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## Human capital, wealth, and nutrition in the Bolivian Amazon

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### Abstract

We analyze anthropometric variables of a society of forager-horticulturalists in the Bolivian Amazon (Tsimane') in 2001–2002. Community variables (e.g., inequality, social capital) explain little of the variance in anthropometric indices of nutritional status, but individual-level variables (schooling, wealth) are positively correlated with nutritional status. Dietary quality (foods high in animal proteins), access to foraging technology, and traditional knowledge of medicinal plants are related to better anthropometric indices.

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### 1. Introduction

In contemporary industrialized nations and in many developing nations, anthropometric indices of nutritional status (e.g., physical stature) correlate reliably with a wide range of indicators of individual well being, such as income, life expectancy, health, and labor

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productivity (Steckel and Rose, 2002; Fogel, 1994; Komlos, 1989; Steckel, 1995, 2003; Strauss and Thomas, 1998). Historical evidence suggests that during the early stages of industrialization, anthropometric indices deteriorated despite income growth. Historical case studies from Japan, Britain, Austria, Hungary, Ireland, and the United States suggest that during the early stages of industrialization adults from rural areas had higher physical stature than their urban counterparts (Baten, 2000; Komlos, 1987, 1989, 2003; Mokyr and Grada, 1994; Shay, 1994). Komlos calls the downswings in physical stature during the early stages of industrialization “one of the most amazing findings” of historical anthropometric studies, and attributes it to growing income inequality, increase in the relative price of food and animal proteins, losses of food during farm-to-city transport, population growth, to unsanitary conditions in cities, as well as to commercialization that brought about a substantial changes in relative prices (Komlos, 1994).

We study a contemporary small-scale, pre-industrial society of foragers and horticulturalists in the Bolivian Amazon, the Tsimane', to identify the covariates of nutritional status among adults (18 years of age and older) during the early stages of sustained participation in a market economy. The results can complement earlier findings obtained on rural self-sufficient populations in a historical setting. Why did self-sufficient peasants and farmers during the initial stages of industrialization in the 18th and 19th centuries enjoyed better nutritional status than their urban counterparts despite having lower income as first suggested in Komlos (1985)? Studies in early-industrial societies suggest that nutritional status improved as the distance from the village to the city increased, presumably because distance shielded people from the unsanitary conditions of cities and because the countryside had greater availability of food and lower prices for staples (Komlos, 1995; Shay, 1994).

Studies in economic history as well as in social epidemiology from industrialized nations suggest that income inequality harms health (Kawachi, 2000; Komlos, 1994; Wilkinson, 1996) partly because it creates psychosocial stress (Wilkinson, 1997), erodes social capital (Kawachi and Kennedy, 2002), and makes it harder to agree on the provision of public goods (Deaton, 2003; Putnam et al., 1993). Estimating the effect of income inequality and social capital on health in contemporary industrial societies is hard because confounding variables such as government transfers, immigration, and racial and ethnic heterogeneity come into play. Estimating the effects of income inequality and social capital in 18th and 19th-century industrial societies is even harder owing to the shortage of information, particularly information related to social capital. Contemporary pre-industrial, small-scale societies provide an alternative setting to explore the relations of interest since they lack most of these confounding variables.

Yet, unlike in industrialized nations, in small-scale, contemporary pre-industrial societies income inequality might have a modest effect on health because there is likely to be little income inequality owing to social norms of sharing and redistribution (Godoy, 2001; Gurven et al., 2000; Kaplan and Hill, 1985), and because the same social norms should protect individual health from the presumably harmful effects of income inequality.

More importantly, the Tsimane' allow one to test whether standard determinants of nutritional status in industrialized nations, such as income, wealth, and human capital hold in societies with different institutional arrangements. To illustrate: if the relation between nutritional status and income, wealth, or human capital displays standard diminishing

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