

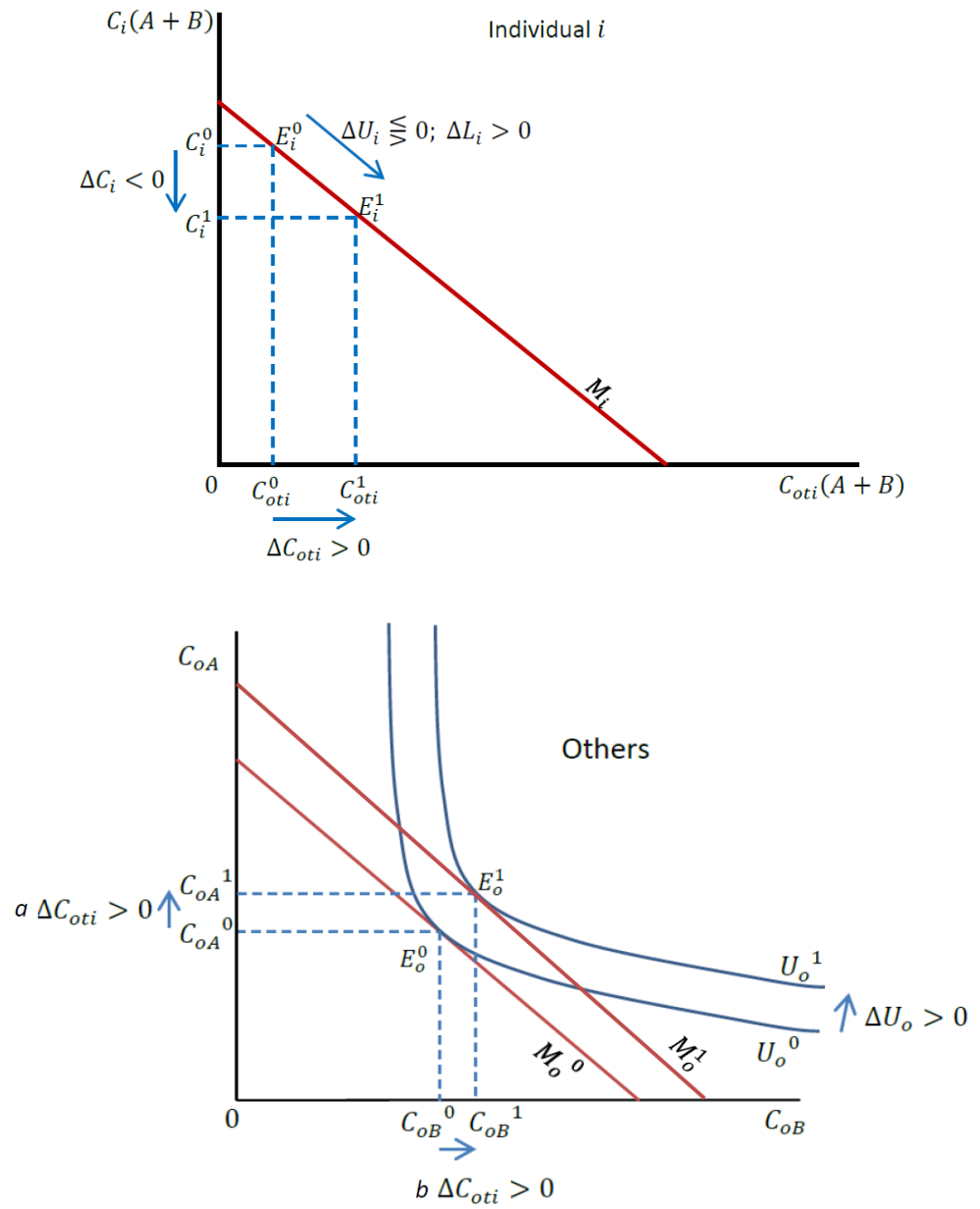


Figure 4.8: The Non-institutional Effect of Psychological Altruism on the Well-being of the Giver and Receiver

and for the society as a whole

$$\frac{\partial W_{NS}}{\partial L_S} = \sum_{i=1}^n \frac{\partial W_{NSi}}{\partial L_i} = \sum_{i=1}^{n-1} \frac{\partial W_{U_i}}{\partial L_i} + \sum_{i=1}^{n-1} \frac{\partial W_{U_{oi}}}{\partial L_i} \leq 0 \quad (4.15)$$

Figure 4.9 and Proposition 4.3 summarise the effect of transfer to both the giver and the receiver.

PROPOSITION 4.3.

The multidimensional well-being of a society can be positively, negatively, or not at all influenced by the level of psychological altruism of an individual, when (1) an individual is psychologically altruistic to other members of a society ($L_i > 0$); (2) impure altruism is excluded from the definition of altruism; (3) psychological altruism influences the altruist's individual well-being directly through social interaction $W_i = w_i \left((M_i - C_{oti})^\alpha \left(\hat{C}_{ooi} + C_{oti} \right)^\beta \right)$; and (4) psychological altruism does not create externalities through institution.

4.4. Conclusion

The main conclusion from this non-institutional approach can offer an explanation for some empirical studies in psychology. On the one hand, the well-being of an altruist is positively influenced by psychological altruism. On the other hand, subjectively poorer individuals show greater behavioural altruism than subjectively richer individuals. Because of the adoption of an imperfect information assumption, the models in this study have been able to come to these conclusions. Using this assumption, others' total consumption (C_{oi}) in the utility function has been replaced by the perceived others' average consumption (\hat{C}_{oi}).

The main findings in this chapter are summarised as follows:

- In the non-institutional approach, the behavioural altruism of an individual creates a positive effect on the well-being of a society, but the level of psychological altruism creates an ambiguous effect on the well-being of the altruist (equation (4.13)). The ambiguity appears because a positive marginal well-being of the level of psychological altruism is only relevant for people who subjectively perceive themselves as having fewer resources than others. In contrast, the well-being of people who perceive themselves as richer than others is negatively influenced by their level of psychological altruism (equation (4.3)). These subjectively richer individuals face a tougher challenge to become more altruistic because for them

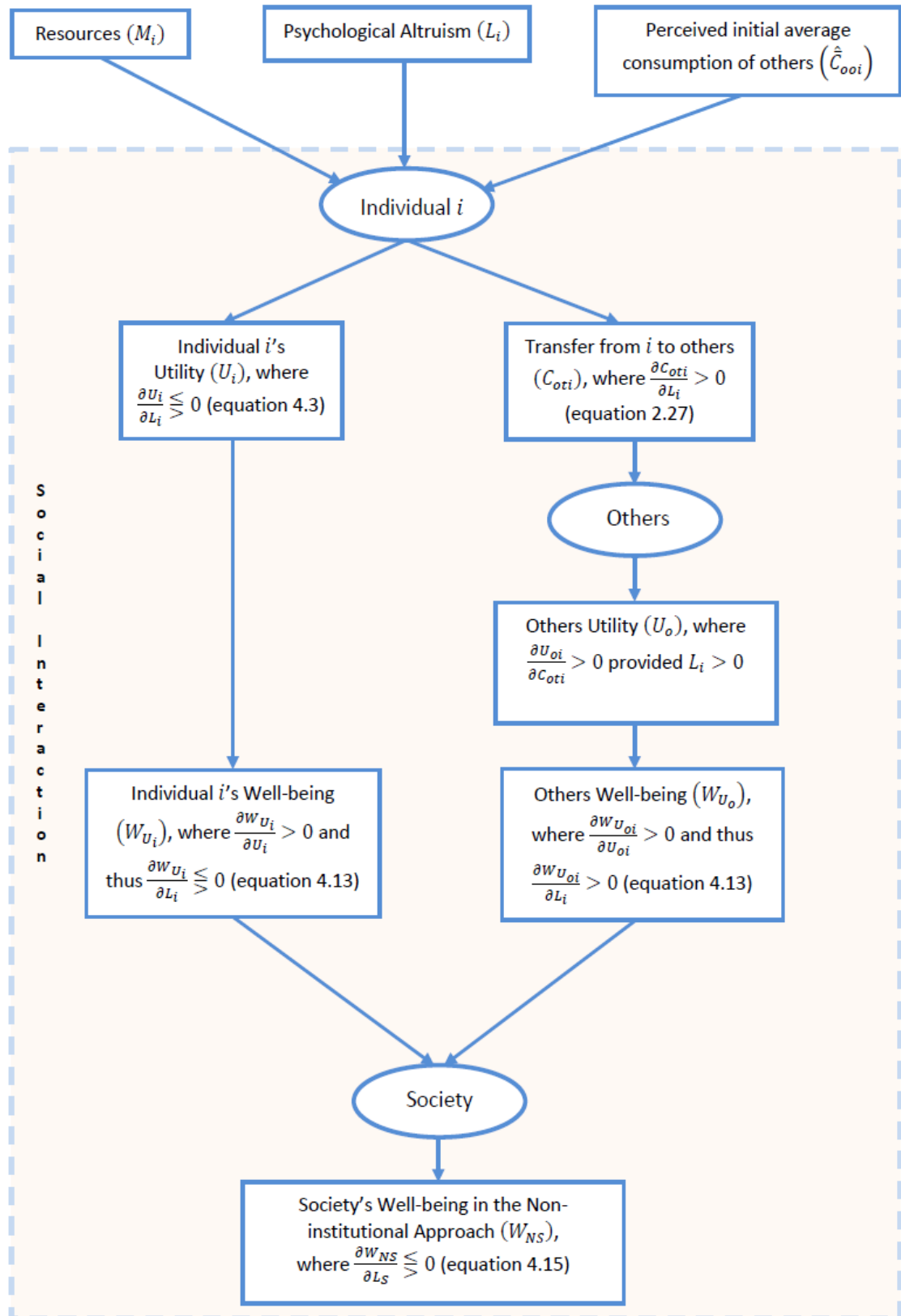


Figure 4.9: The Effect of Psychological Altruism on the Society in the Non-institutional Approach

there is a greater opportunity cost in increasing their level of psychological altruism. Since the ratio of a population regarding the subjectively poor and the subjectively rich cannot be theoretically presumed in this study, the role of psychological altruism in the well-being of the altruist in the society becomes ambiguous.

- The models in the non-institutional approach also show a 'low behavioural altruism trap'. This trap reflects the general difficulty human beings face in a transfer to others when based on pure altruism. On the one hand, the subjectively rich have a lower critical level of psychological altruism (equation (4.10)), and this critical level is the required minimum level of psychological altruism to transfer. However, they face a greater opportunity cost of being psychologically altruistic (equation (4.3)). On the other hand, the subjectively poor are more likely to be psychologically altruistic (equation (4.3)) but unfortunately they require greater psychological altruism to transfer (equation (4.10)). Therefore, the society as a whole is trapped with a low level of pure behavioural altruism.

This chapter has only discussed the direct effect of the change in the level of psychological altruism on the well-being of both the giver and receiver of transfer in the same period. However, the change in the own and others' consumption as a result of the change in the level of psychological altruism will affect the well-being of the society in the next period. This further effect of psychological altruism works through institution and will be discussed in Chapter 5.

CHAPTER 5. THE INSTITUTIONAL APPROACH TO THE ROLE OF ALTRUISM IN WELL-BEING

5.1. Introduction

This chapter discusses how psychological altruism influences well-being through institution. The models are based on the framework developed earlier in Chapters 2 and 3. Section 5.2 begins by explaining the relationship between institutional and non-institutional approaches. By applying the 5 levels of institution from Williamson (2000) and also the externalities of social capital from Collier (2002), Section 5.3 shows the role of psychological altruism in institution and well-being. Through institution, psychological altruism does not influence only the income dimension of well-being, but also other dimensions. The complete role of altruism in multidimensional well-being, which combines the non-institutional and institutional approaches, is presented in Section 5.4.

5.2. The Initial Ambiguity in the Direction of the Net Institutional Effect

The institutional effect is the change in multidimensional well-being in the next period of socio-economic activities caused by the changes of consumption in the non-institutional approach. The non-institutional approach only discusses the direct effect of the change in the level of psychological altruism on the well-being of both the giver (ΔW_{U_i}) and receiver of transfer ($\Delta W_{U_{oi}}$) in the same period. However, the change in an individual's own and others' consumption as a result of a change in the level of psychological altruism will affect the well-being of the society in the next period. Therefore, the institutional effect consists of two elements: $\Delta W_{IS} = \Delta W_{C_i} + \Delta W_{C_{oi}}$ where ΔW_{IS} is the total institutional effect; ΔW_{C_i} is the institutional effect from the change in C_i ; and $\Delta W_{C_{oi}}$ is the institutional effect from the change in C_{oi} .

Chapter 4 has shown that, in the non-institutional approach, the effect of the change in the level of psychological altruism on well-being is ambiguous. The ambiguity comes from the fact that the direction of the effect mainly depends on an individual's perception about the average consumption of others compared to her or his own consumption. Only when own consumption is less than the perceived average

consumption of others ($C_i < \hat{C}_{oi}$) is well-being positively influenced by the level of psychological altruism. Thus for the society as a whole, the ratio between people with $C_i < \hat{C}_{oi}$ and those with $C_i > \hat{C}_{oi}$ matters. As this ratio cannot be theoretically presumed in this study, the role of psychological altruism in well-being in the non-institutional approach becomes ambiguous.

In the institutional approach, the ambiguity can come from the magnitude of the institutional effect from the change in C_i (ΔW_{C_i}) compared to the effect from the change in C_{oi} ($\Delta W_{C_{oi}}$). Because $\partial W_{C_i}/\partial C_i > 0$; $\partial W_{C_{oi}}/\partial C_{oi} > 0$ while $\partial C_i/\partial L_i < 0$; $\partial C_{oi}/\partial L_i > 0$ ⁵⁸, hence $\partial W_{C_i}/\partial L_i < 0$ and $\partial W_{C_{oi}}/\partial L_i > 0$. This means $\Delta W_{C_i} < 0$ and $\Delta W_{C_{oi}} > 0$ for $\Delta L_i > 0$. Accordingly, since $|\partial C_i/\partial L_i| = |\partial C_{oi}/\partial L_i|$, the relative magnitude of $\partial W_{C_i}/\partial C_i$ compared to $\partial W_{C_{oi}}/\partial C_{oi}$ matters. However, up to this point, theoretically it is still difficult to conclude whether the magnitude of $\frac{\partial W_{C_i}}{\partial C_i}$ is greater or equal to or less than $\frac{\partial W_{C_{oi}}}{\partial C_{oi}}$. Only if the marginal product of the resources sacrificed by individual i ($MP_{\Delta C_i}$) is equal to the marginal product from the increased resources received by others ($MP_{\Delta C_{oi}}$) is the net institutional effect of these two elements zero. Therefore, $(MP_{\Delta C_i} = MP_{\Delta C_{oi}}) \rightarrow \left(\frac{\partial W_{C_i}}{\partial C_i} + \frac{\partial W_{C_{oi}}}{\partial C_{oi}} = 0\right)$. Because of this ambiguity, the total institutional effect also becomes unclear.

The marginal product of resources transferred to others can be higher than if they are used for own consumption ($MP_{\Delta C_i} < MP_{\Delta C_{oi}}$). This hypothesis holds especially if an individual transfers only the kinds of resources s/he has in abundance. The more abundant the resources, the more likely an individual to experience lower marginal product from employing those resources. These resources are then transferred to others or for other purposes which face scarcity of these resources. Because they are scarce, these resources are unlikely to be overemployed. Thus, after the transfer, these resources are employed in higher marginal product activities. Public goods can be classified as examples; because of the existence of positive externalities, public goods are usually under provided. Transfer relocates resources from less productive individual uses to

⁵⁸ As M_i and C_{oi} are assumed to be exogenous, while $C_i = M_i - C_{oti}$ in equation (2.14); $C_{oi} = C_{ooi} + C_{oti}$ in equation (2.2); and $\frac{\partial C_{oti}}{\partial L_i} = \frac{M_i + \hat{C}_{ooi}}{(1+L_i)^2} > 0$ in equation (2.27), thus $\frac{\partial C_i}{\partial L_i} = -\frac{M_i + \hat{C}_{ooi}}{(1+L_i)^2} < 0$ and $\frac{\partial C_{oi}}{\partial L_i} = \frac{M_i + \hat{C}_{ooi}}{(1+L_i)^2} > 0$.

relatively more productive activities to produce more public goods. One of the characteristics of a typical public good, compared to private uses, is the need for greater production of scale to be economical. One percent of the resources relocated from an individual purpose to a public purpose may add more than one percent of the additional output for society. In this case, $|\Delta W_{Ci}| > |\Delta W_{Coi}|$, and provided that $\Delta W_{Ci} < 0$ and $\Delta W_{Coi} > 0$, hence $\Delta W_{IS} > 0$ or $\frac{\partial W_{IS}}{\partial L_i} > 0$.

