The positive relationship between real household income and self-declared tolerance

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Abstract

A widespread opinion, supported by many theoretical contributions of philosophers and economists, states that economic prosperity has positive consequences on material wellbeing which are traded off by negative "moral" consequences and social externalities. An opposite school of thought challenges this view by emphasizing that economic growth has also beneficial moral consequences in terms of higher tolerance, affection towards democracy, generosity and social consensus for competition. This paper focuses on the presumed positive effect of economic growth on tolerance, so far unexplored in the literature from an empirical point of view. Using panel data from the German Socioeconomic Panel on around 33,000 individuals over the period 1992-2004 we find a robust positive relationship between real personal household income and self-declared tolerance, both in levels and first differences. These findings are paralleled by consistent evidence on the negative relationship between aggregate variables, such as inflation and unemployment, and (changes of) tolerance towards immigrants. Our results imply that growth may have positive moral consequences assumed that it translates from aggregate into individual level.

1. Introduction

> [I]t is in the progressive state, while the society is advancing to the further acquisition, rather than when it has acquired its full complement of riches, that the condition of the great body of the people, seems to be the happiest and the most comfortable. It is hard in the stationary, and miserable in the declining state. The progressive state is in reality the cheerful and the hearty state to all the different orders of society. The stationary is dull; the declining melancholy
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> Adam Smith's Wealth of Nations

In 1958 Banfeld wrote "The Moral Basis of a Backward Society" claiming, first in the literature, that the underdevelopment of an economy (in his case, of a small community of southern Italy) can be partially due to the lack of trust towards people not belonging to their family. This work has been widely ignored by economists for many decades, the only exception being Arrow who, in 1972, wrote: "It can be plausibly argued that much of the economic backwardness in the world can be explained by the lack of mutual confidence. See Banfeld's remarkable study of a small community in southern Italy". In the following years, Banfeld's ideas on the importance of trust and social relations have been rediscovered and broadened to other aspects of moral behaviors by researchers like Coleman (1990), Putnam (1993), Putnam, Leonardi and Nanetti (1993), Fukuyama (1995) and Guiso, Sapienza and Zingales (2001), among others.

A growing body of literature has explored the positive and circular link between social capital and economic growth, where social capital is typically measured by trust and trustworthiness in interpersonal relationships, trust in institutions, participation levels in associations, election turn-out, and willingness to pay for public goods. Since contracts cannot discipline all contingencies of human action, higher levels of social capital improve the economic performance by facilitating transactions among agents, while a sounder economic environment can determine higher levels of social capital. On the contrary, a widespread opinion in the debate on the consequences of economic growth is that the latter generates positive material benefits which are partially offset by negative moral consequences and social externalities.[1] For example, Scitowsky (1976) argues that economic growth increases comfort which, in turn, dampens stimulation and reduces investment and effort towards those activities which could increase individual happiness. Similarly, in his well known contribution, Hirsch (1976) claims that growth and market economy deplete the moral legacy of the past.

In his recent stimulating book Friedman (2006) criticizes this line of reasoning and argues that economic growth has positive effects not only on the material wellbeing but also on the moral attitudes of the society. The main point of his contribution is that higher GDP should increase affection towards democracy, tolerance, generosity and appraisal for competition. According to Friedman's own words, "*Economic growth - meaning a rising standard of living for a clear*

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[1] The important issue of environmental sustainability of economic growth is beyond the scope of our investigation. The reader can follow the debate on the relationship between growth, pollution and willingness to pay for pollution abatement in the ample literature on the environmental Kutztnets curve (Copeland-Taylor, 2004; Panayotou, 2000).

majority of citizens - more often than not fosters greater opportunity, tolerance of diversity, social mobility, commitment to fairness and dedication to democracy." And conversely, when there is economic stagnation or decline the citizen's "moral character" tends to decline accordingly, there being less tolerance, less openness, and less generosity to the poor and the disadvantaged."

