



# Income comparison, income formation, and subjective well-being: New evidence on envy versus signaling

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## ABSTRACT

Drawing on the distinction between envy and signaling effects in income comparison, this paper uses panel data on subjective well-being from Germany over the period 1991–2009 to study whether the nature of income comparison has changed in the process of economic development and institutional change. We conceptualize a person's comparison income as the income predicted by indicators of her productivity and examine if comparison effects have changed with changes in the income–productivity relationship. We find that (i) after a series of institutional reforms that affected income formation, incomes are now better explained by productivity than they were before the reforms, (ii) before the reforms, signaling was the dominant concern in East Germany whereas envy was dominant in West Germany, (iii) since the reforms, no dominance of envy or signaling effects can be found.

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## 1. Introduction

The subjective evaluation of income has been a major subject of economic analysis in recent years. An intriguing result of this literature is that individuals typically evaluate their own income in comparison with some reference income, that is, the typical income of people with whom they share some relevant characteristics, such as region, age, sex, and the level of education (see Clark, Frijters, Shields, 2008 for a survey).

Comparison income may affect a person's utility in two ways (Hirschman, 1973). One mechanism is that a higher level of comparison income triggers a feeling of envy and thus has a negative effect on a person's utility. The second mechanism involves the idea of signaling. In this view, a higher level of comparison income serves as an indicator for the income level a person may expect to attain in the future, and thus affects her utility positively. As suggested by Hirschman (1973), the signaling effect of comparison income may dominate the envy effect in stages of economic development that are characterized by a high degree of social and economic uncertainty

whereas the envy effect is likely to dominate in more stable and mature economies (Hirschman conjecture).

Consistent with the dominance of signaling over envy when economic prospects are uncertain, Senik (2004) found a positive relationship between subjective well-being (SWB), understood as a proxy for personal utility, and a measure of people's comparison income in Russia. Other papers (see below) found a positive relationship in several transition economies of Eastern Europe in the 1990s, but an overall negative relationship in West European countries.

In this paper, we use panel data for East and West Germany, 1991–2009, to investigate the relationship between people's comparison income and their SWB. Following previous literature (e.g. Clark and Oswald, 1996; Senik, 2004) we measure comparison income by the income of people with similar productivity, as predicted by an earnings equation. This approach allows us to study the effect of comparison income on SWB jointly with the income–productivity relationship and changes thereof.

The distinction between East and West Germany and the time frame considered, which extends to 20 years after unification, allows us to investigate if and how the relationship between comparison income and SWB differs between East and West and over time. Given that economic uncertainty was high in East Germany in the early years after unification, the Hirschman conjecture suggests a dominance of the signaling over the envy effect in the East whereas in the more economically stable and advanced West Germany, envy

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rather than signaling is expected to be the dominant factor in income comparisons. An intriguing question, then, is how these relationships evolved over time in the process of economic development and institutional change.

By running standard SWB regressions with comparison income among the independent variables, we found the coefficient on comparison income to be significantly positive in East Germany and significantly negative in West Germany in the sub-period 1991–1999, whereas the corresponding coefficients in both East and West Germany were insignificant in the sub-period 2000–2009. In addition, we found on the basis of the earnings regressions that the association between people's productivity-relevant characteristics and their income was closer in the latter than in the former sub-period, both in the East and the West.

The significantly positive coefficient on comparison income in East Germany and the significantly negative coefficient in West Germany in the first sub-period are unsurprising in the light of the Hirschman conjecture as they indicate a dominance of signaling over envy in the East and a dominance of envy over signaling in the West.

The insignificance of comparison income in East Germany in the second sub-period is consistent with the idea that the signaling value of comparison income decreased with the decrease of uncertainty in the process of East Germany's social and economic development, such that the signaling effect ceased to dominate the envy effect. In fact, the closer association between income and productivity found in the second sub-period can be taken to constitute direct evidence of a decrease in income uncertainty.

The insignificance of comparison income in West Germany in the second sub-period indicates that envy ceased to dominate signaling in the second sub-period. Similar to the result for East Germany, this finding is also explicable in terms of the closer association between income and productivity: As some literature suggests, people evaluate other people's incomes less negatively when they consider them to be "deserved" rather than reflecting mere luck (for a review, see Clark and D'Ambrosio, 2015). Given this influence of deservingness, it is plausible that envy becomes a less important factor in people's evaluation of others' income if income is generally in better agreement with productivity.<sup>1</sup>

As we discuss below, the closer link between income and productivity may have been driven by reforms of the tax and transfer system and of the labor market undertaken in Germany after the turn of the millennium. The changes in the nature of income comparison may thus plausibly be traced back to those reforms.