However, the actual relative magnitude of $MP_{\Delta Ci}$ compared to $MP_{\Delta Coi}$ depends on the 'rules of the game' or the institution in a society⁵⁹. A suitable institution enables the transferred resources to be employed in activities which create externalities in such a way that $MP_{\Delta Ci} < MP_{\Delta Coi}$. The increase in output after the transfer is greater than the sacrificed output if the resources are self-consumed or $(\partial MP_{\Delta Coi} / \partial MP_{\Delta Ci}) / \partial I > 0$ where I is institution. These externalities include a lower transaction cost, more knowledge, and higher capacity for delivering coordinated actions. This is discussed in more detail in Section 5.3.

Nevertheless, psychological altruism also supports the formation of institution through social interaction⁶⁰. Equation (3.15) shows that behavioural altruism supports social interaction. As behavioural altruism is positively influenced by psychological altruism as presented in equation (2.26), psychological altruism also supports social interaction. Moreover, as discussed in Chapter 3, culture, social capital, as well as institution cannot exist without social interaction. Therefore, the formation of institution is also influenced by psychological altruism through social interaction.

When the quality of the institution partly depends on the average level of psychological altruism in a society⁶¹, the relative magnitude of $MP_{\Delta Ci}$ compared to $MP_{\Delta Coi}$ also depends on the average level of psychological altruism in a society. Technically, because $\frac{\partial I}{\partial L_S} > 0$ and $\frac{\partial \frac{MP_{\Delta Coi}}{MP_{\Delta Ci}}}{\partial I} > 0$, thus $\frac{\partial \frac{MP_{\Delta Coi}}{MP_{\Delta Ci}}}{\partial L_S} > 0$. In short, when the average level of psychological altruism in a society is sufficiently high, $MP_{\Delta Coi}$ can be higher than $MP_{\Delta Ci}$.

⁵⁹ Transfer or aid will be more effective if it is managed with good policies (Burnside & Dollar, 2000).

⁶⁰ Helsley & Strange (2000) shows the importance of social interaction in institution.

⁶¹ Section 5.3.1 provides the explanation.

In conclusion, if the average level of psychological altruism in a society is sufficiently high, the total institutional effect of transfer behaviour on multidimensional well-being will be positive. This conclusion can be formalised as

$$\left\{ \left(L_S = \frac{\sum_{i=1}^n L_i}{n}; \Delta W_{IS} = \Delta W_{C_i} + \Delta W_{C_{oi}} \right); \left(\Delta L_i > 0; \frac{\partial C_i}{\partial L_i} < 0; \frac{\partial W_{C_i}}{\partial C_i} > 0 \rightarrow \frac{\partial W_{C_i}}{\partial L_i} < 0 \rightarrow \right. \right. \\ \left. \Delta W_{C_i} < 0 \right); \left(\Delta L_i > 0; \frac{\partial C_{oi}}{\partial L_i} > 0; \frac{\partial W_{C_{oi}}}{\partial C_{oi}} > 0 \rightarrow \frac{\partial W_{C_{oi}}}{\partial L_i} > 0 \rightarrow \Delta W_{C_{oi}} > 0 \right); \left(\frac{\partial I}{\partial L_S} > \right. \\ \left. 0; \frac{\partial \frac{MP_{\Delta C_{oi}}}{MP_{\Delta C_i}}}{\partial I} > 0 \rightarrow \frac{\partial \frac{MP_{\Delta C_{oi}}}{MP_{\Delta C_i}}}{\partial L_S} > 0 \right) \left. \right\} \rightarrow \therefore \Delta W_{IS} = f(L_S); \frac{\partial \Delta W_{IS}}{\partial L_S} > 0 \blacksquare$$

In short, in this institutional approach, the multidimensional well-being of a society is positively influenced by the average level of psychological altruism in the society. The next sections examine this explanation in more detail.

5.3. The Externalities from Social Capital and Institution Eliminates the Ambiguity

5.3.1. The role of psychological altruism in institution

The social analysis used to discuss the ‘new institutional economics’ in Williamson (2000) consists of four levels, but starts at level zero, so there are technically 5 levels. Level zero is where the evolutionary process inside the mind takes place. Social interaction from time to time modifies things inside human beings’ minds such as intelligence, talents, tastes, preferences, habits, values, and beliefs. Things inside the mind then lead the way each individual thinks, acts, and reacts in interacting with other individuals that will eventually establish the first level. Psychological altruism can be classified as one among various other psychological factors being considered in this level which have their influences on the first level. Moreover, Williamson (2000) remarks that social scientists should be prepared to address the self-interestedness and opportunism of human actors.

The first level is informal institutions where social embeddedness such as norms⁶², religious beliefs⁶³, customs, mores, and traditions are located. Considering the influence of psychological altruism on social interaction as described in Chapter 3, this first level is the result of social interaction. The shared values and beliefs or culture are consequently the base for informal institutions embedded in the society. In other words, informal institutions are influenced by psychological altruism through social interaction.

In the second level is the institutional environment or the formal institutions such as constitutions, laws, and property rights. These formal 'rules of the game' can also be interpreted as the rules in executive, judicative, and legislative institutions. Because the formal-ness of these rules can be explained as the availability of a formal enforcement mechanism, Ahrens (2002) adds one more element; regulation in private organisation. These 'rules of the game' are influenced by informal rules. Because formal institutions in the second level are influenced by informal institutions in the first level, and in the previous process culture influences informal 'rules of the game', in general it can be concluded that culture shapes institutions. Eisenstadt (1986) indicates systematically how crucially important the role of culture is in the formation of institutions by transforming culture into the basic premises of civilisation; social and political order. Thus culture has an important role in addressing problems in division of labour, construction of trust, regulation of power, and the construction of the meaning of human activities⁶⁴.

The third level is the 'play of game' or the enforcement of contracts⁶⁵, which describes the functioning of the 'rules of the game'. The quality or the functionality of the 'rules of the game' is the concern in this level of analysis.

The final step is the resource allocation level, which concerns the transaction cost as the consequence of mal-adaption in enforcing a contract. Williamson (2005) explains that uncertainty – from human behaviour, nature, and technology – causes disturbances, and mal-adaption is the consequence of such disturbances⁶⁶. The quality of the 'rules of

⁶² Norms impose internal constraints so that individuals do not behave opportunistically (Buchanan, 1994), and norms can reduce transaction costs (Young, 1998).

⁶³ Barro & McCleary (2003) show the influence of religious beliefs on individual traits that enhance economic performance.

⁶⁴ For empirical studies that support the role of culture in wellbeing see, for example, Dockery (2010).

⁶⁵ Hurwicz (1987; 2008) also shows the importance of contracts enforcement in institutions.

⁶⁶ North (1987) offers a theoretical framework to show the impact of transaction costs on economic growth.

the game', both formal and informal, will determine the ability of contracts to handle conflict which arises from mal-adaption based on mutuality and order.

Thus, psychological altruism works in three ways when influencing transaction cost. First, psychological altruism reduces uncertainty originating from human behaviour because the higher the level of psychological altruism of other people, the higher the predictability of others' behaviour concerning their compliance to contracts. The possibility of people deviating from contracts for the sake of fulfilling their self-interests by sacrificing others' rights becomes lower. Likewise, as discussed in Chapter 3, psychological altruism that works through social interaction and culture brings uniformity expressed in lower variability of psychological altruism. Second, as a consequence of the first, psychological altruism minimises conflicts arising from mal-adaptation because agents are not selfish. A higher level of psychological altruism creates a lower incidence of cheating in contracts implementation. Third, psychological altruism increases the capacity of the 'rules of the game' to reach mutuality and order in managing conflicts. However, mal-adaptations can still arise through the highly altruistic parties involved in a contract, because uncertainty does not solely come from human behaviour. Natural disaster, extreme weather, weakness in technology, and misunderstanding are also potential sources of conflict. Nevertheless, these kinds of conflicts will be easier to settle if a high enough level of psychological altruism is found in the individuals so that in the end mutuality and order can be achieved.

This means that the channels through which culture reduces transaction costs are the level of reliability of human behaviour and how human behaviour favours not only her or his own interests but also the interests of others. In the model developed in Chapter 3, these two channels are the variability in the level of psychological altruism – lower variability implies higher reliability – and the level of psychological altruism in the society. When informal and formal rules are less than perfect in anticipating mal-adaption, the transaction cost is greater than zero. Connecting the first level through to the fourth level of institutional analysis in Williamson (2000) yields a view that the coherence in the society, or social capital, influences the formation of the 'rules of the game' and thus also influences the transaction cost. By relating this study to Williamson's four plus zero levels of institutional analysis as mentioned above, the whole idea of this study can be summarised as finding the role of the zero level, which is represented by

psychological altruism in the fourth level, and that will eventually shape the general well-being of a society.

The discussion above implies that the capacity of a society for providing public goods also comes from the capacity of psychological altruism in minimising free-riding behaviours. Free-riding can be considered as the behaviour of transferring others' resources to an individual's own resources. Technically, this also means that free-riding exists when

$$C_{oti} = \frac{(\beta/\alpha)M_i - \hat{C}_{ooi}}{1+\beta/\alpha} < 0$$

Thus, there are two possible causes of free-riding behaviour in an individual; a low level of psychological altruism and/or resources shortage. Put differently, the higher the level of psychological altruism, the lower the possibility of free-riding behaviours. When the point of view is broadened to society in general, a higher level of psychological altruism in the members of the society (L_{sc}) enables lower levels of free-riding activities in the society.

To conclude the role of psychological altruism in the institution, the reliability of the level of psychological altruism in the members of the society and in the society in general determines the capability of the society to deliver lower transaction costs. Thus, institution can be described using psychological altruism as

$$I = \frac{L_{sc}}{\theta_{sc}^L} \quad (5.1)$$

where I reflects the quality of institution referred to as the 'play of the game' in the third level in institutional analysis in Williamson (2000), θ_{sc}^L is the variability or standard deviation of the level of psychological altruism in the society, thus $1/\theta_{sc}^L$ reflects the reliability of behaviour, and L_{sc} is the level of psychological altruism in the society which reflects the predictability of behaviour. Substituting equation (3.34) into (5.1) yields

$$I = \frac{S_{sc}}{\theta_{sc}^L} \quad (5.2)$$

Predictability of behaviour can also be represented by the social capital or coherence within the society (S_{sc}).

The relationship between altruism and institution is then formalised in Definition 5.1.

DEFINITION 5.1. *Institution or the ‘play of the game’ in a society can be expressed as the product of the social capital (S_{sc}) and the reliability of the level of psychological altruism ($1/\theta_{sc}^L$) in the society after social interaction when*

- (1) an individual is psychologically altruistic to other members of a society; and*
- (2) impure altruism is excluded from the definition of altruism.*

Equations (5.1) and (5.2) do not only formalise the meaning of institution as in Williamson (2000), but also as in Collard (1978). Collard presents the importance of the level of altruism and the reliability of behaviour of the members of a society in achieving the social payoff (as defined by equations (5.1) and (5.2) above) in a different way. The prisoner’s dilemma game is transformed into an assurance game to show the role of two key factors – unselfishness or psychological altruism and assurance – in determining the co-operation policy chosen by individuals in a society. Trust in human nature based on a previous record of co-operation forms a certain level of assurance that someone will or will not choose a co-operation strategy in the game. On one hand, unselfishness of course can be easily associated with the level of psychological altruism. On the other hand, assurance is essentially the reliability of behaviour. In an assurance game, the total payoff obtained by a society is simultaneously influenced by the level of unselfishness and the assurance of the members. If there is no assurance, a very high level of unselfishness is required for the members to choose a cooperative strategy. In other words, the more assurance there is, the less unselfishness needed by a society to end up with higher payoffs resulting from the cooperative strategy chosen by its members. In short, Collard’s (1978) two factors which determine social payoff neatly fit the two factors which form the ‘play of the game’ in Williamson (2000). In the present study, the two factors are

technically called the level of psychological altruism and the reliability of the level of psychological altruism.

5.3.2. The role of institution in multidimensional well-being

In reviewing the role of social capital in well-being through institution, Collier (2002) does not mention only a lower transaction cost as the result of increased social capital, but rather there are three externalities generated by social capital through one-way interaction, copying, and pooling of resources and information in social interactions. The first externality comes from the predictability and reliability of the agents' behaviour. This kind of behaviour is the cause of the lower transaction cost, which is also the only explanation for the impact of institution in Williamson's approach.

The second externality appears as a one-way observation, copying, and pooling of resources that gives agents chances to acquire more knowledge from other agents or from the organisations which pool information. Moreover, the pooling of resources and information does not only facilitate a transfer of knowledge from one member to another, but also enables organisations to innovate. Innovation can take place in many fields, such as farming, engineering, and also organisation. The key terms in this process that allow copying of knowledge and pooling of information are the reliability of agents' behaviour in general and the level of psychological altruism. This kind of psychological altruism in a society induces agents to be willingly involved in social interaction to acquire new knowledge, and the level of psychological altruism in each member of the society motivates individuals to share their knowledge in social interaction. Besides information, it is also possible to transfer other kinds of resources to other members, such as income or leisure. Transferring income, goods, and time or leisure – providing services to others – from relatively wealthier members to others contributes to lower poverty and higher income equality.

The third externality is brought about by the capacity to deliver coordinated action generated from informal and formal rules. The reliability of agent's behaviour and the extent to which agents value others' well-being establishes a capacity for coordinated action. Several of the benefits gained from a higher capacity for coordinated action are: greater provision of public goods; larger economies of scale from non-market activities;

and a lower transaction cost from lower unfair behaviours in arrogating others' rights. This externality can be greater income or economic well-being for the members of the society. Nevertheless, because it also promotes greater provision of public goods, other dimensions of well-being – such as health, knowledge, and equality⁶⁷ – may eventually also be provided for the society.

Becker (1976) provides another explanation of how altruism can increase equality. Without the role of institution, psychological altruism seems favourable only for the well-being of the altruist. Becker (1976) shows that after social interaction an altruist becomes wealthier than the egoists. At this stage, there is no guarantee that equality will improve. However, when in the following process institution is introduced, there is a possibility that equality will increase. In the explanation, Becker (1976) also shows that the network of people created by an altruist maximises the income of all people included in the altruist's utility function, including the altruist⁶⁸, rather than each individual's own income. This maximisation is based on information about the level of psychological altruism and its reliability in society. As a result, the disparity of income among the members of the network can be reduced. This means better equality well-being as the result of higher psychological altruism.

In summary, the improved well-being of the altruists will be transferred to the rest of the people in the society so that equality is eventually also increased. In this process, both the altruists' and egoists' transfer behaviours depend on the reliability of the level of psychological altruism of others as well as the expected general level of psychological altruism of the people in the society⁶⁹. Put differently, institution plays a key role in creating an increase in equality from a society's level of altruism. In psychology literature (Schwartz et al., 2009), altruism can only improve the health dimension of well-being. Furthermore, this better health dimension eventually also increases the capability of the altruists to acquire income and knowledge dimensions of well-being. In the same way,

⁶⁷ For example, Coate (1995) shows that the government represents the altruistic rich individuals in providing public insurance for the poor.

⁶⁸ The income of all people included in the altruist's utility function including the altruist's income is called social income in Becker (1976).

⁶⁹ As explained in the previous section, institution or the 'rules of the game' as well as the 'play of the game' (Williamson, 2000) can be defined as the general level of psychological altruism and the reliability of the level of psychological altruism in the society.

citizens with better access to resources as in Pierre Bourdieu's approach (Wetterberg, 2007) will eventually transfer their resources to others.

Nevertheless, when social interaction is based merely on the abundance of an individual's resources, it can be regressive to the equality dimension of well-being. In Pierre Bourdieu's approach, access to resources obtained by an individual's involvement in social interaction (Wetterberg, 2007) can be converted into the income, health, and knowledge dimensions of well-being. This access is exclusively gained by those who are involved in social interaction. Because in this approach the access to resources is influenced by an individual's social position, inequality can increase. The income well-being gap between citizens in relatively advantageous social positions and those in disadvantageous positions can widen after social interaction. This negative relationship between social interaction and the equality dimension of well-being happens when social interaction is combined with a low level of psychological altruism. Thus, the level of psychological altruism does not only influence the health, knowledge, and income dimensions of well-being, but also the equality dimension.