The economic literature has thoroughly explored only some of Friedman's arguments. While the relationship between growth and democracy has been widely discussed with the identification of plausible biunivocal causality links between the two variables (see, among others, Glaeser et al., 2003), the nexus between growth and tolerance appears much less explored, even though there exists an ample literature on the impact of ethnic conflicts (a phenomenon which is at the opposite of tolerance) on economic growth (see Easterly and Levine, 1997). Intuitively, Friedman's hypothesis on this point has a sound economic rationale. A relevant part of the public opinion believes that economic activity is a zero sum game in which aggregate payoffs of losers and winners must necessarily clear.[2] Actually, from an algebraic point of view, this is true only when the GDP growth rate is non positive. If the zero sum game is a crucial worry, it is reasonable to assume that such a worry is higher in stagnation periods, when economics is effectively a zero or a negative sum game in the aggregate,[3] than in expansion periods when the size of the "cake" grows and everyone could, in principle, have a higher slice of it.[4]

Friedman's intuition on the positive moral consequences of economic growth on tolerance is not empirically tested in his book which, on the other hand, provides rich historical evidence and a big variety of anecdotes in support of his hypothesis. When reading the book, three lines of criticism arise. First, the simple proximity of two facts in a given historical period (i.e. an outburst of intolerance during economic stagnation) is not a proof that a link between the two actually exists since many other concurring factors may explain the phenomenon. Second, there is a potential endogeneity problem since plausible rationales for supporting both direct and inverse causality links between the two variables exist. Third, if we sharpen our focus on this issue, we may wonder which aggregate or individual aspect of economic prosperity or distress (changes in GDP or in real personal income, variation in the unemployment rate or in the working status) has the highest and most direct effects on the above mentioned moral consequences.

In our paper we try to test empirically the Friedman's hypothesis on the relationship between growth and tolerance, which goes hand in hand with trust,[5] by use of the German Socioeconomic Panel which provides information on economic variables and declarations about values of the same individuals over several years. Our paper is divided into five sections (introduction and conclusions included). In the second section we provide a short literature review on the moral consequences of economic growth by summarizing arguments which identify positive and negative effects. In the third we describe our database and comment descriptive evidence. In the fourth we present and discuss econometric findings from different specifications in which we regress (changes of) self

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[2] The idea of economics as a zero sum game finds an analogy in the second law of thermodynamics on the conservation of energy which states that the total energy going into a system must equal the total energy coming out of it, and cannot be created or destroyed.

[3] This is true at least from a static point of view when we do not consider that, even under constant GDP, a change in the share of investment may be crucial to raise the growth rate in the future. Furthermore, the same nature of market transactions is such that, even in a zero growth economy, market trades increase individual wellbeing in proportion to the sum of consumer and producer surpluses. The zero sum game argument is therefore valid only in a static perspective and if we exclusively focus on observable economic payoffs.

[4] Actually, by translating our reasoning in terms of happiness effects of material wellbeing, relative income and hedonic adaptation may make economic activity a zero sum game even in presence of growth. In fact, if both per capita GDP and people's expectations increase by the same amount, the overall population's wellbeing is unchanged. Therefore, the only way to increase one's satisfaction is by increasing his relative income, which can happen only is somebody else's one diminishes.

[5] It is reasonable to assume that tolerance is a necessary precondition for trust and trustworthiness among individuals.

declared tolerance on (changes of) various measures of aggregate and individual socio-economic conditions. The fifth section concludes.

2. Literature Review

Evaluating the non economic consequences of economic choices is extremely important for the correct definition of policy objectives. Moral values and individual preferences, which are crucially oriented by the former, are not exogenous "fundamentals", since they affect and are affected by economic factors in a circular relationship. However, there is a growing consensus in the literature on the fact that *values affect economic outcomes* and that, in a framework of asymmetric information and incomplete contracts, elements such as trust, trustworthiness, altruism and fairness are necessary to increase the quality and effectiveness of economic relationships which are at the basis of economic prosperity (Knack and Kiefer, 1997; Zak and Knack, 2001; Fehr and Falk, 2002). On the other side, many theoretical and empirical contributions highlight that *economic outcomes affect values* or that the same market structure and economic growth may produce alternative cultural values (such as antagonism and self interest) as side products, therefore interacting with the previously mentioned "civic virtues" and contributing to increase or deplete the moral fabric (see, among others, Hirsch, 1976 and Kumar, 1983).