Previous studies on income comparison with "similar" others include Clark and Oswald (1996), Senik (2004, 2008), Ferrer-i-Carbonell (2005), Luttmer (2005), Caporale et al. (2009), D'Ambrosio and Frick (2012), Knies (2012) and Vendrik (2013). These papers differ from each other in the way comparison income is measured. While Clark and Oswald (1996) and Senik (2004, 2008) derive comparison income from an income regression on individual characteristics, Ferrer-i-Carbonell (2005), Caporale et al. (2009), D'Ambrosio and Frick (2012) and Vendrik (2013) compute comparison income as the average income (cell mean) of people with similar characteristics (age bracket, education level, country). Luttmer (2005) and Knies (2012), using U.S. and German data, respectively, conceptualize comparison income with respect to geographical units rather than people's characteristics.

Independent of the method of measurement used, comparison income's effect on well-being is found to have been negative in "mature" capitalist economies in Europe and positive in transition economies during the 1990s. Results for the U.S. are mixed:

<sup>1</sup> We emphasize that the coefficient on comparison income represents the *net* effect of envy and signaling and that, similar to previous literature, we are unable to disentangle the two effects. The possibility that signaling decreased in East Germany and envy decreased in West Germany is plausible, but only one of many possibilities.

Luttmer (2005) found a negative effect of average income of broadly defined neighborhoods, whereas Senik (2008) found a positive effect of productivity-based comparison income.

The study by Knies (2012) is of particular interest for the present work because she uses German data from the second part of our observation period. Using a notion of comparison income defined in terms of narrowly defined neighborhoods, but without reference to productivity, she finds that the neighborhood income effect is negative in West Germany but positive in East Germany. This finding supports the interpretation of our results in terms of changes in the income-productivity relationship: If local comparison income, undifferentiated by productivity, had also lost its importance in the post-2000 period, the insignificance of productivity-dependent comparison income that we find could not have been caused by a better match between income and productivity. On the other hand, since *locally defined* comparison income was important for well-being even after 2000, this reinforces the proposed interpretation of our results (acting like a placebo regression).<sup>2</sup>

The paper is organized as follows. Section 2 presents the conceptual framework. Section 3 presents the empirical framework. Section 4 reports and discusses the empirical results. Section 5 concludes.

## 2. Conceptual framework

### 2.1. Well-being effects of comparison income

We follow previous literature by hypothesizing an envy effect and a signaling (information) effect of others' income (Hirschman, 1973).<sup>3</sup> As pointed out by Clark, Kristensen, Westergaard-Nielsen (2009), the coefficient on others' income in a well-being equation will mix the envy element and the signaling element. The coefficient will be negative or positive depending on the relative size of the two elements.

The negative income externality (envy) may work through mechanisms that involve phenomena like conspicuous consumption and relative income (Veblen, 1899 and Duesenberry, 1949, respectively), and perceived fairness. With respect to fairness, it has been observed that the income externality may be smaller when others' income is considered to reflect effort rather than chance (e.g. Hoffman et al. 1994; Cherry, Frykblom, Shogren, 2002).<sup>4</sup> The coefficient on others' income is thus expected to become less negative or more positive as deservingness increases, *ceteris paribus*, even if this does not affect the other mechanisms underlying the negative externality.<sup>5</sup>

The positive income externality (from signaling) arises if the incomes of others are taken as an indicator of one's own future prospects. Following Hirschman (1973), the signaling effect will be greater in more uncertain environments. As uncertainty decreases, so does the signaling effect and, hence, the coefficient on others' income (*ceteris paribus*).

To formalize the role of comparison income as a potential source of both envy and information, we assume that an individual derives utility  $u$  from her current income  $y$  and her expected future income  $y^e$ . In addition, she receives disutility from some comparison income, that is, the "typical" income  $\hat{y}$  of persons with similar characteristics

<sup>2</sup> We are grateful to a reviewer for suggesting this line of reasoning.

<sup>3</sup> Other authors refer to envy as jealousy (see e.g. Senik 2008).

<sup>4</sup> Hoffman et al. (1994) found that when the role of proposer in the ultimatum game is earned rather than being randomly assigned, respondents are more likely to accept unequal offers. Similar results are reported in Cherry, Frykblom, Shogren (2002) when the asset of the dictators in the bargaining game is legitimate. Contrary to this, psychological and sociological literature has found that people suffer even more from comparisons when they can only blame themselves for their poor performance (Wollert et al., 1983, Sheeran, Abrams, Orbell, 1995).

<sup>5</sup> Empirically discriminating between different mechanisms involved in the negative externality is out of the scope of this paper. We are unaware of research that has done so.

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