5.3.3. The dimensions of well-being

Since the multidimensionality of well-being is variably interpreted in the literature, this section is important in determining the dimensions of well-being as applied in this study. Each set of dimensions of well-being can lead to different conclusions regarding the role of altruism. For example, explicitly including income well-being as one of the dimensions can offer a clear explanation of how a lower transaction cost, as one of the products of psychological altruism, creates a higher level of well-being.

The previous section has shown that the dimensions affected by institution are health, knowledge, income, and equality. Appendix 3 also demonstrates that the various dimensions of well-being offered in the literature can be classified into knowledge, income, and equality dimensions. By employing a method for formulating dimensions of well-being as in Alkire (2007), three sources of dimensions are included in the well-being variable in equation (5.3), i.e. normative or axiomatic assumptions from theory, public consensus, and participation. The normative assumptions approach is applied to provide a theoretical background to the construction of the dimensions. This approach becomes

more important in a theoretical study. Three sets of well-being dimensions based on a theoretical consideration are included. The first set is from the participation-optimum and critical-optimum of need-satisfaction in Doyal & Gough (1991), the second is from the capability approach in Nussbaum (2000), and the third is from a combination of capability approach, income well-being, and the social inclusion dimensions from Wagle (2008). The public consensus (Asselin & Anh, 2008) approach is then applied to bring the dimensions derived from the theoretical approach in line with current measurements of well-being. In addition, the participation approach (Mukherjee, 1999) is also applied to confirm the dimensions' practicality in a survey setting. The resulting dimensions – health, knowledge, income, and equality – are compatible with the combined types of externalities of altruism from Williamson (2000) and Collard (1978) as discussed earlier in this chapter.

5.3.4. The role of psychological altruism in multidimensional well-being

Institution needs to be combined with resources or aspects of capital to satisfy human needs. Unless all kinds of resources – including natural, physical, financial, and human (DFID, 1999) – are involved, institution alone produces nothing. Hence, the general function of the role of institution in shaping the dimensions of well-being, which also reflects the fourth level of institutional analysis in Williamson (2000), can be formulated as

$$W = W(I, N, K, F, H) \quad (5.3)$$

where N , K , F , H , and W are respectively natural resource, physical resources, financial resources, human resources, and the general level of well-being of the society. The list of resources or aspects of capital in DFID (1999) is slightly different from general capital in an economic growth model for four reasons. First, the analysis in DFID is mainly to address sustainable livelihoods, particularly the livelihoods of the poor where breaking down capital into natural, physical, financial, and human can better explain the change in well-being. Second, the well-being discussed in DFID is not solely dominated by income well-being, but rather other dimensions of well-being are also considered. Third, particularly in a field survey of an empirical study where the sample comes from individual information for each person, examining such aspects of capital will give a more

detailed picture of the importance of each characteristic of a respondent's resources. Lastly, the opportunity to obtain such detailed information on capital is greater in a field survey of empirical study.

In the standard growth model as employed by Mankiw, Romer, & Weil (1992) $Y = AK^\alpha L^\beta H^\gamma$. The constant A represents total factor productivity, which in part reflects the quality of institution, while the variables K , L , and H respectively represent capital, labour, and human capital. Whilst labour is usually represented by working age population to indicate the quantity of labour, education level attainment is a common proxy for investment in human capital used to indicate the quality of labour. Combining these sets of resources with the set from equation (5.3), the equations become

$$W = IN^{an}K^{ak}F^{af}H^{ah} \quad (5.4)$$

where $W, I, N, K, F, H, an, ak, af$, and ah are respectively well-being, institution, natural capital, physical capital, financial capital, human capital, and the elasticity of each dimension of well-being with respect to natural capital, physical, financial, and human capital. Since the list of capitals or resources in equation (5.4) is based on equation (5.3), this model fits better for a multidimensional well-being study in addressing sustainable livelihoods based on personal information, so that equation (5.4) can be rewritten as

$$W_i = IN_i^{ani}K_i^{aki}F_i^{afi}H_i^{ahi} \quad (5.5)$$

where $W_i, N_i, K_i, F_i, H_i, ani, aki, afi$, and ahi are well-being, institution, natural capital, physical capital, financial capital, human capital, and the elasticity of each dimension of well-being with respect to natural capital, physical, financial, and human capital of each individual in a society.

In a cross-society study where the unit of analysis is a society, such as a district, province, or country, the resources focused on individual (N_i, K_i, F_i , and H_i) in equation (5.5) should be replaced by a more widely accepted list of resources, i.e. K for physical capital, H for human capital, and L for labour in the society. Since the variable L has

already been used to represent the level of psychological altruism, in the following discussions, L for labour will be replaced by Lb . Thus, substituting the list of resources in equation (5.4) with K, H , and Lb , the model can be written as

$$W = IK^{bk}H^{bh}Lb^{blb} \quad (5.6)$$

which is more applicable to a cross-society study where the unit of analysis is a society, such as district, province, or country. Substituting equation (5.2) into (5.5) and (5.6) yields

$$W_i = \frac{S_{sc}}{\theta_{sc}^L} N_i^{ani} K_i^{aki} F_i^{afi} H_i^{ahi} \quad (5.7)$$

and

$$W = \frac{S_{sc}}{\theta_{sc}^L} K^{bk} H^{bh} Lb^{blb} \quad (5.8)$$

However, in order to focus the analysis on the role of altruism in well-being, the two lists of resources in equation (5.7) and (5.8) can be simplified. Those lists of resources are replaced by a single variable M representing resources which could be interpreted as either individual natural, physical, financial, and human resources or a society's physical capital, human capital, and labour. Therefore, this model does not replace either the standard growth model from Solow (1956) that

$$Y = AF(K, L)$$

or the growth model from Mankiw, Romer, & Weil (1992) that

$$Y = AF(K, L, H)$$

In both models, A represents total factor productivity where institution has its role.

Meanwhile, in equations (5.7), (5.8), and (5.9), the institution is further elaborated as $\frac{S_{sc}}{\theta_{sc}^L}$.

Moreover, variable Y which represents only the income or economic dimension of well-

being becomes irrelevant as the dependent variable in this study because an institution that is created by social capital, social interaction, culture, and altruism generates multidimensional well-being (W). Thus the well-being function in this institutional approach can be expressed as

$$W_{IS} = \frac{S_{sc}}{\theta_{sc}^L} M^{cm} \quad (5.9)$$

where cm is the elasticity of multidimensional well-being with respect to the resources M .

Therefore, the role of the level of psychological altruism in well-being can be expressed as

$$\frac{\partial W_{IS}}{\partial S_{sc}} = \frac{\partial W_{IS}}{\partial L_{sc}} = \frac{M^{cm}}{\theta_{sc}^L} > 0 \quad (5.10)$$

and the role of the variability of the level of psychological altruism is

$$\frac{\partial W_{IS}}{\partial \theta_{sc}^L} = -\frac{S_{sc} M^{cm}}{(\theta_{sc}^L)^2} = -\frac{L_{sc} M^{cm}}{(\theta_{sc}^L)^2} \quad (5.11)$$

Equation (5.10) shows that an increase in the level of psychological altruism in a society after social interaction raises well-being at a constant rate $\left(\frac{M^{cm}}{\theta_{sc}^L}\right)$ no matter how low or high the psychological altruism level. In contrast, assuming a positive average level of psychological altruism in a society in equation (5.11), an increase of variability of the level of psychological altruism will make well-being decline. Put differently, as long as there is psychological altruism in a society, even if the level is relatively low, a higher level of reliability of the behaviour of the members of the society means a higher level of well-being. The importance of the reliability of behaviour becomes greater as the general level of psychological altruism in the society becomes higher, because the magnitude of $\frac{\partial W}{\partial \theta_{sc}^L}$ depends on the value of L_{sc} . It indicates that a very altruistic society is more sensitive

towards changes in the reliability of the behaviours of the members. A similar relationship occurs between resources and the reliability of behaviour. A society with relatively more abundant resources also has a higher sensitivity to changes in the reliability of the behaviours of its members.

5.3.5. Some extreme values

Nonetheless, there are two possible extreme values of L_{sc} which can create different conclusions. Firstly, when $L_{sc} = 0$ or on average the members of a society do not care at all about others' consumption, the reliability of the behaviour of people in this society becomes an irrelevant factor in influencing well-being. As in general the members do not influence each other, others' behaviour becomes an irrelevant factor in one's economic decision. As a result, general well-being is independent of the variability of the level of psychological altruism in a society. Secondly, if a society is extremely un-altruistic ($L_{sc} < 0$) so that an increase in one member's consumption causes another member's utility to decrease, unreliability favours the society's general well-being. In a very un-altruistic society, instead of giving, the common interests of individuals are more dominated by the motivation to conduct free-riding activities as well as taking others' resources. These kinds of behaviours create negative effects on the general well-being of the society. When others' behaviours are predictable, these activities (free-riding and taking others' resources) becomes more attractive. Conversely, when others' behaviours are increasingly unpredictable (θ_{sc}^L increases), well-being-decreasing activities become less attractive because they are more difficult to perform. In short, when the general level of psychological altruism is extremely low ($L_{sc} < 0$), higher variability of the level of psychological altruism creates a positive impact on the general well-being of a society. However, since $L_{sc} < 0$ means the negative well-being of a society (equation (5.9)), this second extreme level of psychological altruism will not be discussed any further.

Combinations of extreme values in the level of psychological altruism and variability are also worth noting. A very high level of psychological altruism is not effective in creating well-being if it is combined with low reliability in behaviour (high variability of the level psychological altruism). The ideal situation is of course when a very high level of psychological altruism coexists with a high level of reliability in behaviour, and the worst is when a low level of altruism is combined with low reliability. A situation in which a very

low level of altruism is accompanied by high reliability in behaviour requires a slightly more delicate explanation. When the average level of psychological altruism is 0.01, for example, not many externalities from transfers of resources can be expected. This can lead to a low level of well-being. However, the situation can turn around if behaviour is highly predictable. If $\theta_{sc}^L = 0.009$ for instance, the index for institution in a society will be 1.11. This value is equivalent to a situation where the level of altruism is much higher but with a much lower reliability. For example when $L_{sc} = 0.8$ and $\theta_{sc}^L = 0.72$. Both situations, the first and the second case, yield the same level of well-being. In Williamson's (2000) terminology, a possible explanation for this situation lies in the fact that level-three institution or the 'play of the game' is developed from level-two and level-one institution. Level-two institution or the 'rules of the game' represents formal institutions such as constitutions, laws, and property rights. Meanwhile level one represents informal institutions where social embeddedness such as norms, customs, mores, and traditions are located. The low L_{sc} indeed weakens institution, but at the same time very high reliability in behaviour enables formal institution to be more precisely formulated and efficiently enforced. At the end, the level of well-being in the first case will not be far different from the second one.

Further examination of these extreme values can also be conducted by graphing a curve based on equation (5.9). The curve in Figure 5.1⁷⁰ shows that well-being as a function of the level of psychological altruism in a society after social interaction is a straight line and the slope is constant at $\frac{M^{cm}}{\theta_{sc}^L}$ as equation (5.10) implies. A higher level of psychological altruism in a society is always better for the common well-being. In the meantime, this constant slope is not found in well-being as a function of the variability of the psychological altruism level as shown in Figure 5.2⁷¹. The well-being curve in Figure 5.2 is ever declining and approaching zero as the variability gets larger (the slope of the curve is always negative and approaches zero). When the unreliability of behaviour in a society becomes extremely high, an abundance of resources would be useless. The 'rules of the game' cannot work in this kind of society and can be shown by massive free-riding activities and very low level of public goods provision. Very rare voluntary social

⁷⁰ Assuming $\theta_{sc}^L = 1$, $M = 100$, and $cm = 1$.

⁷¹ Assuming $L_{sc} = 1$, $M = 100$, and $cm = 1$.

interactions, extremely high transaction costs, severe innovation shortages, enormous hindrances to knowledge spreading among the society, as well as widespread insecure feelings and psychological discontent may also be the effects which eventually undermine general well-being.

5.3.6. The role of psychological altruism before and after social interaction

Another view of the role of psychological altruism in well-being can also be exercised by searching the impact of the level of psychological altruism before social interaction. Substituting equation (3.27) into $S_{sc} = L_{sc}$ in (5.9) yields

$$W_{IS} = \left(\frac{L_s + \omega(L_o - L_s)}{\theta_{sc}^L} \right) M^{cm} \quad (5.12)$$

Therefore, the derivative of multidimensional well-being with respect to the average level of psychological altruism in the society before social interaction or the cultural process (L_s) is then

$$\frac{\partial W_{IS}}{\partial L_s} = \frac{1 - \omega}{\theta_{sc}^L} M^{cm} > 0 \quad (5.13)$$

The result of the derivation process above shows that the level of psychological altruism before social interaction (L_s) has a constant positive influence on well-being.

Thus, the effect of psychological altruism after social interaction (L_{sc}) as illustrated in Figure 5.2 is similar to the effect of psychological altruism before social interaction (L_s) in equation (5.13). At all levels of psychological altruism before social interaction, the slope of the level of well-being is constant. Each additional level of psychological altruism in a society always gives the same additional well-being at all levels of psychological altruism.

However, there is one important difference between the effect of the level of psychological altruism before and after social interaction. This difference can be seen by comparing the effect of L_s in Figure 5.1 and L_{sc} in Figure 5.3. These figures show that a negative average level of psychological altruism before social interaction in a society

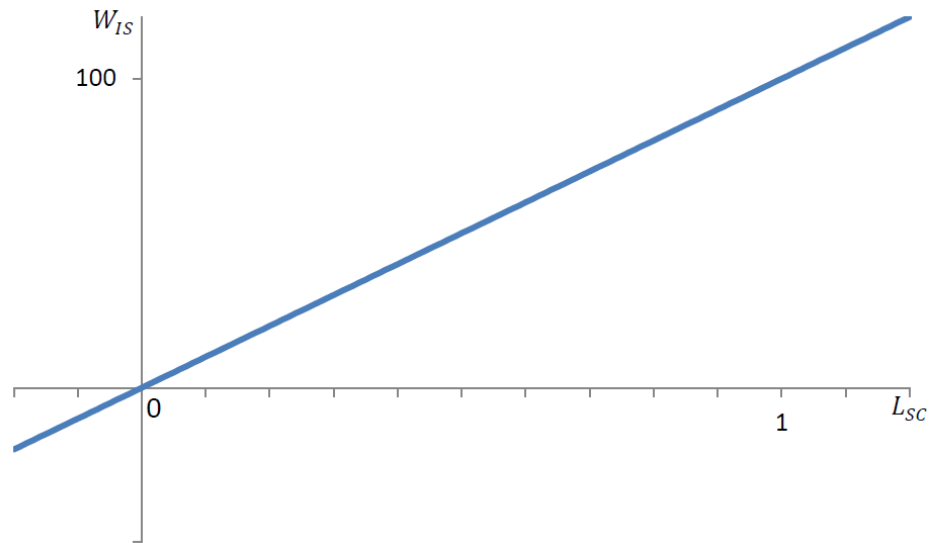


Figure 5.1: Well-being Curve in Institutional Approach as a Function of Psychological Altruism after Social Interaction

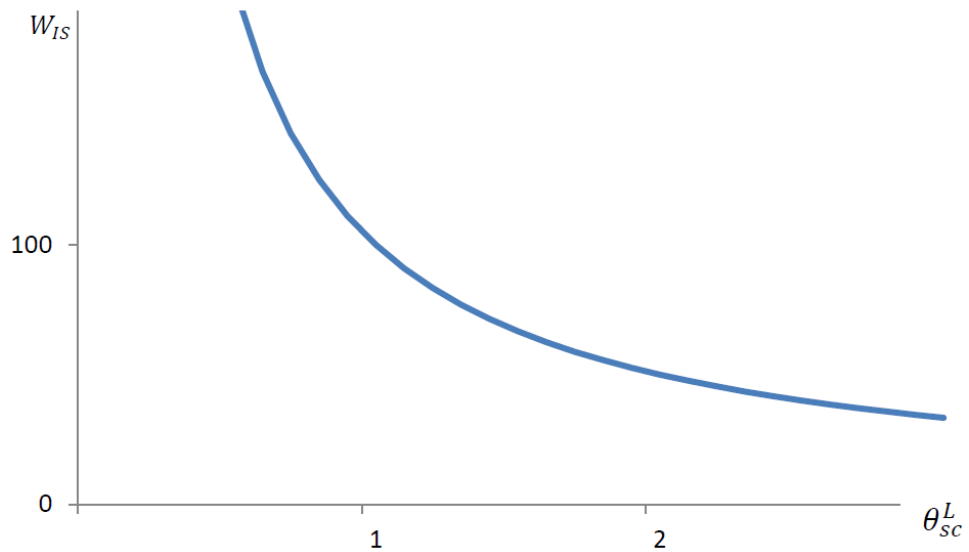


Figure 5.2: Well-being Curve in Institutional Approach as a Function of the Variability of Psychological Altruism after Social Interaction

$(L_s < 0)$ does not necessarily mean negative well-being after social interaction. Meanwhile, a negative average level of psychological altruism after social interaction ($L_{sc} < 0$) does indeed mean negative well-being ($W < 0$). Only when the L_s is extremely low, is well-being less than zero.