Scholars of different disciplines tend to polarize around these two different views on the causality direction between economic growth and morality. On the one side, psychologists tend to emphasize that moral values are time invariant personality traits which are inherited from birth or childhood.[6] On the other side, economists (and even more sociologists) emphasize that the socioeconomic environment crucially affects the "law of motion" of individual beliefs and attitudes. However, the biunivocal relationship between moral values and economic success described above risk to generate a paradox: moral values are important in determining economic success but the resulting economic growth may deplete the stock of the same moral values, thereby undermining the roots of economic success.

Within this general argument we shortly consider more specific theories and empirical evidence on specific relationships related to the circularity between market prosperity and moral fabric. A first argument emphasizing the negative consequences of economic growth on moral values is the well known trade-off between comfort and stimulation (Scitowsky, 1976), where affluence generated by economic growth increases individual comforts. This, in turn, dampens incentives to build those values and virtues which require effort to be maintained and strengthened. A second argument comes from Hirsch (1976) who has a well known critical position on the moral consequences of market economy and economic growth. In his book on *Social limits to growth* the author identifies three main negative effects of market economies on moral values: the "tyranny of small decisions", the "commercialization bias" and the "depleting moral legacy". The first is related to the classical coordination failure problem.[7] The second refers to a typical Marxian argument: the fact that in a free market economy everything, including moral values, becomes object of exchange generates corruption and venality and deteriorates the moral fabric of the society. Finally, the social morality is a "legacy of the precapitalist and preindustrial past" (Hirsch, 1976: 117) which is necessary to let

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[6] De Neve and Cooper (1999) identify a large number of identity traits which may significantly affect economic success. Some of them such as extroversion, agreeableness and neuroticism are particularly important with this respect.

[7] *"Individual choices, each made separately and thereby necessarily without taking account of the interaction between them, combine to have destructive social consequences. These consequences are destructive in the sense that they produce a worse result for the individual concerned than could have been obtained by coordination of individual choices with some method that took account of the mutual interaction."* (Hirsch 1976: 37).

economic transactions work. Market economies, especially after the industrialization process, are characterized by negative values like individualism and avarice and by negative social contexts due to anonymity, mobility of workers, etc., which deplete such legacy.

On this point Arrow (1972) is explicitly in conflict with Hirsh's view.[8] According to the former, the fact that altruism is "a depleting stock rather than a self-generating flow feeding partly on itself" is a "questionable premise". Another criticism to the theories which attribute to market economies negative consequences on the moral fabric comes from Polanyj (1957). The author argues that the depletion effect is counterbalanced by the reaction of those more harmed by competition, who exert pressure to create laws and institutions aimed at offsetting this tendency.

Concern of social scientists sharing Hirsch's position has contributed to the opinion that market economy and economic growth have beneficial effects in terms of material wellbeing, but also undesirable side consequences on moral values, which must be tolerated if we attach great importance to individual prosperity. A brilliant synthesis of this line of thought is provided by Keynes when he says that "*For at least another hundred years we must pretend to ourselves and to everyone that fair is foul and foul is fair; for foul is useful and fair is not. Avarice and usury and precaution must be our gods for a little longer still. For only they can lead us out of the tunnel of economic necessity into daylight*".[9] Friedman's book challenges this perspective by supporting, with historical and anecdotic evidence, all the counterarguments advanced in the literature to show that economic growth has indeed not only positive material but also positive moral consequences.

