



## Life satisfaction, income and personality



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### ABSTRACT

We use personality traits to better understand the relationship between income and life satisfaction. Personality traits mediate the effect of income on life satisfaction. The effect of neuroticism, which measures sensitivity to threat and punishment, is strong in both the British Household Panel Survey and the German Socioeconomic Panel. Neuroticism increases the usually observed concavity of the relationship: individuals with a higher neuroticism score enjoy extra income more than those with a lower score if they are poorer, and enjoy extra income less if they are richer. When the interaction between income and neuroticism is introduced, income does not have a significant effect on its own. To interpret the results, we present a simple model based on Prospect Theory, where we assume that: (i) life satisfaction is dependent on the gap between aspired and realized income, and this is modulated by neuroticism and (ii) income increases in aspirations with a slope less than unity, so that the gap between aspired and realized income increases with aspirations. From the estimation of this model we argue that poorer individuals tend to over-shoot in their aspirations, while the rich tend to under-shoot. The estimation of the model also shows a substantial effect of traits on income.

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## 1. Introduction

Given its importance for welfare analysis and public policy, the general relation between self-reported well-being and personally available income has been widely investigated. A regression of life satisfaction on income using both cross-sectional and panel survey data from a developed country generally shows a significant, positive, but small estimated coefficient of income (e.g. Blanchflower & Oswald, 2004; Ferrer-i-Carbonell & Frijters, 2004). Although the debate on the existence of a satiation point is still open, there is general agreement that the size of the effect is decreasing with income, consistent with the usual assumptions on the utility function of individuals, as Layard, Mayraz, and Nickell (2008) explicitly point out.<sup>2</sup>

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<sup>2</sup> Layard et al. (2008) find that marginal life satisfaction with respect to income declines at a faster rate than that implied by a logarithmic utility function. Kahneman and Deaton (2010) argue that the effect of income on an emotional dimension of well-being, like happiness self-reports, reaches a maximum at an annual income of 75,000 USD, and it has no further positive influence for higher values; while the non-emotional measures of well-being like the Cantrill ladder do not feature this satiation point.

However, a significant amount of evidence suggests that the link between income and life satisfaction is more complex than that. Life satisfaction appears to be monotonically increasing with income when one studies this relation at a point in time across nations (e.g. Di Tella & MacCulloch, 2010; Stevenson & Wolfers, 2008). Over time, however, the relation between GDP and life satisfaction appears rather different. In a well-known finding, Easterlin reports no significant relationship between happiness and aggregate income in time-series analysis. For example, the income per capita in the USA in the period 1974–2004 almost doubled, but the average level of happiness shows no appreciable trend upwards. This puzzling finding, appropriately called the Easterlin Paradox (Easterlin, 1974) has been confirmed in similar studies by psychologists (Diener, Diener, & Diener, 1995) and political scientists (Inglehart, 1990), and has been shown to also hold for European countries (Easterlin, 1995).<sup>3</sup> A recent paper by Proto and Rustichini (2013) finds a positive relationship between growth and satisfaction for countries with a GDP below 15,000 USD but shows that this relationship is flat in richer countries, suggesting a gap between aspiration and realized income.

A potential explanation of the paradox is that individuals adapt to current conditions, and the level of subjective well-being tends to revert to a baseline level depending on a reference point, an idea originally proposed by Brickman and Campbell (1971). Aspirations are naturally associated with the reference point provided by current income. Hence, to the extent that an increase in income leads to an increase in aspirations, changes in income may not have a long-run effect on subjective wellbeing.<sup>4</sup> Another explanation of the Easterlin Paradox hinges on the concept that relative, rather than absolute income, is the main determinant of life satisfaction, an idea that can be dated back to Duesenberry (1949). The two explanations are closely related.<sup>5</sup>

The present paper aims to shed more light on the relation between personal income and life satisfaction by analyzing how personality affects this relation. Recently, economists have recognized the importance of introducing personality traits into economic models (Borghans, Duckworth, Heckman, & ter Weel, 2008; Rustichini, 2009; Almlund, Duckworth, Heckman, & Kautz, 2011). Recent studies show that personality has a biological basis, as DeYoung and Gray (2010) argue in an exhaustive survey of the literature.

The rest of the paper is organized as follows. In Section 2 we describe the datasets, the main variables (2.1) and the econometric model (2.2). In Section 3 we show the results from the estimation of the econometric model. In Section 4 we describe our theory and estimate the structural model (4.1). In Section 5 we conclude by highlighting the main results. Additional analysis and more technical details are in the appendix.

## 2. Data and methods

### 2.1. Data

We use two national data sets: the British Household Panel Survey (BHPS), covering the years 1996–2008 (the question on life satisfaction was introduced in 1996), and the German Socioeconomic Panel Study (SOEP), available for the years 1984–2009. Both SOEP and BHPS are longitudinal datasets, with the same individuals interviewed every year. Summary statistics relating to all the main variables are presented in Tables 1 and 2. We now provide a brief description of the main variables.

#### 2.1.1. Big 5 personality traits

The Big Five are usually measured through self-report based on the NEO Five-Factor Inventory (see e.g. Costa & McCrae, 1992). There is a large literature demonstrating the reliability of this questionnaire and the stability of the personality traits. The data used in the current paper have been elaborated from the standard short questionnaire present in the BHPS and SOEP datasets (in the year 2005). Personality traits are usually assessed with the NEO-Five Factor Inventory (NEO-FFI) with 60 items (12 items per domain). However, recent scale-development studies have indicated that the Big Five traits can be reliably assessed with a smaller number of items (e.g., Gosling, Rentfrow, & Swann, 2003). For instance, pilot work from the German Socio-Economic Panel (GSOEP) study led to a 15-item version of the well-validated Big Five Inventory (Benet-Martinez & John, 1998) that can be used in large-scale surveys. The questions are presented in Section A of the appendix.

We use data on the Big Five personality traits in the 2005 waves of the BHPS and SOEP datasets as measures of individuals' personality for the entire time span that we observe each individual for. Borghans, Duckworth, Heckman, and ter Weel (2008) argue that personality traits vary little for individuals aged between 18 and 65, the life span we are considering. Our data are consistent with this result since when we regress the personality traits against age and age squared we find that they explain a very small portion of the variance. For example in a regression of neuroticism with age and age<sup>2</sup>, the  $R^2 = 0.0027$  in the SOEP and  $R^2 = 0.0025$  in the BHPS. The effect on all other traits is very similar. Although it is unlikely that

<sup>3</sup> There is some disagreement in the time-series based analyses: Oswald (1997) shows evidence of a small positive temporal correlation between life satisfaction and GDP in industrialized countries and Stevenson and Wolfers (2008) find significant happiness gains in Japan in the post-war period.

<sup>4</sup> Easterlin (2005), Stutzer (2004) and McBride (2010) provide some empirical evidence on how aspirations increase in income, Di Tella and MacCulloch (2010) show evidence that individuals adapt to status, although they cannot reject the hypothesis of no full adaptation to a change in income in four years.

<sup>5</sup> Clark and Oswald (1996), Blanchflower and Oswald (2004), Ferrer-i-Carbonell (2005), Luttmer (2005) and Senik (2009), among others, present empirical validations of this hypothesis. See Clark, Frijters, and Shields (2008) for an extensive survey of the theoretical and empirical literature explaining the Easterlin Paradox.

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