Although $L_S < 0$, the cultural process through social interaction can create positive well-being. The capability of the process to create positive well-being from negative psychological altruism before social interaction depends on the magnitude of all factors involved in the cultural process. Those factors include the level of psychological altruism offered by values leaders (L_0); the efficiency in the market for values (ω); the highest level of psychological altruism in the society (L_L); the average proportion of own consumption which supports social interaction (\bar{q}); the average proportion of transfer to others which supports social interaction (\bar{g}); the resources available in the society (M); as well as adherence to culture (ac), which is influenced by the method of interaction, current social culture, forces of the natural environment, and forces of humans. When those factors are sufficient to create a positive level of psychological altruism after social interaction, the well-being after the cultural process will be positive.

In addition, the impact of the level of psychological altruism after social interaction is greater than the level before social interaction. From equations (5.10) and (5.13) we can write that⁷²

$$\frac{\partial W_{IS}}{\partial L_{Sc}} - \frac{\partial W_{IS}}{\partial L_S} = \frac{M^{cm}\omega}{\theta_{Sc}^L} > 0 \quad (5.14)$$

Provided M^{cm} , ω , and θ_{Sc}^L are positive, the derivative of multidimensional well-being with respect to the level of psychological altruism after social interaction is higher than before social interaction. Despite the fact that both psychological altruism before and after social interaction has a positive influence on well-being, the level of psychological altruism after

$$\begin{aligned} {}^{72} \frac{\partial W_{IS}}{\partial L_{Sc}} - \frac{\partial W_{IS}}{\partial L_S} &= \frac{M^{cm}}{\theta_{Sc}^L} - \frac{1-\omega}{\theta_{Sc}^L} M^{cm} \\ &= \frac{M^{cm} - (1-\omega)M^{cm}}{\theta_{Sc}^L} \\ &= \frac{M^{cm}(1-(1-\omega))}{\theta_{Sc}^L} \\ &= \frac{M^{cm}\omega}{\theta_{Sc}^L} > 0 \end{aligned}$$

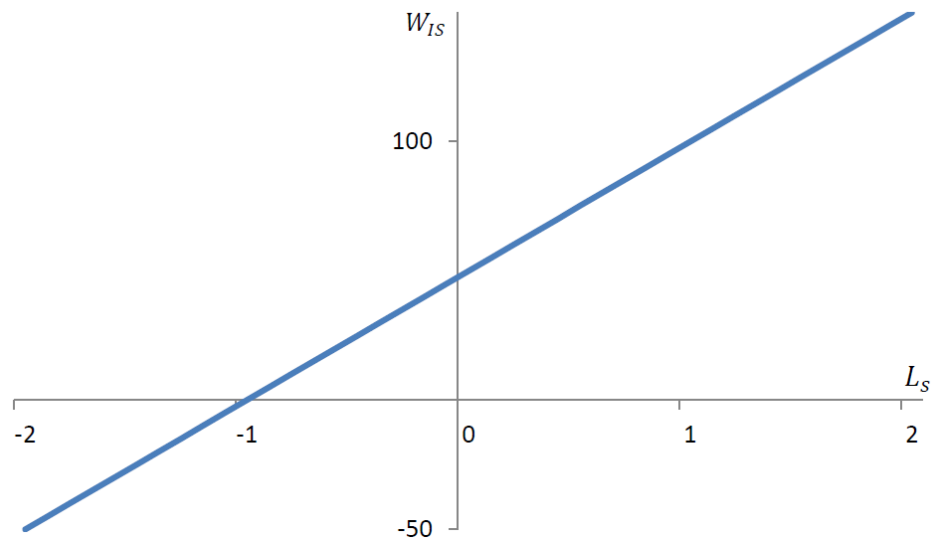


Figure 5.3: Well-being Curve in Institutional Approach as a Function of Psychological Altruism before Social Interaction

social interaction has greater influence on well-being. On the one hand, the initial level of psychological altruism can only have an impact on well-being after a cultural process which involves social capital, social interaction, the efficiency of the market for altruistic values and beliefs to culture, method of interaction, initial social culture, as well as the natural environment. On the other hand, the level of psychological altruism after social interaction is the resulting level after the process which of course has a more direct effect on well-being.

5.3.7. Summary

The relationship between altruism and well-being in this institutional approach is summarised in Proposition 5.1.

PROPOSITION 5.1.

- a. The multidimensional well-being of a society is positively influenced by the average level of psychological altruism in the society after social interaction (L_{SC});*

- b. provided a positive average level of psychological altruism in a society, the multidimensional well-being of a society is negatively influenced by the variability of the level of psychological altruism after social interaction in the society (θ_{sc}^L);*
- c. the multidimensional well-being of a society is positively influenced by the average level of psychological altruism in the society before social interaction (L_S); and*
- d. provided the efficiency of the market for altruistic values and beliefs is positive, the average level of psychological altruism after social interaction has a greater impact on the multidimensional well-being of a society than the average level of psychological before social interaction,*

when (1) an individual is psychologically altruistic to other members of a society; (2) impure altruism is excluded from the definition of altruism; (3) social interaction is measured by the quantity and quality of resources which support social interaction; (4) culture is defined as shared values and beliefs within a society; (5) social capital is defined as the social coherence of a society; (6) institution is defined as the ratio between the level of psychological altruism and the variability of the level of psychological altruism in the society after social interaction; and (7) institution is the only way psychological altruism influences well-being.

A summary of this institutional approach is also illustrated in Figure 5.4.

5.4. Combining Institutional and Non-institutional Approaches

The total effect of altruism on well-being can be found from both the institutional and non-institutional approaches. The separation of the institutional approach in the previous sections above from the non-institutional approach discussed in Chapter 4 is only relevant in an analysis setting. The analysis suggests the direct effect of social

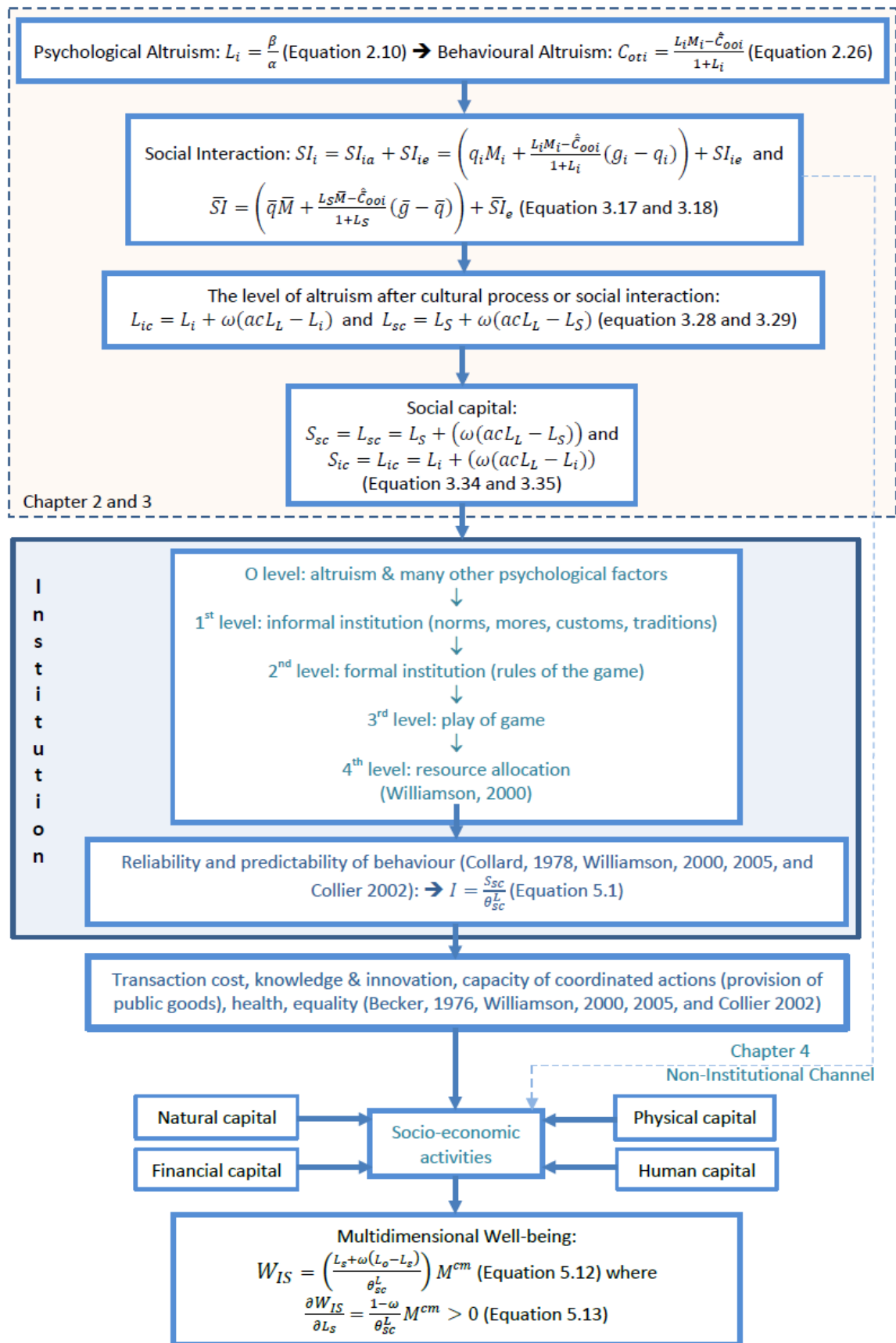


Figure 5.4: The Role of Psychological Altruism in Multidimensional Well-being in the Institutional Approach

interaction in a non-institutional approach can be easily separated from the benefit of altruism on well-being that works through institution. In the real world, what an individual receives from social interaction, social capital, and institution are apparently perceived as a single concept of well-being without any possible separation between institutional and non-institutional applications. Hence, combining both approaches reveals a comprehensive picture of the role of altruism in well-being

The combined effect of the level psychological altruism on well-being can be expressed by summing up equations (4.15) and (5.13) as

$$\frac{\partial W}{\partial L_s} = \frac{\partial W_{IS}}{\partial L_s} + \frac{\partial W_{NS}}{\partial L_s} \lesseqgtr 0 \quad (5.15)$$

where W is the total multidimensional well-being when approaches are combined. The institutional effect in equation (5.13) shows that $\frac{\partial W_{IS}}{\partial L_s} > 0$, while the non-institutional effect in equation (4.15) shows that $\frac{\partial W_{NS}}{\partial L_s} \lesseqgtr 0$. Thus, the total influence of the level of psychological altruism on the multidimensional well-being in a society can be positive, negative, or neutral. The ambiguity comes from the non-institutional effect.

Substituting equations (4.3), (4.15), and (5.13) into (5.15) yields

$$\frac{\partial W}{\partial L_s} = \frac{1-\omega}{\theta_{sc}^L} M^{cm} + \sum_{i=1}^{n-1} \left(\left(\frac{1}{(1+L_i)^2} \right) \left(\log \frac{(\hat{C}_{oi})}{(C_i)} \right) U_i \right) + \sum_{i=1}^{n-1} \frac{\partial W_{U_{oi}}}{\partial L_i} \quad (5.16)$$

Equations (4.3), (4.15), and (5.13) show that $\frac{1-\omega}{\theta_{sc}^L} M^{cm}$ and $\sum_{i=1}^{n-1} \frac{\partial W_{U_{oi}}}{\partial L_i}$ are greater than zero,

but $\sum_{i=1}^{n-1} \left(\left(\frac{1}{(1+L_i)^2} \right) \left(\log \frac{(\hat{C}_{oi})}{(C_i)} \right) U_i \right)$ can be equal to, greater than, or less than zero.

However, as the difference between \hat{C}_{oi} and C_i cannot be presumed theoretically in this study, thus

$$\frac{1-\omega}{\theta_{sc}^L} M^{cm} + \sum_{i=1}^{n-1} \frac{\partial W_{U_{oi}}}{\partial L_i} \leq \sum_{i=1}^{n-1} \left(\left(\frac{1}{(1+L_i)^2} \right) \left(\log \frac{(\hat{C}_{oi})}{(C_i)} \right) U_i \right)$$

Therefore, the total influence of psychological altruism in a society can also be equal to, greater than, or less than zero.

Nevertheless, the influence of the variability of the level of psychological altruism (θ_{sc}^L) in this combined approach is no different from the institutional approach. θ_{sc}^L only matters in the institutional approach (equations (5.9) and (5.11)), while the level of well-being in the non-institutional approach (equation (4.3)) is not influenced by θ_{sc}^L . Therefore, as illustrated in Figure 5.2, the multidimensional well-being in this combined approach is negatively influenced by the variability of the level of psychological altruism or

$$\frac{\partial W}{\partial \theta_{sc}^L} < 0 \quad (5.17)$$

The role of the level of psychological altruism and the variability are summarised in Proposition 5.2.

PROPOSITION 5.2.

- a. *The multidimensional well-being of a society can be positively, negatively, or uninfluenced by the average level of psychological altruism of the members of the society;*
- b. *The multidimensional well-being of a society is negatively influenced by variability of the level of psychological altruism of the members of the society*

when

- (1) *impure altruism is excluded from the definition of altruism;*
- (2) *culture is defined as shared values and beliefs within a society;*
- (3) *social capital is defined as the social coherence of a society;*

- (4) psychological altruism influences the altruist's individual well-being directly through social interaction; and*
- (5) psychological altruism creates externalities to the society through institution.*

The role of psychological altruism in multidimensional well-being in this combined approach is summarised in Figure 5.5.

5.5. Conclusion

The general multidimensional well-being in a society is influenced by the level of altruism in the society. This influence works through two channels. First, in the non-institutional approach, altruism directly influences the well-being of the society through social interaction. The altruist's well-being is directly influenced by the level of psychological altruism, while behavioural altruism influences the well-being of the rest of the society. Second, in the institutional approach, psychological altruism influences well-being by creating externalities through formal and informal institutions.