One of Friedman's arguments, namely the relationship between economic growth and democracy, has been thoroughly explored. An important issue in the relationship between growth and democracy is the direction of the causality nexus, where different contributions find support for significant links in both directions. Among the studies emphasizing the role of the quality of institutions (under different facets) and democracy in sustaining economic growth we find Knack and Kiefer (1995), Mauro (1995), Hall and Jones (1999), Acemoglu (2001 and 2002) and Easterly and Levine (2003). On the opposite, the alternative perspective that democracy does not anticipate, but rather follows, economic development has been supported by another sub-branch of this specific literature. Glaeser et al. (2004) resume the point by quoting Lipset (1960) who argues that more educated individuals tend to solve their disputes in courts and not with violent private conflicts and are more willing to participate and fuel the life of institutions.[10]

In contrast to the first (affection to democracy), a second relevant argument by Friedman, the positive effect of economic growth on tolerance, has never been empirically tested, even though the reverse causality nexus has been examined in the empirical growth literature. Starting from the observation of the plague of ethnic conflicts in sub-Saharan countries, Easterly and Levine (1997) observe that the degree of ethnic fractionalization has negative and significant effects on growth and is a significant negative factor in conditional convergence estimates. The interpretation of this finding starts from the observation that ethnic conflict is exactly the opposite of tolerance which, in turn, is the fundamental prerequisite for the existence of "bridging" and not just "bonding" social capital (Gittell and Vidal, 1998, and Narayan, 1999), that is, of trust relationships which are not confined within an ethnic group but extend across members of different groups.

If we look at trust and trustworthiness, two of the main facets of the complex concept of social capital, we know that they are necessary to create productive relationships among individuals in

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[8] For an accurate analysis of this debate see Carvalho and Rodrigues (2006).

[9] "The Future", *Essays in Persuasion* (1931) Ch. 5.

[10] Note however that, under such argument, the relationship between economic development and democracy is indirect since there is a third factor (education) which is expected to influence both.

frameworks of asymmetric information and incomplete contracts in which monitoring is costly or not possible (Fehr and Falk, 2002). Absence of tolerance or, even worse, ethnic conflicts are one of the microeconomic causes of poor economic performance as they prevent the development of economic relationships among individuals belonging to different ethnic groups. Additional contributions at micro and macro level on the effects of social heterogeneity and ethnicity on economic prosperity have been developed, among others, by Alesina, Baqir and Easterly (1999), Gradstein and Justman (2002), Gradstein (2003) and Montalvo and Reynal-Querol (2005). Since all these contributions look at the effect of (lack of) social capital on growth, the intuition that the tolerance-growth nexus could work in the opposite direction at micro level has therefore never been explored in the empirical literature. Our paper aims at filling in the gap by working on panel data which allow evaluating the effects of changes in personal and aggregate prosperity on tolerance, net of the attitudes related to inherited personality traits, under the assumption that the latter are time invariant.

3. Empirical Analysis

The data source for our empirical analysis is the German Socio-Economic Panel (GSOEP). The panel is unbalanced and covers the 1984-2004 period. However, in this paper we consider only 13 waves, from 1992 to 2004, because the tolerance question we focus on was added to the survey only in 1992. The dataset in its original fashion was organised in separated blocks of variables for each survey year. The final dataset is the result of a wide work of selection and re-denomination of variables in order to make them homogeneous across survey years. The dynamic panel is built by appending the 13 waves. The additional datafile that the GSOEP offers to integrate base survey data with more accurate information on household income and education has been used to improve the quality of our information. The dataset used for this research is an unbalanced panel with 32,880 different individuals for a total of 168,626 observations.

Our dependent variable is based on the following question "What is your attitude towards immigration to Germany. Are you concerned about it?" for which the possible answers are: (i) "Very Concerned", (ii) "Somewhat Concerned" and (iii) "Not Concerned At All". We rescaled this measure in order to have 3 for "Very Concerned" and 1 for "Not Concerned At All", giving to the variable a more intuitive interpretation also in the estimation results. Now, a relevant question is whether our variable is a good proxy for the concept of tolerance. In its *Declaration on the Principles of Tolerance" UNESCO defines tolerance as "respect, acceptance and appreciation of the rich diversity of our world's cultures, our forms of expression and ways of being human. Tolerance is harmony in difference.*"[11] Even though a single indirect question cannot capture the richness of the concept, we may observe that concern for immigrants is very likely to be negatively correlated with acceptance of cultural diversity, which is a main part of the UNESCO definition.

