Indonesian regional welfare development, 1900–1990: New anthropometric evidence ☆

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ABSTRACT

The study of heights provides a promising approach to a better understanding of the biological welfare of countries and regions for which conventional economic data are relatively sparse. This paper is based on a dataset previously unexploited: the individual records of nearly 10,000 Indonesian men conscripted into the Royal Netherlands East Indies Army (KNIL) used together with individual data on another 10,000 Indonesians, recorded as part of the Indonesian Family Life Surveys (IFLS). These two sets of records provide the height and place of birth of members of birth cohorts spanning nearly the entire 20th century.

Our aim in this paper is to trace the development of average height in Indonesia over the course of the twentieth century. Whereas both average height and average income increased during the second half of the century, we find that this was only after they had diverged in the first half: a divergence similar to the one (frequently discussed in the literature) that had occurred in several other countries toward the end of the 19th century. Using a newly developed "height accounting" method, we estimate that in Indonesia increasing income inequality accounts for about half of this divergence, which gradually disappeared after the Second World War, as income inequality decreased and average height increased until it was rising in tandem with average income.

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1. Introduction

The notable increase over the past several years in the number of anthropometric studies devoted to economic development (Komlos, 1998, 2004; Stegl and Baten, 2009) reflects the emerging consensus among anthropometricians that height is indicative of an individual's economic – and nutritional environment at birth (Tanner, 1978; Steckel, 1995). One significant advantage of the anthropometric approach is that it provides a measure of the standard of living in regions and periods for which conventional economic data are lacking. Take, for instance, the case of Indonesia; because the data on economic and social conditions there prior to 1993 are inadequate (Van der Eng, 2002), researchers lack the means to resolve satisfactorily their debate on the issue of welfare development (Booth, 1998; Dick et al., 2002), and especially of the impact of the government's so-called "ethical" policy during the first half of the 20th century, deemed (depending upon what indicator was used) a success by some (e.g., Boomgaard, 1986; Van Doorn, 1994) and a failure by others (e.g., Elson, 1984; Barlow, 1985). The room for debate widens when one turns one's attention to regional development (Clemens and

Lindblad, 1989). Height-development data on Indonesians provide a reliable basis for measuring variations in their biological welfare across both time and space.

The fact that the relationship between income and height is non-monotonous – that a rise in average income is often accompanied by a stagnation, or even a decline, in average height – is an issue familiar to readers of the literature. It underlies the Antebellum Puzzle in the US (Komlos, 1987) and the Food Puzzle in Great Britain (Floud et al., 1990; Clark et al., 1995) and recently also in Burma (Bassino and Coclanis, 2008). This seesaw phenomenon is usually, but not exclusively, attributed to the geographical separation, beginning in both countries in the late 19th century, between the place of food production (agricultural regions) and the bulk of the food's consumers (urban regions); the nutritional quality of one's diet becomes a function of geography.

Above line of reasoning suggests that the several factors separating persons from food consumption led to increasing height inequality in the 19th century. However, this argument will only apply if per capita income is sufficiently low since with higher incomes also consumption will be higher. Indeed, Steckel (1995) argues that in phases of economic development marked by a low per capita GDP, height changes are largely attributable to an increase in income equality. When per capita GDP reaches a sufficiently high level, further changes in height are driven by economic growth.

Our purpose in this paper is to determine whether this pattern, describing the economic evolution of the US and Great Britain, holds for an underdeveloped country, namely Indonesia. In order to try to determine whether height changes in the early phase of economic development were driven by one set of forces and in a later phase by others, and what those forces were, we construct a height dataset, paying particular attention to differences between Java and the Outer Provinces (everything outside of Java, i.e., including the main islands of Sumatra, Kalimantan, Sulawesi, and Irian Jaya). We then use both qualitative data and a method of height decomposition in order to account for changes in average height.

The paper is organized as follows. In Section 2 we describe the data and report some descriptive statistics. In Section 3 we explore the relationship between height and income in Indonesia, and address the issue of whether evidence for this relationship can be found in food consumption and health. In order to determine whether height changes during the 1930s were due to one set of factors and postwar ones to another, we decompose, in Section 4, the observed height changes into a level effect and a distribution effect of income, on the one hand, and a residual factor, on the other. Finally, we offer our conclusions.

2. Height data for Indonesia

Because there is little extant information on income inequality in developing countries prior to the 1950s, those who study this issue draw instead on anthropometric data.[1] Notable among such studies are those of Komlos (1985) and Austin et al. (2011), and in the case of Indonesia in particular Van der Eng (1995) and Baten et al. (2010).

In the latter study the development of heights in Indonesia between about 1750 and 1990 is estimated on the basis of four sources: slave data, migrant data, medical/anthropometric studies, and a recent dataset derived from the Indonesian Family Life Survey (IFLS), for the birth cohorts that span the period 1940–90. For information on height changes during the first half of the twentieth century, they rely on several medical/anthropometric studies. While these sources shed some light on the overall development of height within Indonesian society, the data themselves are drawn from heterogeneous sources. Moreover, the authors do not deal with the difference between Java and the Outer Provinces, an issue that is frequently discussed in the literature. In order to address this difference, we use a newly available dataset for the period 1900–30 which, while less than perfect, is internally consistent and thus permits us to examine the issue of interregional development in the first decades of the twentieth century. Using another, equally consistent, dataset on heights after the 1930s we are able to analyze height trends over the entire twentieth century.

The first source consists of military data – name, age, place of birth, and height – on 9085 Indonesian men born between about 1890 and 1935 who joined the Dutch forces between 1945 and 1947. (Although the original muster rolls are missing, these data are preserved in military-pension documents housed in the national archives.) Nationaal Archief (1949) Most of the birth years are located between 1900 and 1930 (Tables 1 and 2).[2] Our other source consists of two Indonesian Family Life Surveys (IFLS-1 and -4), those for

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[1] An exception is Baten et al. (2009), but it is on the basis of anthropometric data that they estimate many of their Gini coefficients.

[2] The rapid deterioration of the Dutch position in Indonesia after the Second World War raises questions about the geographic heterogeneity of our dataset. While a large proportion of the Dutch soldiers reenlisted after the war, because of the unstable situation, including the British occupation of Java, most of the new recruits came from North Sulawesi, the Moluccas, Timor, and West Java (Zwitzer and Herhusius, 1977). Our dataset does indeed slightly reflect this regional bias: the percentage of recruits from these areas rises from about 45% before the war to about 58% after the war. Moreover, men from the island of Madura constituted a disproportionately large number of the postwar recruits (Bouwman, 1995), a disproportion reflected in our dataset, which includes – in addition to standard numbers of recruits from the other regions of Indonesia (2168 Javanese, 1632 Manadonese, 1135 Ambonese, 1751 Sundanese, and 270 Timorese) – 447 Madurese, a significantly higher percentage than in 1937. In other words, we found an increase in the proportion of recruits from regions other than the island of Java in the postwar period. This phenomenon improves the quality of our dataset for two reasons. First, it makes for a wider geographical representation, correcting the prewar bias in favor of the Moluccas and Java. Second, it provides a more accurate cross-section of the population – its religious, educational, and occupational makeup – since it was not until the war that men from a wide range of social strata were able to enlist. In fact, when it comes to occupations our sample's figures come close to matching those of the censuses (i.e. 71, 9, and 20 percent for agriculture, industry and services in our sample versus 67, 12, and 21 percent for Indonesia as a whole (Marks, 2009)). This also applies if we only look at the older age cohorts, suggesting that there is no evidence of any serious bias in that older soldiers have higher ranks and originate from more wealthy families.