The main findings in this chapter are summarised as follows:

- Institution or the 'play of the game' of a society can be expressed as the product of the social capital and the reliability of the level of psychological altruism in the society after social interaction (equation (5.2)).
- In the institutional approach, the multidimensional well-being in a society is positively influenced by the average level of psychological altruism in the society (equation (5.10) and (5.11)). The average level of psychological altruism in the society influences institution through the predictability and reliability of behaviour in the society. The greater predictability and reliability of behaviour generate a lower transaction cost, a greater knowledge or education, better health, and more equality in the society. Thus, the income, knowledge, health, and equality dimensions of well-being in the society are positively influenced by the average level of psychological altruism.
- The ambiguity in the non-institutional approach causes ambiguity in the total effect of the level of psychological altruism on the multidimensional well-being of

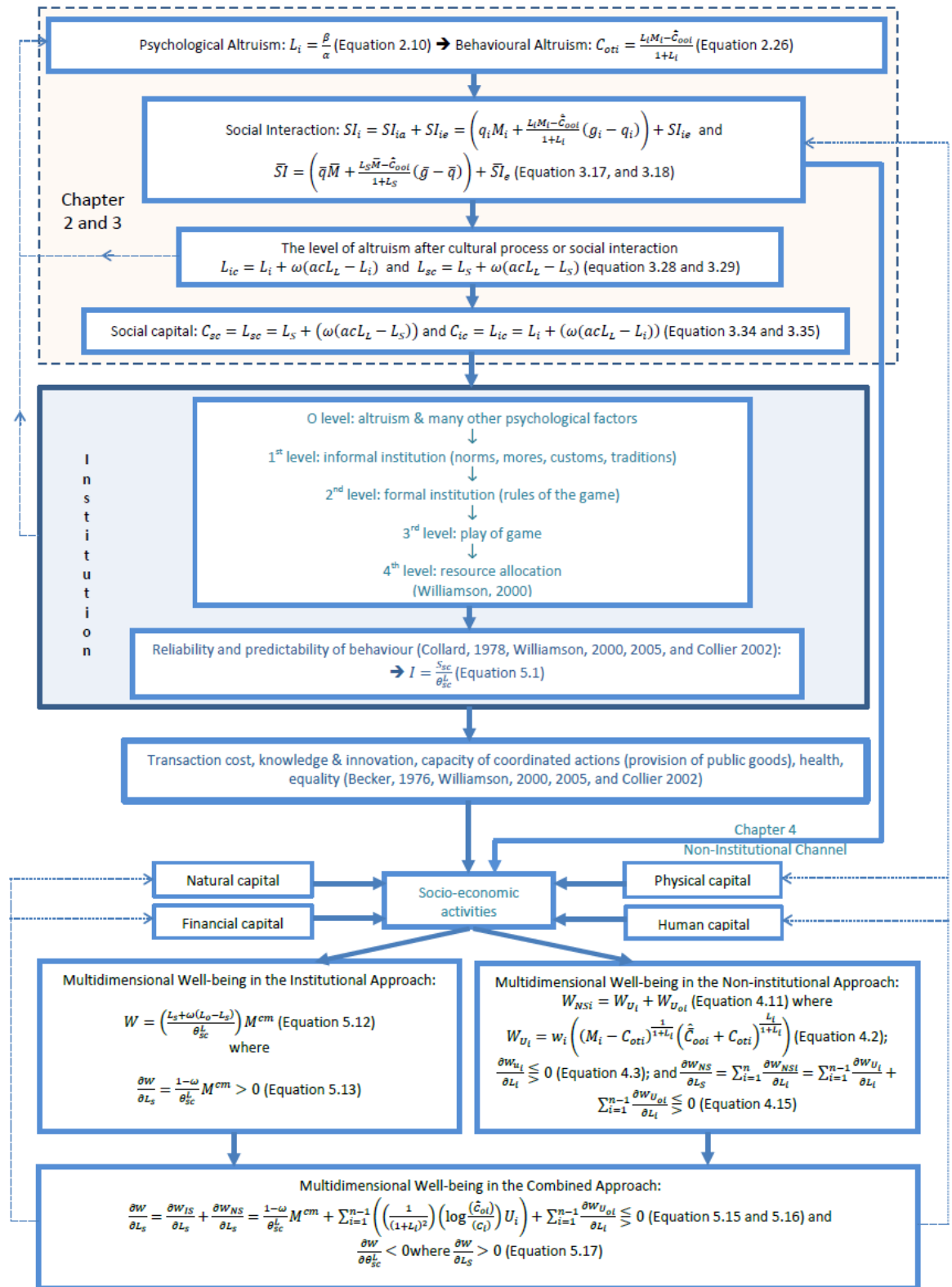


Figure 5.5: The Role of Psychological Altruism in Multidimensional Well-being in the Combined Approach

a society (equations (5.15) and (5.16)). Nonetheless, as the variability of the level of psychological altruism in a society only matters in the institutional approach, the

influence of the variability in the combined approach is no different from the institutional approach. Multidimensional well-being is negatively influenced by the variability of the level of psychological altruism in a society (equations (5.16) and (5.17)).

This chapter has shown that the level of psychological altruism influences the multidimensional well-being in a society. Chapter 6 will provide further evidence to show the importance of psychological altruism in well-being by envisaging a society where there is no psychological altruism at all.

CHAPTER 6. THE POSSIBILITY OF A SOCIETY WITHOUT PSYCHOLOGICAL ALTRUISM

6.1. Introduction

Including psychological altruism as one of the factors influencing a society's well-being, as mathematically expressed in equations (4.2), (4.15), and (5.10), shows the role of altruism in well-being. However, the importance of psychological altruism will be more noticeable when envisaging a society where there is no psychological altruism at all. Although, as described in Chapter 2, extremely low levels of psychological altruism can take values below zero, simulating a situation with zero psychological altruism ($L_S = 0$ or $L_{sc} = 0$) would be sufficient to show its importance. The considerable effect of assuming zero psychological altruism in the model would therefore be sufficient to demonstrate the importance of psychological altruism in well-being. Considering that the role of altruism has been illustrated mainly using a mathematical approach in this text, the following discussion about the absence of altruism will begin by reviewing some of the equations formulated in the preceding chapters. The effect of the absence of psychological altruism will be discussed step by step; from its effects on the utility function (Section 6.2), transfer behaviour (Section 6.3), social interaction (Section 6.4), social capital (Section 6.5), institution (Section 6.6), and multidimensional well-being (Sections 6.7 and 6.8).

6.2. Utility Function without Psychological Altruism

In an individual utility function (equation (2.8)), a zero level of psychological altruism clearly means that an individual is only concerned about her or his own consumption. In this equation, the absence of psychological altruism makes the elasticity of an individual's utility to the consumption of others equal to zero ($\beta = 0$). Thus, the level of psychological altruism is also zero ($L_i = \frac{\beta}{\alpha} = 0$). Others' consumption (\hat{C}_{oi}) then

becomes irrelevant to this individual's utility. Without psychological altruism the utility function becomes

$$U_i = C_i^\alpha \quad (6.1)$$

so that only own consumption (C_i) matters.

6.3. Transfer Behaviour without Psychological Altruism

When an individual's consumption is at its optimal level (equation (2.26)), the absence of psychological altruism encourages the individual to transfer resources owned by other individuals in the society to her or his own consumption

$$C_{oti} = -\hat{C}_{ooi} \quad (6.2)$$

This willingness to take others' resources is not influenced by the individual's own resources before the transfer. In other words, regardless of whether an individual is rich or poor, if the level of psychological altruism is zero, the motivation to transfer others' resources to one's own will be present.

Such willingness to take others' resources in equation (6.2) also shows that even when someone is not envious, a very low level of psychological altruism can induce an individual to take others' resources. Envy is the feeling of being better off if other people become worse off (Becker, 1974) or $\frac{\partial U_i}{\partial \hat{C}_{oi}} < 0$. Provided that $U_i = C_i^\alpha \hat{C}_{oi}^\beta$ and $\alpha, C_i, \hat{C}_{oi}$ are greater than zero, hence $\frac{\partial U_i}{\partial \hat{C}_{oi}} = \beta C_i^\alpha \hat{C}_{oi}^{\beta-1} < 0$ only if $\beta < 0$ or $L_i < 0$. When an individual is envious ($L_i < 0$), the willingness to take others' resources will be even stronger. However, such willingness does not start at $L_i = 0$. The willingness to take others' resources ($C_{oti} < 0$) in equation (2.26) starts when⁷³ the level of psychological altruism becomes lower than the ratio between the perceived initial average consumption of others and one's own income $\left(L_i < \frac{\hat{C}_{ooi}}{M_i}\right)$.

⁷³ $C_{oti} = \frac{L_i M_i - \hat{C}_{ooi}}{1 + L_i}$ in equation (2.26). Thus $C_{oti} < 0$ if $L_i < \frac{\hat{C}_{ooi}}{M_i}$ provided $L_i > 0$,

Therefore, a greater \hat{C}_{ooi} makes an altruistic individual ($L_i > 0$) more likely to be willing to take others' resources ($C_{oti} < 0$). Assuming that the probability of having an extremely high level of psychological altruism ($L_i > 1$) is lower than having $0 < L_i \leq 1$, the subjectively poor individual $\left(\frac{\hat{C}_{ooi}}{M_i} > 1\right)$ is more likely to have the willingness to take others' resources than the subjectively rich individual $\left(\frac{\hat{C}_{ooi}}{M_i} < 1\right)$.

The moderating factor that controls whether or not this willingness will actually be realised as a transfer is the opportunity to do so. Such opportunity is practically formed by the prevailing 'rules of the game' in the society, and is the result of the preceding social interaction. Thus, institution, both formal and informal, determines the method of the transfer in revealing this motivation – for example, begging, stealing, or merely hoping – as well as the result of the method used. For example, when there is a strong norm in the society that does not allow people to take others' belongings, and if at the same time this norm is supported by high adherence to the norm, an individual's willingness to take others' resources may voluntarily be transformed into a mere hope that others are altruistic enough to share their resources. On the other hand, if both the norm and the enforcement of it permit the taking of others' belongings, the willingness to transfer may be transformed into begging, stealing or corruption.

Whether or not this willingness becomes reality depends on how the current formal and informal institutions deal with these types of potential behaviours in society. If this self-interest assumption also holds for the rest of the members of the society, it would mean that the general level of psychological altruism in the society is also zero ($L_{SC} = 0$). Similarly, the tendency of an individual to be willing to acquire others' resources also holds for the whole of the society. Eventually, this willingness becomes the 'play of the game' in the society, because the final stage of an institution depends on the level zero of institution in the society (Williamson, 2000). As a result, assuming that the institution of this society is capable of preventing individuals from trying to arrogate others' belongings each other, it would be almost impossible. This would be assuming a strong institution when the 'play of the game' is weak.

6.4. Social Interaction without Psychological Altruism

Without psychological altruism, a society experiences less social interaction. If the level of psychological altruism is zero, the average social interaction in a society in equation (3.18) becomes

$$\bar{S}I_{L_S=0} = \bar{q}\bar{M} - \hat{\bar{C}}_{ooi}(\bar{g} - \bar{q}) + \bar{S}I_e \quad (6.3)$$

Without psychological altruism, social interaction is determined only by non-altruistic factors including own resources (\bar{M}), the perceived initial average consumption of others ($\hat{\bar{C}}_{ooi}$), and a social interaction subsidy ($\bar{S}I_e$). This equation shows that social interaction can still exist in a society without psychological altruism, yet the quantity will not be as high as it is in social interaction with positive psychological altruism, because⁷⁴

$$\bar{S}I_{L_S>0} - \bar{S}I_{L_S=0} = \left(\frac{L_S(\bar{M} + \hat{\bar{C}}_{ooi})}{1+L_S} \right) (\bar{g} - \bar{q}) > 0, \text{ provided } (\bar{g} - \bar{q}) > 0 \quad (6.4)$$

Even though an individual is involved in social interaction in order to obtain some benefit, this benefit will not flow from others or organisations voluntarily. Without psychological altruism, any benefit must be based on a mechanism which forces others to give away their resources. Market activities, where sellers' and buyers' self-interests in goods and services meet, become the only mechanism underlying social interaction. Recognising the tendency for a society to establish a regulatory body, the government also serves as a source of mechanism which promotes social interaction through subsidy. For example, being granted with authoritative power, the government can require citizens to participate in a social interaction such as the armed forces. Nonetheless,

⁷⁴ $\bar{S}I_{L_S>0} - \bar{S}I_{L_S=0} = \left(\left(\bar{q}\bar{M} + \frac{L_S\bar{M} - \hat{\bar{C}}_{ooi}}{1+L_S} (\bar{g} - \bar{q}) \right) + \bar{S}I_e \right) - \left(\bar{q}\bar{M} - \hat{\bar{C}}_{ooi}(\bar{g} - \bar{q}) + \bar{S}I_e \right)$
 $= \bar{q}\bar{M} + \left(\frac{L_S\bar{M} - \hat{\bar{C}}_{ooi}}{1+L_S} (\bar{g} - \bar{q}) \right) + \bar{S}I_e - \bar{q}\bar{M} + \hat{\bar{C}}_{ooi}(\bar{g} - \bar{q}) - \bar{S}I_e$
 $= \left(\frac{L_S\bar{M} - \hat{\bar{C}}_{ooi}}{1+L_S} + \hat{\bar{C}}_{ooi} \right) (\bar{g} - \bar{q})$
 $= \left(\frac{L_S\bar{M} - \hat{\bar{C}}_{ooi} + (1+L_S)\hat{\bar{C}}_{ooi}}{1+L_S} \right) (\bar{g} - \bar{q})$
 $= \left(\frac{L_S(\bar{M} + \hat{\bar{C}}_{ooi})}{1+L_S} \right) (\bar{g} - \bar{q}) > 0, \text{ provided } (\bar{g} - \bar{q}) > 0$

publicly provided means for social interactions such as roads, railways, and telecommunication networks rely for their provision to a great extent on government assistance.

6.5. Social Capital without Psychological Altruism

There is no social capital without psychological altruism. While to some extent social interaction can still exist without psychological altruism, the coherence of a society or social capital cannot survive without psychological altruism. Equation (3.34) shows that zero psychological altruism in a society means there is no social coherence. Being psychologically altruistic means one's utility is related to what is being consumed by others. Because others' utility depends on their own consumption, psychological altruism enables society's members to be related to one another, although perhaps only a fraction of the society is really psychologically altruistic. In other words, when a society is characterised by its members paying attention only to their own well-being without considering the well-being of others, there is no coherence in that society. The social capital in that society is technically zero.

6.6. Institution without Psychological Altruism

Institution or the 'play of the game' cannot be established without psychological altruism. In equations (5.1) and (5.2), $L_{SC} = 0 \Rightarrow I = 0$. However, a high level of psychological altruism alone does not guarantee that the institution is sufficient for supporting a high level of multidimensional well-being. The reliability of the level of psychological altruism is also important for establishing externalities created by a sufficient institution or the 'rules of the game' and the 'play of the game' within a society. Equation (5.1) indicates that the average level of psychological altruism, along with its variability, forms the quality of institution. A more reliable and higher level of psychological altruism in a society creates a higher quality of institution. In conclusion, institution cannot be established without psychological altruism.

6.7. Multidimensional Well-being without Psychological Altruism

In the non-institutional approach, a zero level of psychological altruism has two effects on the well-being of a society; the effect on the altruist and the effect on the rest of the members of the society. For the altruist, a change from an altruistic ($L_i > 1$) to a self-interested ($L_i = 0$) individual has an ambiguous effect on well-being. As implied by equations (4.2) and (4.3), the well-being of a subjectively poor individual ($C_i < \hat{C}_{oi}$) decreases as the level of psychological altruism decreases to zero. Meanwhile the decrease in the level of psychological altruism has the opposite effect on the well-being of the subjectively rich ($C_i > \hat{C}_{oi}$).

For other people in the society, a zero level of psychological altruism in individual i means that there is no chance for other people in the society to gain greater well-being from individual i 's transfer (C_{oti}). Equation (2.26) implies that $C_{oti} < 0$ when $L_i = 0$. Since the increase in others' well-being only happens when $C_{oti} > 0$, a zero transfer from individual i means a zero increase in others' well-being.

In the institutional approach, the result of an absence of psychological altruism is that the multidimensional well-being of a society will be very low. In this approach, psychological altruism is not the only element needed for establishing well-being. Financial, physical, human, and natural resources are indeed essential for multidimensional well-being. However, those resources will be useless if the institution does not work properly in society (equation (5.9)).

Zero psychological altruism creates a high transaction cost, very limited information and knowledge dissemination, lack of innovation, and very low public goods provisions. Hence, without psychological altruism, the available resources cannot be efficiently and effectively managed for the well-being of the whole society. To sum up, psychological altruism is not everything, nor is it the only factor important for multidimensional well-being, but when the level of psychological altruism is too low, the level of well-being will also be very low.

Simplifying equation (5.9) into

$$W_{IS} = IM^{cm}$$

implies that in a society where $M_1^{cm} > M_2^{cm}$, it is possible that $W_{IS1} < W_{IS2}$ if and only if $I_2 > I_1$. A society initially bequeathed with abundant natural resources, highly educated human resources, advanced technology, and huge financial resources will face problems in utilising such capital for the well-being of its members if there is weak institution and lack of social interaction caused by low levels of psychological altruism.

Denying the existence of psychological altruism, both in an individual utility function and in an income well-being function, as generally assumed in mainstream economic theories, entail an inevitable contradiction or inconsistency in its assumption. This inconsistency will be demonstrated in the following section. Section 6.8 discusses the contradiction between assuming multidimensional well-being as only a function of resources and assuming a zero average level of psychological altruism in society.

6.8. The Contradiction Created by Assuming Multidimensional Well-being as Only a Function of Resources

The following discussion offers additional evidence for Proposition 5.1.a in Chapter 5, which states that the multidimensional well-being of a society is influenced by the level of psychological altruism within that society. Regarding Proposition 3.2 in Chapter 3, an explanation has been given for rejecting the assumption that the average level of psychological altruism of a society is always equal to zero. However, the evidence for Proposition 3.2 was developed without considering the implication on well-being. Hence, this section provides an explanation about the problem that arises when the same assumption is applied to a well-being model. The discussion will show that assuming the average level of psychological altruism in a society as always equal to zero contradicts the assumption that the multidimensional well-being in a society is only a function of their resources.