Figure 1 shows the distribution of responses across the entire sample period. With this respect we observe that 23 percent of respondents declare to be "Not Concerned At All", 48 percent of them to be "Somewhat Concerned", while 29% are "Very Concerned". Figure 2 illustrates the distribution of changes in concern in the sample period. Notice that variation in concern is quite relevant and involves more than 40 percent of sample respondents (around 37 percent one-rung changes and around 4 percent two-rung changes). Figure 3 shows the evolution across years of the share of individuals "very concerned" about foreigners for the overall sample and for German natives only:

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[11] The Merriam Webster Dictionary defines, not very differently and more succinctly, tolerance as "sympathy or indulgence for beliefs or practices differing from or conflicting with one's own".

the aggregate level of concern appears quite stable over time. Figures 4 and 5 repeat the exercise for, respectively, the individuals "somewhat concerned" and "not concerned at all", with similar results.

For a preliminary inspection of our dependent variable we calculate year by year transitions to different states of concern about foreigners (see Table 1). As expected, persistence in a given level of self-declared tolerance is quite high (between 50 and 60 percent and higher in the intermediate response), but variability of the dependent variable for the same individual across years is not negligible, with a 35% probability of passing from an extreme state to the intermediate one. Much lower, and below 10 percent, the probabilities of a sudden change from an extreme to the other extreme state. On the whole, transition probabilities confirm that there is substantial variation of self declared tolerance which needs interpretation.

Table 2 reports the list of variables considered in our regressions with corresponding summary statistics. The change of real household income is computed as annual percent change. Among the possible macro variables we select the 3-year percent changes in the real per capita GDP at constant prices and the 3-year unemployment and inflation rates, the underlying assumption being that people need more time to realize changes in the macroeconomic situation. Data on GDP and unemployment are from Econstats while those on inflation are from the IMF's International Financial Statistics. The macroeconomic picture in our sample period is quite gloomy. The average GDP growth rate is below 1.5 percent and the real household income, which measures the purchasing power of the interviewed sample, diminishes by an average of 1.46 percent per year.

A problem arises when using macroeconomic data like GDP growth rates, inflation and unemployment since their variation in our sample is very limited (only 13 observations, one for each year) against a total sample size of around 168,000 observations on the level of concern. This implies that statistical inference from the effects of these variables is poor and their coefficients in econometric estimates can be unstable (see Frey and Stutzer, 2000). For this reason we decide to rely more on the one-year percent change in real household income to test our hypothesis on the effects of growth on tolerance, since it is measured at the individual level, and to use the macroeconomic variables mainly as a control.

In our regressions we control for gender, age, nationality, education and marital status. With regard to the employment status we create a dummy variable (Unemployed) which is equal to 1 if an individual is unemployed in a given year and 0 otherwise. Furthermore we generate a dummy variable (Loss of job) to take into account also negative variations in the employment status: the variable takes value 1 if a person lost his job in the given year and 0 otherwise. Table 3 shows the correlation between the two dependent variables of interest, level of concern and change of level of concern, and the set of control variables we will use in our regressions. Looking at the first column we can see that the German nationality, age, married and unemployment status are positively correlated with the level of worry, while the single status and higher education and income have a positive impact on tolerance. Similar findings apply for the change in level of worry. Note that both levels and changes in real household income are significantly and negatively correlated with concerns about foreigners, while only the second variable is still negative and significantly correlated with changes in such concern.

Tables 4 and 5 look at the issue from a slightly different perspective since we inspect the distribution of selected variables across changes in self declared tolerance. In Table 4 we observe that the share of Germans, married and individuals loosing their job with the lowest level of tolerance is markedly lower than that of the overall sample. The main difference in the marital status variables is in the share of those with the highest level of self declared tolerance. With this

respect, singles and separated exhibit a higher value than married respondents (28.89 and 25.70 respectively against 23.51). More relevant to the focus of our paper, people with higher concern against foreigners declare a lower real household income (average monthly income for those with the highest level of concern is 2,773 1984 Demarks, more than 200 Demarks lower that that (2,999 Demarks) of those declaring the lowest level of concern) .

