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Risk aversion, time preference and health production: Theory and empirical evidence from Cambodia

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ABSTRACT

This paper quantifies the relationship between risk aversion and discount rates on the one hand and height and weight on the other. It studies this link in the context of poor households in Cambodia. Evidence is based on an original dataset that contains both experimental measures of risk taking and impatience along with anthropometric measurements of children and adults. The aim of the paper is to (i) explore the importance of risk and time preferences in explaining undernutrition and (ii) compare the evidence stemming from poor households to strikingly similar findings from industrialized countries. It uses an inter-generational approach to explain observed correlations in adults and children that is inspired by the height premium on labor markets. Parents can invest in the health capital of their child to increase future earnings and their consumption when old: better nutrition during infancy translates into better human capital and better wages, and ultimately better financial means to take care of elderly parents. However this investment is subject to considerable uncertainty, since parents neither perfectly foresee economic conditions when the child starts earning nor fully observe the ability to transform nutritional investments into long-term health capital. As a result, risk taking households have taller and heavier children. Conversely, impatience does not affect child health. In the case of adults, only weight and the body mass index (BMI), but not height, are positively and moderately correlated with risk taking and impatience.

1. Introduction

This paper studies the link between risk and time preferences and health capital of children and adults as proxied by their anthropometric status. This relationship is investigated using an original dataset from rural Cambodia that features both experimental measures of risk taking and impatience along with the height and weight of all household members.

The aim of the paper is to complement the empirical literature dealing with adult and child nutrition in developing countries by examining the importance of risk and time preference parameters in explaining underdevelopment, and contrast the evidence in this paper stemming from poor households to strikingly similar findings from industrialized countries. Likewise, this study sheds light on the deeper determinants of weight-for-age and height-for-age *z*-scores. These indicators are often studied by development economics (Strauss and Thomas, 1998). More generally, this evidence also adds to the few papers that match household and experimental measures of risk and time preferences on a large scale in developing countries – most importantly, Tanaka et al. (2010) correlate risk and time preferences with wealth, political history, occupation, and other demographic variables in Vietnam.

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Recent anthropometric studies in developed countries have found that impatience is positively correlated with obesity or the BMI (see Komlos et al., 2004; Smith et al., 2005 for the US, Borghans and Golsteyn, 2006 for the Netherlands). Similarly, Anderson and Mellor (2008) provide evidence that experimental measures of risk aversion as measured by lottery choice experiments correlate negatively with obesity and other forms of unhealthy lifestyle. In terms of human capital, a series of papers have shown that risk averse people in advanced economies invest less in schooling (see the important work by Belzil and Leonardi, 2007 for Italy, Hartog et al., 2002 for the Netherlands). Using an intergenerational approach similar to this paper, Brown and Taylor (2012) show that parental risk aversion is negatively linked with academic test scores of children, as well as with not attending college after high school. Agee and Crocker (1996) provide estimates of discount rates parents use when investing in child quality, which are roughly equal to discount rates applied to their own health.

The approach of this paper differs from most studies on health capital and risk and time preference in developed countries in that it uses an inter-generational approach to explain observed correlations in adults and children. In particular, this approach shows that household risk preferences translate into their children's height and weight, controlling for parental height. This empirical strategy may also reduce reverse causality, timing issues and omitted variable bias. A similar point for an inter-generational approach is made by Brown and Taylor (2012) in a study on schooling and parental risk aversion. In the case of Germany, Dohmen et al. (2011) provide evidence that height correlates with risk attitudes. But then, do people with a higher BMI take more risks, or does risk taking induce a higher BMI? Similarly, when correlating risk aversion with education levels, one cannot rule out that education at least partly shapes risk preferences.

This inter-generational perspective on health capital is inspired by the height premium on labor markets. Deep parental preferences in terms of risk and impatience may have profound long-term impacts on their children nutritional status, body stature and subsequent labor market chances. Indeed, Hoddinott (2009) finds that child nutrition substantially increases adult earnings in a thorough study for Guatemala. Similarly, Persico et al. (2004) show that body stature during adolescence relates to wages. This also complements recent evidence in industrialized countries on labor market success and body stature. As mentioned above, Dohmen et al. (2011) argue that height correlates with risk attitudes which in turn could explain the well-known correlation between height and earnings. Using British and American data, Case and Paxson (2008) underline that height is positively associated with cognitive ability, which eventually increases wages. At the other extreme, obesity can decrease earnings as forcefully shown by Brunello and D'Hombres (2007).

Evidence in this paper is qualitatively similar to studies in developed countries. Child height and weight correlate strongly and positively with risk taking in a simple lottery experiment. In addition, there is a moderate correlation of adult BMI and weight and impatience. In other words, the association between anthropometric status and risk as well as time and risk preferences seems to persist across stages of economic development and generations. It is also robust to controlling for the inter-generational transmission of health (i.e. parental height and BMI).

However a developing country context warrants a new interpretation. It has been well documented that economic growth leads to an increase in average height and to a rise in obesity or overnutrition. In rich countries, obesity is concentrated among the poor, while the relatively well-off in industrialized countries strive to be tall and slim. In contrast, many babies in developed countries suffer from undernutrition. In poor countries, in particular early nutritional status is strongly correlated with cognitive and economic achievement. The rich classes in poor countries tend to have a higher and often too high a BMI. Here a high BMI reflects a higher economic status. In other words there is transition in BMIs as countries become richer, which has been coined the socio-economic status reversal in BMI (see Pampel et al., 2012). These patterns suggests that in poor countries people would invest in nutrition per se, increasing the probability of economics success in the future, while in rich countries they invest in healthy nutrition and behavior, reducing the risk of obesity-related health problems and promoting economic status in the future. All these considerations describe intergenerational investment decisions. Therefore risk preferences are likely to matter in different ways because of the uncertainty associated with future outcomes and the ultimate pay-off of investments.

The remainder of the paper is structured as follows: Section 2 presents insights from simple models of intertemporal nutrition to motivate the empirical analysis. Section 3 lays out the empirical model. The dataset and the context are presented in Section 4. Section 5 reports baseline results and a series of robustness checks. Section 6 concludes.

2. Theoretical considerations

While this paper is empirical, it is useful to discuss the theoretical links between risk, discount rates and the nutrition of adults. Furthermore to explain and better understand the observed correlations for adults, we consider theoretically and empirically the mechanisms for children.

2.1. Adults

The positive correlation between impatience and obesity or the BMI (see Komlos et al., 2004; Smith et al., 2005 for the US, Borghans and Golsteyn, 2006 for the Netherlands) is in line with predictions from intertemporal models of consumption, health investments and health capital. Also, since height is relatively fixed over time after a certain age, the relationship is likely driven by the weight component in the BMI. As in Komlos et al. (2004) assume that an individual maximizes his life-time utility as a function of consumption c and health f, where the latter is a function of previous health investments I_{-1}. It follows that relatively impatient people tend to under-invest in healthy