Assuming that the multidimensional well-being of a society is only a function of their resources ($W_{IS} = w_{IS}(M)$) also means assuming that the average level of psychological altruism in the society is greater than zero. In equation (5.9), assuming that

$$W_{IS} = \left(\frac{L_{sc}}{\theta_{sc}^L} \right) M^{cm} = M^{cm} \quad (6.5)$$

can only be done by supposing that there is positive psychological altruism in the society ($L_{SC} > 0$). Technically, equation (6.5) implies that

$$\left(\frac{L_{SC}}{\theta_{SC}^L}\right) = 1 \Rightarrow L_{SC}, \theta_{SC}^L > 0$$

The institution index (I) which is equal to one implies that both the level of psychological altruism and its standard deviation must be greater than zero. Thus, multidimensional well-being cannot be assumed to be only a function of resources without also assuming a positive level of psychological altruism.

On the contrary, as expressed in equation (5.1), assuming that the average level of psychological altruism as equal to zero ($L_{SC} = 0$) means the institution is also zero ($I = \frac{L_{SC}}{\theta_{SC}^L} = 0$). When an individual as self-interested or non-altruistic ($L_i = \beta/\alpha = 0$) ensures the utility is solely a function of this individual's consumption (C_i). Consequently, this individual is psychologically willing to transfer others' consumption to her or his own consumption ($C_{oti} = -\hat{C}_{ooi}$). The five levels of institution in Williamson (2000) shows that the psychological consideration at the level of institution of zero determines the 'play of the game' in the fifth level of institution. The desire to take others' resources in the zero level of institution will be apparent in the final level of institution. When the zero level is un-altruistic, the final level will also be un-altruistic. As a result, assuming a zero level of psychological altruism for the institutional well-being in equation (5.9) means that

$$(L_{SC} = S_{SC} = 0) \Rightarrow \left(\frac{S_{SC}}{\theta_{SC}^L}\right) = 0 \Rightarrow (W = 0)$$

Thus, assuming a zero average level of psychological altruism in a society contradicts with assuming that the multidimensional well-being of a society is only a function of their resources. On the one hand, assuming no psychological altruism causes the well-being of a society to be equal to zero. Considering that, for a society to exist, the well-being must be greater than zero, so this assumption should be avoided. On the other hand, assuming that the well-being of a society is only a function the resources (human, financial,

physical, and natural) is implicitly assuming that individuals are not entirely selfish ($L_{sc} > 0$). There is a certain level of positive psychological altruism which makes the institution index equal to one. The average level of psychological altruism in a society does not necessarily have to be equal to one to fulfil $W_{IS} = \left(\frac{L_{sc}}{\theta_{sc}^L}\right) M^{cm} = M^{cm}$. This explanation along with Proposition 3.2 can serve as additional evidence for Proposition 5.1.a.

6.9. Conclusion

A society cannot exist without psychological altruism. The absence of psychological altruism causes less social interaction and impaired formal as well as informal institution in a society. Accordingly, the society fails to effectively and efficiently utilise its available resources to create all dimensions of well-being. Thus, altruism needs to be considered in developing a model to explain any dimensions of well-being, including income well-being. Assuming a well-being model as only a function of resources inevitably means implicitly assuming the existence of psychological altruism. If self-interest is assumed in developing the utility function, the resulting well-being will be equal to zero.

Social choice is inevitable in any activity which converts resources to consumption. Whether theoretically perceived as a process to achieve either utility or well-being, each decision to use scarce resources in a society always faces the question regarding whose consumption the goods and services are intended for. Thus, developing a well-being model without considering for whom the resources are intended will undermine the validity of the model. Accordingly, the choice between own and others' consumption should also be included in the well-being model. As a result, the well-being model should not only include resources but also psychological altruism, and can be expressed as:

$$\left(W := \{E_c, H_e, K_n, E_q\}; W = w(C)\right) \wedge (C = c(M, L_s)) \Rightarrow \left(W := \{E_c, H_e, K_n, E_q\}; W = w(M, L_s)\right)$$

where W is the multidimensional well-being of a society; E_c is the income dimension of well-being; H_e is the health dimension of well-being; K_n is the knowledge dimension of well-being; E_q is the equality dimension of well-being; C is consumption; M is resources, and L_s is the average level of psychological altruism in the society. Consequently, a well-

being model which fails to include psychological altruism is not a complete model as formalised as follows:

$$\begin{aligned} \left(W := \{E_c, H_e, K_n, E_q\} : W = w(M, L) \right) &\neq \left(W^* := \{E_c, H_e, K_n, E_q\} : W^* = w(M) \right) \\ &\Rightarrow \left(W := \{E_c, H_e, K_n, E_q\} : \neg(W = w(M)) \right) \end{aligned}$$

where W^* is an incompletely defined well-being function.

CHAPTER 7. GENERAL CONCLUSIONS, POLICY IMPLICATIONS, AND FURTHER RESEARCH

7.1. General Conclusion

Relaxing the assumption of perfect information regarding others' consumption enables the development of a model that accommodates altruism beyond family boundaries. Further research on the role of altruism in well-being becomes possible because the relationship between psychological and behavioural altruism can now be precisely defined. The role of altruism in well-being through social interaction, culture, social capital, and institution is summarised in the following main conclusions of this thesis⁷⁵:

1. Psychological and behavioural altruism:

- The level of psychological altruism in an individual can be defined as the ratio between the weight attached to the perceived average consumption of others (β) and the weight attached to own consumption (α) of the individual's utility function ($U_i = C_i^\alpha (\hat{C}_{ooi} + C_{oti})^\beta = C_i^\alpha \hat{C}_{oi}^\beta$ in equation (2.8));
- Behavioural altruism (C_{oti}) is positively influenced by the level of psychological altruism of an individual ($\frac{\partial C_{oti}}{\partial L_i} = \frac{M_i + \hat{C}_{ooi}}{(1+L_i)^2} > 0$ in equation (2.27));
- The level of psychological altruism of an individual can be empirically estimated when the information on the resources available for the individual, the transfer to others from this individual, and the perceived initial average consumption of others in the society are provided ($L_i = \frac{\beta}{\alpha} = \frac{C_{oti} + \hat{C}_{ooi}}{M_i - C_{oti}}$ in equation (2.29));
- Behavioural altruism is negatively influenced by the misperception regarding the initial average consumption of others ($\hat{C}_{ooi} - \bar{C}_{ooi}$) and positively influenced by

⁷⁵ Some final findings of this research were presented as a paper in the 26th RSE-ANU PhD Conference in Economics and Business 2013 in Canberra, Australia.

the misperception regarding own resources ($\hat{M}_i - M_i$) (formalised in equation (2.35) as $\frac{\partial C_{oti}}{\partial \hat{C}_{ooi}^\varepsilon} = -\frac{1}{1+L_i}$ and $\frac{\partial C_{oti}}{\partial \hat{M}_i^\varepsilon} = \frac{L_i}{1+L_i}$); and

- By introducing an individual's misperception about others' consumption ($\hat{C}_{ooi}^\varepsilon$) and the misperception about own resources (\hat{M}_i^ε), the model ($C_{oti} = \frac{L_i \hat{M}_i - \hat{C}_{ooi}^\varepsilon}{1+L_i} = \frac{L_i(M_i + \hat{M}_i^\varepsilon) - (\bar{C}_{ooi} + \hat{C}_{ooi}^\varepsilon)}{1+L_i}$ in equation (2.34)) can explain many other factors in psychology, biology, and economics literature that influence behavioural altruism. Those factors include resources, age, information, relatedness, gratitude, good mood, genes, bystander, disaster, norm, model, and gender. Essentially, the explanation is made by considering the possible effect of each factor on L_i , M_i , \bar{C}_{ooi} and $\hat{C}_{ooi}^\varepsilon$.

2. Social interaction and psychological altruism:

Social interaction is positively influenced by the average level of psychological altruism in a society ($\frac{\partial \bar{S}I}{\partial L_S} = \frac{(\bar{M} + \hat{C}_{ooi})(\bar{g} - \bar{q})}{(1+L_S)^2} > 0$ in equation (3.19)).

3. Self-interest versus altruism assumption:

The average level of psychological altruism in a society (L_S) cannot be assumed to be always equal to zero (equation (3.20)).

4. Culture and psychological altruism:

- Culture creates two important effects on the average level of altruism in a society: higher average level of psychological altruism ($L_{SC} - L_S = \omega(acL_L - L_S) > 0$ in equation (3.31)) and a lower variability of the level of psychological altruism in the society ($\sigma_{SC} - \sigma_S < 0$ in equation (3.33)); and
- Unless all members of a society have exactly the same level of psychological altruism ($L_S = L_i$ for each i .), the society would not need a perfect adherence to culture and a perfectly efficient market for values and beliefs to have a lower variability and a higher average level of psychological altruism after the cultural process (equation (3.31) and (3.33)).

5. Social capital and psychological altruism:

- The social capital of a society can be defined as the degree of social coherence among members of the society, or the average level of psychological altruism in

the society after social interaction ($C_{sc} = L_{sc} = L_s + \omega(L_o - L_s)$ in equation (3.34)); and

- The social capital owned by an individual in a society can be expressed as the individual's level of psychological altruism after social interaction ($C_{ic} = L_{ic} = L_i + \omega(L_o - L_i)$ in equation (3.35)).

6. The dimensions of well-being:

The general level of multidimensional well-being can be disaggregated into health, knowledge, income, and equality dimensions. This set of dimensions is the result of applying the method from Alkire (2007). The sources of dimensions chosen are normative assumptions from theory, public consensus, and participation approaches.

7. Multidimensional well-being and psychological altruism in the non-institutional approach:

- For an individual who perceives others as having less resource than s/he has ($M_i > \hat{C}_{ooi}$), the health well-being of the individual is negatively influenced by the level of psychological altruism ($\frac{\partial W_{NSi}}{\partial L_i} > 0$ in equations (4.12), (4.13), and (4.14));
- For an individual who perceives others as having more resources than s/he has ($M_i < \hat{C}_{ooi}$), the health well-being of the individual is positively influenced by the level of psychological altruism ($\frac{\partial W_{NSi}}{\partial L_i} > 0$ in equations (4.12), (4.13), and (4.14));
- The two previous conclusions imply that an individual who perceives others as having more resources than s/he does is more likely to have a higher level of psychological altruism;
- As behavioural altruism is positively influenced by psychological altruism ($\frac{\partial C_{oti}}{\partial L_i} > 0$ in equation (2.27)), an individual who perceives others as having more resources than s/he does is more likely to show a greater level of altruistic behaviour;
- The critical level of psychological altruism for a subjectively rich individual ($M_i > \hat{C}_{ooi}$) is lower than that of a subjectively poor person ($M_i < \hat{C}_{ooi}$). Critical level of psychological altruism (L_i^*) is the minimum level of psychological altruism that can induce a pure altruistic behaviour. $L_i^* < 1$ for the subjectively rich and $L_i^* > 1$ for the subjectively poor (equation (4.10)); and

- The models also show a low behavioural altruism trap. On the one hand, the subjectively rich have a lower critical level of psychological altruism, but they face a greater opportunity cost of being psychologically altruistic. On the other hand, the subjectively poor are more likely to be psychologically altruistic but unfortunately they require greater psychological altruism to transfer. Therefore, the society as a whole is trapped in low pure behavioural altruism.
8. Multidimensional well-being and psychological altruism in the institutional approach:
- The institution of a society can be defined as the ratio between the average level of psychological altruism and the variability of the level of psychological altruism after social interaction ($I = \frac{L_{sc}}{\theta_{sc}^L}$ in equation (5.1));
 - The multidimensional well-being of a society is positively influenced by the average level of psychological altruism ($\frac{\partial W_{IS}}{\partial L_s} > 0$ in equation (5.13)); and
 - The multidimensional well-being of a society is negatively influenced by the variability of the level of psychological altruism ($\frac{\partial W_{IS}}{\partial \theta_{sc}^L} < 0$ in equation (5.11)).
10. In general (from the combined, institutional and non-institutional, approach):
- The ambiguity in the non-institutional approach causes ambiguity in the total effect of the level of psychological altruism on the multidimensional well-being of a society ($\frac{\partial W}{\partial L_s} \gtrless 0$ in equation (5.16)); and
 - The multidimensional well-being of a society is negatively influenced by the variability of the average level of psychological altruism in the members of the society ($\frac{\partial W}{\partial \theta_{sc}^L} < 0$ in equation (5.11) and (5.17)).

This thesis on the role of psychological altruism in multidimensional well-being through social interaction, culture, social capital, and institution is summarised in Appendix 1.

7.2. Policy Implications

Although the focus of this thesis is on the role of altruism in multidimensional well-being, the model is developed through a comprehensive approach. The variables taken into consideration are not only altruism or those closely related to it, but also include other influencing variables found in multidimensional well-being literature. Those

variables include social interaction, culture, social capital, institution, and all types of capital (natural, physical, financial, and human). Accordingly, the policy implications that cover all those variables are as follows.

Any development programs or projects aiming to support well-being should avoid over-emphasising one factor while understating other factors that are important for supporting well-being. There is no one single variable that is relatively more important than the others. This study shows that altruism, social interaction, culture, social capital, institution, natural resources, human resources, physical resources, and financial resources are inter-related to one another in a mechanism that supports multidimensional well-being. A weakness in one variable can undermine the whole capacity of the system in creating higher well-being. For example, when social interaction is hindered by a lack of communication, transportation, or organisation infrastructure, the current level of altruism in a society cannot effectively generate externalities through the cultural process, social capital, and institution.

Among other variables, any development programs or projects aiming to support well-being should include altruism as an important factor which can influence the ability of a society to reach a higher level of well-being. As discussed in Chapters 4, 5, and 6, through its ability to both utilise the potential of the resources available in a society and produce positive social externalities, the absence of altruism could impair the ability of the resources in a society to support the well-being of its members. Considering the importance of altruism, there are some factors that can be managed in order to generate a higher level of altruism in society. As found especially in psychology literature, altruism is influenced by factors such as relatedness, norm, model, age, information, and social interaction.

The level of psychological altruism in a society is influenced by social interaction (Chapter 2 and 3), culture (Chapter 3), and institution (Chapter 5). Thus, factors that can promote social interaction and culture such as communication, transportation, or organisation infrastructure can be targeted to promote the level of psychological altruism.⁷⁶ In more real examples for rural areas in developing countries, the policy can include rural road improvement, phone lines provision, giving better access to motorcycle financing, internet access provision, public transport improvement, on-going assistance

⁷⁶ Dur and Sol (2010) shows that financial incentives can influence productivity through social interaction.

for rural organisation management, as well as providing better access to regional and national government agencies. Nevertheless, formal institution such as laws as well as local regulation can also be targeted to give favourable environment in the society for greater social interaction and psychological altruism. For developing countries, the examples can include easier requirements to form new organisations in rural areas, human rights protection, improving law enforcement to prevent corrupt behaviours, and more transparency on rural government agencies. Each society or rural area may need a unique policy design in promoting well-being through psychological altruism which shall be based on some empirical studies.

7.3. Further Research

The results of the research discussed in this thesis offer a range of aspects regarding the role of altruism in well-being which can be investigated in further research. The objective of this study is to focus more on developing a comprehensive theoretical mechanism on how altruism influences well-being. As a result, some aspects of the role of altruism in well-being could not be addressed extensively in this study due to the possibility of distracting attention from the main objective. In addition, the limited time and resources available in conducting this research have also prevented the thesis from covering those aspects. Thus, they will be better examined in separate studies based on the results of this study. Following are some ideas which could be examined in further research on the role of altruism in well-being:

1. Introducing selective altruism (Epstein, 1993) into the model to find the impact of a different kind of altruism on well-being. This model can be initiated by dividing the population into sub-groups and varying the α and β to capture selective altruism.
2. Introducing a different utility function which can show that an individual's happiness is not only influenced by attainments but also by aspirations, as suggested in Easterlin (2003).
3. Introducing an election structure for determining the altruistic values and beliefs leaders in the cultural process. This matching or election model can also be extended to determine the actual level of altruism practiced within a society.

4. Making the model dynamic to show how the whole inter-relatedness among altruism, social interaction, culture, social capital, institution, and resources works over time.
5. Introducing money values into the model.
6. Extending the models to explain the impact of envy or hatred or jealousy.
7. Applying this model on empirical data by conducting a survey especially to measure the level of altruism in individuals and the society as well as their well-being. The findings in this thesis have already provided the models for the measurements.

