ELSEVIER

Power law tails in the Italian personal income distribution

F. Clementi[a,c,*], M. Gallegati[b,c]

[a]*Department of Public Economics, Faculty of Economics, University of Rome 'La Sapienza', Via del Castro Laurenziano 9, I–00161 Rome, Italy*
[b]*Department of Economics, Università Politecnica delle Marche, Piazzale Martelli 8, I–62100 Ancona, Italy*
[c]*S.I.E.C., Università Politecnica delle Marche, Piazzale Martelli 8, I–62100 Ancona, Italy*

Abstract

We investigate the shape of the Italian personal income distribution using microdata from the Survey on Household Income and Wealth, made publicly available by the Bank of Italy for the years 1977–2002. We find that the upper tail of the distribution is consistent with a Pareto-power law type distribution, while the rest follows a two-parameter lognormal distribution. The results of our analysis show a shift of the distribution and a change of the indexes specifying it over time. As regards the first issue, we test the hypothesis that the evolution of both gross domestic product and personal income is governed by similar mechanisms, pointing to the existence of correlation between these quantities. The fluctuations of the shape of income distribution are instead quantified by establishing some links with the business cycle phases experienced by the Italian economy over the years covered by our dataset.
© 2005 Elsevier B.V. All rights reserved.

*Corresponding author. Department of Public Economics, Faculty of Economics, University of Rome 'La Sapienza', Via del Castro Laurenziano 9, I–00161 Rome, Italy. Tel.: +39 06 49 766 843; fax: +39 06 44 61 964.
E-mail addresses: Fabio.Clementi@uniroma1.it (F. Clementi), gallegati@dea.unian.it (M. Gallegati).

1. Introduction

In the last decades, extensive literature has shown that the size of a large number of phenomena can be well described by a *power law* type distribution.

The modeling of income distribution originated more than a century ago with the work of Vilfredo Pareto, who observed in his *Cours d'économie politique* (1897) that a plot of the logarithm of the number of income-receiving units above a certain threshold against the logarithm of the income yields points close to a straight line. This power law behaviour is nowadays known as *Pareto law*.

Recent empirical work seems to confirm the validity of Pareto (power) law. For example, Aoyama et al. [1] show that the distribution of income and income tax of individuals in Japan for the year 1998 is very well fitted by a power law, even if it gradually deviates as the income approaches lower ranges. The applicability of Pareto distribution only to high incomes is actually acknowledged; therefore, other kinds of distributions has been proposed by researchers for the low–middle income region. According to Ref. [2], US personal income data for the years 1935–1936 suggest a power law distribution for the high-income range and a lognormal distribution for the rest; a similar shape is found by Souma [3] investigating the Japanese income and income tax data for the high-income range over the 112 years 1887–1998, and for the middle-income range over the 44 years 1955–1998.[1] Ref. [4] confirm the power law decay for top taxpayers in the US and Japan from 1960 to 1999, but find that the middle portion of the income distribution has rather an exponential form; the same is proposed by [5] for the UK during the period 1994–1999 and for the US in 1998.

The aim of this paper is to look at the shape of the personal income distribution in Italy by using cross-sectional data samples from the population of Italian households during the years 1977–2002. We find that the personal income distribution follows the Pareto law in the high-income range, while the lognormal pattern is more appropriate in the central body of the distribution. From this analysis we get the result that the indexes specifying the distribution change in time; therefore, we try to look for some factors which might be the potential reasons for this behaviour.

The rest of the paper is organized as follows. Section 2 reports the data utilized in the analysis and describes the shape of the Italian personal income distribution. Section 3 explains the shift of the distribution and the change of the indexes specifying it over the years covered by our dataset. Section 4 concludes the paper.

2. Lognormal pattern with power law tail

We use microdata from the Historical Archive (HA) of the Survey on Household Income and Wealth (SHIW) made publicly available by the Bank of Italy for the

---

[1]Reed [6] suggests that a Pareto law may hold also for lower incomes, yielding a so-called *double Pareto-lognormal distribution*, that is a distribution with a lognormal body and a double Pareto tail.