

# A Generalised Measure of Disparity for Dichotomous Populations

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*Many populations are intrinsically dichotomous and many others are meaningfully dichotomised. For gauging the level of disparity between two sections with respect to a certain trait, many disparity indices have been devised. They are all based on aggregate sectional rates. They all err ignoring the relative sizes of the two sections, thus tacitly assuming that the two sections are of equal size. This paper devises a new positive disparity measure through a simple geometrical device and generalises it for the situation of unequal size sections. The measures are applied to female-male and rural-urban dichotomies in the case of literacy for the states of India. It is found that a disparity measure that ignores the issue of relative size, grossly underestimates/overestimates the magnitude of disparity.*

## I Introduction

Many populations are intrinsically dichotomous and many others are meaningfully dichotomised. The former may be a male-female division and the latter may be a rural-urban one. One may also consider white-black or civil-tribal divisions. Based on sectional rates and averages certain disparity measures are already in use. We provide here a new measure which is intuitively appealing.

The measures already in use tend to ignore relative sizes of two sections. As a result they are suitable only for those populations in which the sections are equally numerous. For such a situation we shall first develop a new measure of disparity. We shall also develop a measure of disparity which will be suitable for the situation of unequal sections. However, it will be shown that the former is a particular case of latter.

The paper is divided in ten parts. In Part II, the problem is posed and in Part III, the line of equality is introduced for both the situations. In Part IV, the line of distribution for both the situations of equal and unequal division of population between two sections, is introduced. In Part V, the measure is derived when the sections are equal in size while in Part VI, the measure is derived when the two sections are not equal. Part VII shows that the latter measure is a generalisation of the former. Part VIII deals with the properties of the measure. Part IX provides an illustration based on literacy rates for the states of India according to female-male and rural-urban divisions. Part X concludes the paper.

## II The Problem

Most disparity measures consider rates  $R_1$  and  $R_2$  for two sections. The differences and ratios based on  $R_1$  and  $R_2$  are usually employed as disparity measures<sup>1</sup>. Sopher (1974) who did not find in literature a valid method of comparing disparities<sup>2</sup>, purportedly tried

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<sup>1</sup> In line with Sopher (1974), we have preferred to use the term disparity instead of inequality when number of units is two. We have not however replaced the term equality by parity.

<sup>2</sup> Sopher (1974) points out that the ratio and difference measures are used with some want of confidence.