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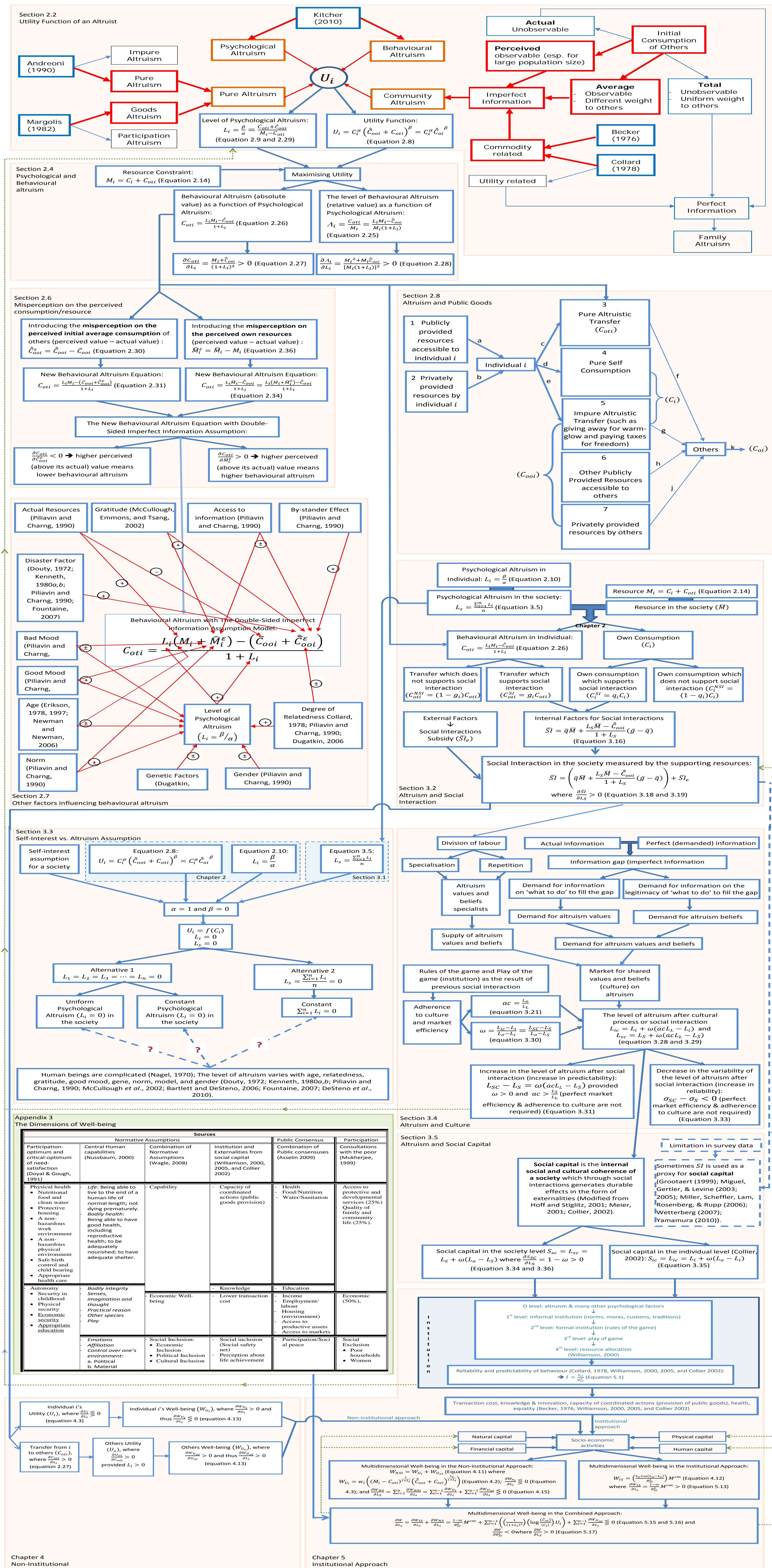
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Summary of the Models



Appendix 2

Proofs Summary

A.2.1. Proposition 2.1

The Lagrange function for maximising utility in equation (2.8) with respect to C_i and C_{oti} , using the resources constraint of equation (2.14), is

$$F(C_i, C_{oti}) = C_i^\alpha (\hat{C}_{ooi} + C_{oti})^\beta + \lambda(M_i - C_i - C_{oti})$$

Thus

$$F'_{C_i}(C_i, C_{oti}) = \alpha C_i^{\alpha-1} (\hat{C}_{ooi} + C_{oti})^\beta - \lambda$$

$$F'_{C_{oti}}(C_i, C_{oti}) = \beta C_i^\alpha (\hat{C}_{ooi} + C_{oti})^{\beta-1} - \lambda$$

and

$$\hat{C}_{ooi} + C_{oti} = \frac{\beta}{\alpha} C_i$$

$$C_i = \frac{\alpha}{\beta} (\hat{C}_{ooi} + C_{oti})$$

$$C_{oti} = \frac{\beta}{\alpha} C_i - \hat{C}_{ooi} = \frac{\frac{\beta}{\alpha} M_i - \hat{C}_{ooi}}{1 + \frac{\beta}{\alpha}} = \frac{L_i M_i - \hat{C}_{ooi}}{1 + L_i} \quad (\text{A.1})$$

$$\Lambda_i = \frac{C_{oti}}{M_i} = \frac{L_i M_i - \hat{C}_{ooi}}{M_i(1 + L_i)}$$

Therefore,

$$\frac{\partial C_{oti}}{\partial L_i} = \frac{M_i - \hat{C}_{ooi}}{(1 + L_i)^2} > 0 \text{ for } M_i > 0 \text{ and } \hat{C}_{ooi} > 0.$$

and

$$\frac{\partial \Lambda_i}{\partial L_i} = \frac{M_i^2 + M_i \hat{C}_{ooi}}{(M_i \{1 + L_i\})^2} > 0 \text{ for } M_i > 0 \text{ and } \hat{C}_{ooi} > 0.$$

A.2.2. Proposition 2.2

Replacing M_i with \hat{M}_i in equation (2.29) and (A.1) yields

$$L_i = \frac{\beta}{\alpha} = \frac{C_{oti} + \hat{\bar{C}}_{ooi}}{\hat{M}_i - C_{oti}}$$

and

$$C_{oti} = \frac{L_i \hat{M}_i - \hat{\bar{C}}_{ooi}}{1 + L_i} \quad (\text{A.2})$$

Substituting equation (2.30) and (2.36) for \hat{M}_i and $\hat{\bar{C}}_{ooi}$ in (A.2) yields

$$C_{oti} = \frac{L_i M_i + L_i \hat{M}_i^\varepsilon - \bar{C}_{ooi} - \hat{\bar{C}}_{ooi}^\varepsilon}{1 + L_i}$$

Therefore,

$$\frac{\partial C_{oti}}{\partial \hat{\bar{C}}_{ooi}^\varepsilon} = -\frac{1}{1+L_i} < 0, \text{ provided } L_i > 0$$

and

$$\frac{\partial C_{oti}}{\partial \hat{M}_i^\varepsilon} = \frac{L_i}{1+L_i} > 0, \text{ provided } L_i > 0$$

A.2.3. Proposition 3.1

Measured by the resources sacrificed, the identity for the average social interaction in a society is formulated in equation (3.15) and (3.17) as

$$\bar{S}I = \bar{q}\bar{C}_i + \bar{g}\bar{C}_{oti} + \bar{S}I_e = \bar{q}\bar{M} + \bar{C}_{oti}(\bar{g} - \bar{q}) + \bar{S}I_e \quad (\text{A.3})$$

Substituting equation (A.1) for C_{oti} in (A.3) yields

$$\begin{aligned}
\bar{S}I &= \bar{q}\bar{C}_i + \bar{g}\bar{C}_{oti} + \bar{S}I_e = \bar{q}\bar{M} + \bar{C}_{oti}(\bar{g} - \bar{q}) + \bar{S}I_e \\
&= \bar{q}\bar{C}_i + \bar{g}\frac{1}{n}\sum_{i=1}^n \frac{L_i M_i - \hat{C}_{ooi}}{1 + L_i} + \bar{S}I_e = \bar{q}\bar{M} + \frac{1}{n}\sum_{i=1}^n \frac{L_i M_i - \hat{C}_{ooi}}{1 + L_i} (\bar{g} - \bar{q}) + \bar{S}I_e \\
&= \bar{q}\bar{C} + \bar{g}\frac{L_S \bar{M} - \hat{C}_{ooi}}{1 + L_S} + \bar{S}I_e = \bar{q}\bar{M} + \frac{L_S \bar{M} - \hat{C}_{ooi}}{1 + L_S} (\bar{g} - \bar{q}) + \bar{S}I_e
\end{aligned} \tag{A.4}$$

Thus

$$\frac{\partial \bar{S}I}{\partial L_S} = \frac{(\bar{M} + \hat{C}_{ooi})(\bar{g} - \bar{q})}{(1 + L_S)^2} > 0 \text{ provided } \bar{M} > 0, \hat{C}_{ooi} > 0, \text{ and } \bar{g} - \bar{q} > 0 \tag{A.5}$$

A.2.4. Proposition 3.2

Equation (2.8), (2.10), and (3.5) imply that

$$\begin{aligned}
&(U_i = f(C_i)) \vee (\beta = 0) \Rightarrow (L_i = 0) \wedge (L_S = 0) \Rightarrow (L_1 = L_2 = L_3 = \dots = L_n = \\
&0) \vee \left(L_S = \frac{\sum_{i=1}^n L_i}{n} = 0 \right)
\end{aligned}$$

However,

$$\begin{aligned}
&\neg \left(\frac{\sum_{i=1}^n L_i}{n} = L_i \right) \Rightarrow \neg (L_1 = L_2 = L_3 = \dots = L_n = 0) \\
&\neg \left(\sum_{i=1}^n \Delta L_i = 0 \right) \Rightarrow \neg (\Delta L_S = 0) \Rightarrow \neg \left(\frac{\sum_{i=1}^n L_i}{n} = 0 \right) \text{ provided } \Delta n = 0 \\
&\neg (L_1 = L_2 = L_3 = \dots = L_n = 0) \vee \neg \left(\frac{\sum_{i=1}^n L_i}{n} = 0 \right) \Rightarrow \neg (L_S = 0) \\
&\therefore \neg (L_S = 0)
\end{aligned} \tag{A.6}$$

A.2.5. Proposition 3.3

The level of psychological altruism after a cultural process is defined in equation (3.28) and (3.29) as

$$L_{ic} = L_i + \omega(acL_L - L_i) \quad (\text{A.7})$$

$$L_{SC} = L_S + \omega(acL_L - L_S) \quad (\text{A.8})$$

where L_{ic} is the level of psychological altruism in individual i , and L_{SC} is the average level of psychological altruism in the society after a cultural process.

Thus,

$$L_{SC} - L_S = \omega(acL_L - L_S) > 0 \text{ if } ac > \frac{L_S}{L_L} \text{ and } \omega > 0 \quad (\text{A.9})$$

A.2.6. Proposition 3.4

The difference between the variability of the level of psychological altruism in a society after and before a cultural process is

$$\sigma_{SC} - \sigma_S = \left(\sqrt{\frac{\sum_{i=1}^n (L_{SC} - L_{ic})^2}{n}} \right) - \left(\sqrt{\frac{\sum_{i=1}^n (L_S - L_i)^2}{n}} \right) \quad (\text{A.10})$$

Simplifying equation (A.10) and then substituting equations (A.7) and (A.8) into (A.10) yields

$$\begin{aligned} & \sum_{i=1}^n (L_{SC} - L_{ic})^2 - \sum_{i=1}^n (L_S - L_i)^2 \\ & \sum_{i=1}^n ((L_S + \omega L_o - acL_S) - (L_i + \omega L_o - \omega L_i))^2 - \sum_{i=1}^n (L_S - L_i)^2 \\ & \sum_{i=1}^n (L_S - L_i)^2 ((1 - \omega)^2 - 1) < 0 \text{ if } L_S \neq L_i \end{aligned} \quad (\text{A.11})$$

A.2.7. Proposition 3.5

Social capital is defined in equation (3.34) as

$$S_{ic} = L_i + \omega(L_o - L_i) = L_i + (\omega(acL_L - L_i)) \quad (\text{A.12})$$

$$S_{SC} = L_S + \omega(L_o - L_S) = L_S + (\omega(acL_L - L_S)) \quad (\text{A.13})$$

where S_{sc} is the social capital of a society and S_{ic} is the social capital stored within individual i .

Thus

$$\frac{\partial S_{sc}}{\partial L_s} = 1 - \omega > 0 \text{ provided } 0 \leq \omega < 1 \quad (\text{A.14})$$

A.2.8. Proposition 4.1

Equation (4.2) shows the role of the level of psychological altruism in well-being in the non-institutional approach as

$$W_{U_i} = w_{u_i}(U_i) = w_{u_i} \left((M_i - C_{oti})^{\frac{1}{1+L_i}} (\hat{C}_{ooi} + C_{oti})^{\frac{L_i}{1+L_i}} \right) \quad (\text{A.15})$$

Thus,

$$\frac{\partial W_{U_i}}{\partial L_i} = \left(\left(\frac{1}{(1+L_i)^2} \right) \left(\log \frac{\hat{C}_{oi}}{(C_i)} \right) \right) U_i, \quad (\text{A.16})$$

provided $U_i, L_i > 0$

$$\begin{cases} > 0 & \text{if } |C_i - \hat{C}_{oi}| < \begin{cases} C_{oti} = 0 \wedge M_i < \hat{C}_{ooi} \\ C_{oti} > 0 \wedge M_i < \hat{C}_{ooi} + 2C_{oti} \\ C_{oti} < 0 \wedge M_i < \hat{C}_{ooi} - 2C_{oti} \end{cases} \\ = 0 & \text{if } |C_i - \hat{C}_{oi}| = \begin{cases} C_{oti} = 0 \wedge M_i = \hat{C}_{ooi} \\ C_{oti} > 0 \wedge M_i = \hat{C}_{ooi} + 2C_{oti} \\ C_{oti} < 0 \wedge M_i = \hat{C}_{ooi} - 2C_{oti} \end{cases} \\ < 0 & \text{if } |C_i - \hat{C}_{oi}| > \begin{cases} C_{oti} = 0 \wedge M_i > \hat{C}_{ooi} \\ C_{oti} > 0 \wedge M_i > \hat{C}_{ooi} + 2C_{oti} \\ C_{oti} < 0 \wedge M_i > \hat{C}_{ooi} - 2C_{oti} \end{cases} \end{cases}$$

A.2.9. Proposition 4.2

In equation (A.1), provided $L_i > 0, C_{oti} > 0$ if $L_i > \frac{\hat{C}_{ooi}}{M_i}$. Thus, the critical level of psychological altruism is

$$L_i^* \begin{cases} > 1 & \text{if } M_i < \hat{\hat{C}}_{ooi} \\ = 1 & \text{if } M_i = \hat{\hat{C}}_{ooi} \\ < 1 & \text{if } M_i > \hat{\hat{C}}_{ooi} \end{cases} \quad (\text{A.17})$$

A.2.10. Proposition 4.3

Equation (4.12) shows that the non-institutional change in multidimensional well-being with respect to a change in the level of psychological altruism of individual i can be expressed as

$$\frac{\partial W_{NSi}}{\partial L_i} = \frac{\partial W_{U_i}}{\partial L_i} + \frac{\partial W_{U_{oi}}}{\partial L_i} \quad (\text{A.18})$$

Provided from Chapter 4 that $\partial W_{U_i}/\partial U_i > 0$; $\partial W_{U_{oi}}/\partial U_{oi} > 0$; $\partial U_i/\partial L_i \leq 0$; $\partial U_{oi}/\partial C_{oti} > 0$; $\partial C_{oti}/\partial L_i > 0$; and $\partial U_{oi}/\partial L_i > 0$, therefore

$$\frac{\partial W_{U_i}}{\partial L_i} \leq 0 \text{ and } \frac{\partial W_{U_{oi}}}{\partial L_i} > 0 \quad (\text{A.19})$$

Thus

$$\frac{\partial W_{NSi}}{\partial L_i} \leq 0 \quad (\text{A.20})$$

and

$$\frac{\partial W_{NS}}{\partial L_S} = \sum_{i=1}^n \frac{\partial W_{NSi}}{\partial L_i} = \sum_{i=1}^{n-1} \frac{\partial W_{U_i}}{\partial L_i} + \sum_{i=1}^{n-1} \frac{\partial W_{U_{oi}}}{\partial L_i} \leq 0 \quad (\text{A.21})$$

A.2.11. Proposition 5.1

Equation (5.9) defines well-being in the institutional approach as

$$W_{IS} = \frac{S_{sc}}{\theta_{sc}^L} M^{cm} \quad (\text{A.22})$$

Substituting equations (A.13) and (A.8) for S_{sc} in (A.21) yields

$$W_{IS} = \frac{L_S + (\omega(acL_L - L_S))}{\theta_{sc}^L} M^{cm} = \frac{L_{sc}}{\theta_{sc}^L} M^{cm} \quad (\text{A.23})$$

Thus

$$\frac{\partial W_{IS}}{\partial L_S} = \frac{1 - \omega}{\theta_{sc}^L} M^{cm} > 0 \quad (\text{A.24})$$

$$\frac{\partial W_{IS}}{\partial L_{sc}} = \frac{M^{cm}}{\theta_{sc}^L} > 0 \quad (\text{A.25})$$

$$\frac{\partial W_{IS}}{\partial \theta_{sc}^L} = -\frac{S_{sc} M^{cm}}{(\theta_{sc}^L)^2} = -\frac{L_{sc} M^{cm}}{(\theta_{sc}^L)^2} \quad (\text{A.26})$$

$$\frac{\partial W_{IS}}{\partial L_{sc}} - \frac{\partial W_{IS}}{\partial L_S} = \frac{M^{cm} \omega}{\theta_{sc}^L} > 0 \quad (\text{A.27})$$

Nonetheless, equation (A.23) implies that

$$\left(W = \left(\frac{L_{sc}}{\theta_{sc}^L} \right) M^{cm} = M^{cm} \right) \Rightarrow \left(\frac{L_{sc}}{\theta_{sc}^L} \right) = 1 \Rightarrow L_{sc}, \theta_{sc}^L > 0$$

and

$$(L_{sc} = 0) \Rightarrow \left(\frac{L_{sc}}{\theta_{sc}^L} \right) = 0 \Rightarrow (W = 0)$$

A.2.12. Proposition 5.2

The combined effects of the level psychological altruism on well-being can be expressed by summing up equations (A.24) and (A.21) as

$$\frac{\partial W}{\partial L_s} = \frac{\partial W_{IS}}{\partial L_s} + \frac{\partial W_{NS}}{\partial L_s} \leq 0 \quad (\text{A.28})$$

Substituting equations (A.16), (A.21), and (A.24) for $\frac{\partial W_{NS}}{\partial L_s}$ and $\frac{\partial W_{IS}}{\partial L_s}$ in (A.28) yields

$$\frac{1-\omega}{\theta_{sc}^L} M^{cm} + \sum_{i=1}^{n-1} \left(\left(\frac{1}{(1+L_i)^2} \right) \left(\log \frac{(\hat{C}_{oi})}{(C_i)} \right) U_i \right) + \sum_{i=1}^{n-1} \frac{\partial W_{Uoi}}{\partial L_i} \quad (\text{A.29})$$

where

$$\frac{1-\omega}{\theta_{sc}^L} M^{cm} + \sum_{i=1}^{n-1} \frac{\partial W_{Uoi}}{\partial L_i} \leq \sum_{i=1}^{n-1} \left(\left(\frac{1}{(1+L_i)^2} \right) \left(\log \frac{(\hat{C}_{oi})}{(C_i)} \right) U_i \right)$$

Appendix 3

The Dimensions of Well-Being

A.3.1. Introduction

Since the multidimensionality of well-being is variably interpreted in literature, this appendix is important to determine the dimensions of well-being applied in this study. Since a relationship between psychological altruism and social capital was established in Chapter 3, a definition of well-being is necessary for the examination of the role of altruism in well-being in Chapter 5. Each set of dimensions of well-being can lead to different conclusions regarding the role of altruism in well-being. Explicitly including economic well-being as one of the dimensions, for example, can offer a clear explanation of how a lower transaction cost, as one of the products of psychological altruism, creates a higher level of well-being.

Section A.3.2 explains the method applied in choosing the dimensions of well-being, which is that suggested in Alkire (2007). This method is based on the classification of the source of dimensions into five different types. The type of sources chosen should be adjusted in line with the goal of the study. Since this study is expected to find the role of altruism in well-being in its general sense, the use of only a single source will be avoided. Using more than one source can increase the chances of the dimensions being more generally applicable.

Section A.3.3 applies the method in determining the multidimensionality of well-being in this study. Three sources of dimensions are employed: normative or axiomatic assumptions; public consensus; and participation. Normative assumptions are theories which provide some normative foundations for the dimensions of well-being, public consensus is a set of dimensions chosen by international organisations and national governments in many countries to measure multidimensional well-being, and participation is an empirical research approach that produces a set of dimensions by summarising respondents' opinions regarding their well-being.

A.3.2. The method for choosing dimensions

Using income as an indicator for the economic dimension of measuring well-being has long been applied for its practicality, but at the same time this monetary approach faces some limitations. The readily available data enables the researcher to make cross-countries and time series analyses using income or consumption. However, considering that some societies are less monetised than others, there are substantial price discrepancies between regions, and most importantly some element of well-being, such as equality, cannot be found in market. Therefore, income alone is not sufficient to cover the multidimensional nature of human well-being.

Although the multidimensionality of well-being has been widely accepted among economists, there has not been a consensus concerning the dimensions to be included in measuring well-being. Different approaches create different dimensions. For example, the human needs approach introduced by Doyal & Gough (1991) recommends two dimensions; physical health and autonomy. Nussbaum's work on the capability approach offers more dimensions, i.e. life, bodily health, bodily integrity, senses, imagination and thought, emotions, practical reason, affiliation, other species, play, and control over one's environment (Deneulin & Shahani, 2009). Discussions on multidimensional poverty do not seem to converge in agreement on the dimensions.

Although theoretically the number of dimensions can be two, ten, or even more, well-being measurement is usually limited to two, three, or four dimensions (Thorbecke, 2007). The main difficulty imposed by using more than four dimensions is in determining the degree of substitutability and complementarity among those dimensions. Hence two dimensions are more commonly chosen, e.g. health and education; health and income; or equality and income.

Alkire (2007) provides very useful alternative sources of dimensions, i.e. existing data; normative assumptions; public consensus; participation; and empirical analysis. There is no single source that has been found to be better than any of the others. Essentially, the selection of sources depends on the objective of each study. For example, when the focus is on testing a theory, a normative assumption approach may be chosen as the main source of dimensions. Further, combining two or more sources can increase the reliability of the dimensions employed in a study.

A.3.3. Combining normative assumptions, public consensus, and participation

This study will utilise three sources of dimensions, i.e. normative assumptions from theory, public consensus, and participation[†]. First, a normative assumptions approach is chosen to provide the appropriate theoretical background in constructing the dimensions. Four important sets of well-being dimensions based on the theoretical considerations to be included in the study are: those derived from participation-optimum and critical-optimum of need-satisfaction by Doyal & Gough (1991); the dimensions derived from the capability approach by Nussbaum (2000); a combination of a capability approach, economic well-being, and social inclusion dimensions from Wagle (2008); and a set of externalities from social capital (Collier 2002) as well as the impact of institution (Williamson, 2000; 2005). The fourth set of dimensions result from a socio-economic process which combines the level of psychological altruism, culture, social capital, institution, and other capitals in this study.

Second, the public consensus approach will make the dimensions selected more comparable with current well-being measurements. The various alternative sets in this approach have been carefully analysed by Asselin & Anh (2008) and finally summarised in a table reflecting not only public consensus well-being dimensions for international comparisons, but also dimensions for national and local comparisons.

Third, the participation approach is needed to ensure the dimensions are appropriate for the society being studied. Dimensions from normative and public consensus approaches may not be able to reflect what people in a developing country really value in their well-being. Mukherjee (1999) has provided some general characteristics of well-being and poverty in Indonesia. This study reflects a typical multidimensional study organised by the World Bank. Finally, Table A.3.1 summarises the above three sources of dimensions.

[†] Alkire (2007) also offers two other sources of dimensions, existing data and empirical approach. In the existing data approach, the dimensions are selected based on the availability of data. Thus, this approach will not be applied, because the objective of choosing the dimensions in this study is to show a theoretical explanation of how the dimensions of well-being are influenced by altruism. Empirical approach refers to studies that apply some pre-formulated values from experts' point of views on a community. Practical reasons and people's aspirations are ignored and people are treated as objects. For this reason, experimental approach may be best used to inform participatory approach, but not as a sole basis for choosing dimensions. This is also the reason that this approach is not applied in this study.

Table A.3.1: Extracting Four Main Dimensions

Sources						Dimension
Normative Assumptions				Public Consensus	Participation	
Participation-optimum and critical-optimum of need-satisfaction (Doyal & Gough, 1991)	Central human capabilities (Nussbaum, 2000)	Combination of normative assumptions (Wagle, 2008)	Institution and externalities from social capital (Williamson, 2000; 2005; and Collier 2002)	Combination of public consensuses (Asselin, 2009)	Consultations with the poor (Mukherjee, 1999)	
Physical health <ul style="list-style-type: none"> Nutritional food and clean water Protective housing A non-hazardous work environment A non-hazardous physical environment Safe birth control and child bearing Appropriate health care 	<i>Life</i> : Being able to live to the end of a human life of normal length; not dying prematurely. <i>Bodily health</i> : Being able to have good health, including reproductive health; to be adequately nourished; to have adequate shelter.	Capability	Capacity of coordinated actions (public goods provision)	Health Food/nutrition Water/sanitation	Access to protective and developmental services (25%) Quality of family and community life (25%).	Health (as an outcome)
Autonomy <ul style="list-style-type: none"> Security in childhood Physical security Economic security Appropriate education 	<i>Bodily integrity</i> <i>Senses, imagination and thought</i> <i>Practical reason</i> <i>Other species</i> <i>Play</i>		Knowledge	Education		Knowledge (as an outcome)
		Economic well-being	Lower transaction cost	Income Employment/labour Housing (environment) Access to productive assets Access to markets	Economic (50%),	Income or consumption (as an outcome)
	<i>Emotions</i> <i>Affiliation</i> <i>Control over one's environment:</i> <i>a. Political</i> <i>b. Material</i>	Social Inclusion: <ul style="list-style-type: none"> Economic Inclusion Political Inclusion Cultural Inclusion 	Social inclusion (Social safety net) Perception about life achievement	Participation/social peace	Social exclusion <ul style="list-style-type: none"> Poor households Women 	Equality or social inclusion(as an outcome)

Note: The method of choosing dimensions is based on Alkire (2007)

Those alternatives need to be simplified to a set of only two, three, or four dimensions maximum as implied in by Thorbecke (2007). Reducing many sets of dimensions to a more manageable set is not an easy task. However, besides the complicated differences among those sets, there are certain similarities that can be obtained. Those similarities appear as health, knowledge, income, and equality. These four dimensions are all important elements of the dimensions found in the normative assumptions from theories, public consensus, and participation sources listed in Table A.3.1.

The first similarity is health. Health is explicitly stated in almost all of the sources (Doyal & Gough, 1991; Nussbaum, 2000; Collier, 2002; and Asselin, 2009), while it is only implicitly included in Mukherjee as 'access to protective and developmental services' and 'quality of family and community life'. By seeing health, especially its indicator such as life expectancy, as an outcome of an individual's well-being, this dimension can logically serve as an indicator of those items described in the lists of the four sources of dimensions. Thus, well-being dimensions will be incomplete without explicitly mentioning health as one of the dimensions.

The second similarity is knowledge. Unlike health, knowledge or education are only explicitly listed in Doyal & Gough (1991), Collier (2002), and Asselin (2009). However, elements, such as imagination and thought, practical reason, and other species in Nussbaum (2000), are highly associated with education. Knowledge indicators, such as education attainment, can also be reflected as an outcome of other items such as 'bodily integrity' or 'senses, imagination and thought' in Nussbaum (2000). For example, higher education can mean higher levels of imagination. In addition, knowledge as one of the externalities from psychological altruism in this study and also capability in Wagle (2008) certainly reflects education. Therefore it is appropriate for knowledge to be the second important dimension of well-being. A healthy individual is not necessarily also knowledgeable.

The third similarity is income or economic well-being. Higher levels of provision of the other dimensions in Asselin (2009) such as employment, access to productive assets, and access to markets to some extent will create higher levels of income. In other words, higher income will not only reflect greater opportunity to consume a wider range of goods and services in the market, but it can also reflect other dimensions not directly related to market. It is also important to include income or economic well-being as a separate dimension due to its flexibility to be converted into other dimensions. This flexibility allows autonomy or the

capability to cope with the changing social and natural environments. When a person's health dimension is high and unfortunately her or his knowledge is poor, this person cannot easily maintain her or his initial level of well-being in a situation where knowledge is increasingly needed for life. In other words, this person is lacking the flexibility to cope with a changing environment. Unless this person has a higher level of the more flexible dimension of well-being, s/he could never be autonomous or have the capability to maintain the previous level of well-being.

The fourth and the last dimension is equality or social inclusion. This dimension of equality represents social inclusion in Waggle's dimensions and Mukherjee's study; emotions, affiliation, and control over one's environment as in Nussbaum's approach; social safety net and perception about life achievement outcomes from the present study; participation as in Asselin's study; and also poor households and women's social exclusion in Mukherjee's participatory approach. In a family or society level, higher well-being in the other three dimensions (health, knowledge, and income) cannot automatically also mean improved social inclusion. A very common example is of course found in economic well-being. Higher income does not necessarily mean greater equality. Without the equality dimension, the other three dimensions cannot comprehensively reflect the general well-being of a society.

Health, knowledge, income, and equality may have some weaknesses in covering all the dimensions in those sources, but other combinations of only four dimensions may not be as effective as these are. If income is replaced by emotions, for example, the new set will lose the capability of covering many other dimensions listed in Table A.3.1 such as economic security, employment, access to market, and access to productive assets. Any other scenario will also likely suffer the same problem. The additional elements gained by replacing one of the four dimensions above would be fewer than the previous elements lost by the replacement.

In measuring well-being, there are still at least five steps remaining to be completed. The first is choosing indicators for each dimension. When data availability constraints affect opportunities for choosing some possible suggested indicators, a structural equation modelling method can be useful. The second step is determining the types of interaction among dimensions and indicators. The last three steps are deciding the relative weight of each dimension, identifying who is multidimensionally poor, and aggregating across

dimensions (Alkire, 2007). These five steps are especially needed for empirical studies and beyond the interest of this study.

A.3.4. Conclusion

The general level of multidimensional well-being can be disaggregated into health, knowledge, economic, and equality dimensions. This set of dimensions is the result of applying the method from Asselin (2009). The types of sources of dimensions chosen are normative assumptions from theory, public consensus, and participation approaches. The normative assumptions from theory are picked as the main approach because this study is a theoretical study which is interested in revealing the general dimensions of well-being. Normative assumptions are obtained from the participation-optimum and critical-optimum of need-satisfaction by Doyal & Gough (1991), the capability approach by Nussbaum (2000), a combination of the capability approach, economic well-being, and social inclusion dimensions from Wagle (2008), and also a set of dimensions gained from a socio-economic process in the present study. The public consensus approach is from Asselin & Anh (2008), which is summarised in a table reflecting not only public consensus dimensions for international comparisons, but also dimensions for national and local comparisons. The participation approach is from Mukherjee (1999), which provided some general characteristics of well-being in Indonesia. As a result, the health, knowledge, income, and equality dimensions are expected to comprehensively cover multidimensional well-being.

Based on those four dimensions, the well-being in this study can be defined as a condition of an individual or society which is characterised by mental and physical health, education or knowledge, income, and equality. This definition avoids using subjective words such as 'a condition of being contented with', 'happiness', or 'sufficient with'. Thus, the four dimensions of well-being can form an objective level of well-being without being relatively compared to the subjective aspiration of the individual or society towards the dimensions. This choice of using an objective instead of subjective definition of well-being is merely based on a practical reason. The reason is to isolate the discussion from factors influencing an individual's or a society's contentment as a state characterised by the dimensions. Discussion on such factors can be a separate study closely related to psychology.

Nevertheless, the word 'condition' has been selected to avoid the problem of choosing a certain approach of well-being. Some alternative approaches of well-being

discussed in the literature are for example: capability, freedom, functioning, and autonomy (Doyal & Gough, 1991; Nussbaum, 2000; Sen, 2008). Thus, the definition of well-being in the present study can be regarded as a generic definition which is ready to be applied in any type of approach on the definition of well-being.