When repeating the calculations on changes in self-declared tolerance (Table 5) we can see that the average number of moves from not concerned at all to very concerned (highest to lowest level of tolerance) is very low (on average 2.3) but becomes higher for those who lose their job (3.27%). Furthermore, there is an evident negative correlation between the change in real household income and the change in the level of concern about foreigners. Those moving from the lowest to the highest level of concern register on average a real annual reduction of 2.28 percent in their monthly household income, while those moving in the opposite direction (from the highest to the lowest level of concern) report on average an increase of 1.83 percent. Surprisingly enough, negative family shocks seem to be associated to a reduction of the worry for foreigners. An example of it is the share of separated who do one step ahead in tolerance which is 20.1%, higher than the sample average. The findings described above are obviously non conclusive since composition effects, inherited traits and reverse causality may significantly blur the picture. Econometric estimates presented in the following section will try to solve the problems mentioned above and verify the significance of the correlations observed.

4. Econometric findings

The discrete qualitative nature of the dependent variable requires that we estimate the model with a (random effects) panel ordered probit approach. We estimate the model both in levels and first differences. The model in levels includes the full set of regressors and a time trend, while the model in first differences only a subset of the variables (which are expected to affect also first differences) and no time trend. The use of first differences helps us to disentangle the effects of life events from that of psychological traits inherited from childhood. Tolerance is affected by economic or family shocks but is also determined by fixed characteristics which are generally modeled as time invariant individual intercepts in panel data (fixed effects). By first differencing our specification we eliminate the fixed effects from the model (for a similar approach see, among others, Ravaillon-Loskhin, 2002, and Ferrer-i-Carbonell and Frijters, 2004). The independent variables we select include various socio-economic individual controls (gender, age, nationality, education, marital status, employment status, loss of employment), the real household income and some aggregate macroeconomic variables (GDP growth, inflation and the unemployment rate).

Tables 4 and 5 presented some evidence on the effect of selected variables on the tolerance towards foreigners. Regressions in Table 6 seem to confirm the suggestion of descriptive findings. Being married, divorced or unemployed increases the level of concern while higher income and education levels have the opposite effect. Age and male gender have a negative effect on tolerance, although the effect becomes statistically not significant when considering only native Germans. With regard to macro variables, inflation and unemployment rates are both significant and have the expected sign. The positive sign is consistent with the hypothesis that higher levels of inflation correspond to a reduction in the purchasing power and therefore have a negative effect on tolerance, while higher levels of unemployment increase the perception of competition in the society.[12] A puzzling result is

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[12] Several empirical papers document that it is not just the personal unemployment status but also the aggregate level of unemployment which negatively affects individual happiness (Di Tella et al. 2001 and 2003; Becchetti et al. 2007). The

related to the GDP growth which has a positive effect on the level of concern. Consider however, as said before, that this variable takes only 13 different values in a sample which contains 149,424 (Regr. L3) and 80,451 (Regr. L4) observations. Moreover, the GDP growth is extremely flat in the considered period.

Table 7 presents the results of first difference regressions. The dependent variable is the change of declared level of concern while the independent variables are age, separation status, change in real household income, loss of job and the three macro variables used in the previous tables. While regressions D1 and D3 include the full sample, D2 and D4 contain only the people who declare to be native Germans. Age and loss of job are positively associated with an increase in the level of concern, while a raise in real income has a significant and positive effect on tolerance. Results on inflation and unemployment rates are in line with that in Table 6 while the coefficient of the GDP growth is statistically not significant anymore, possibly solving the puzzle.

5. Interpretations and robustness checks

The above described econometric findings support the hypothesis of a significant association between real household income and tolerance in the expected direction. Can we conclude that economic growth has positive moral consequences from this point of view? The answer seems to be affirmative *when prosperity translates into significant changes in individual economic conditions (not only growth but also the distribution of "growth dividends" matters)*. Our findings are inevitably weaker when we look at the relationship between the dependent variable and the aggregate measure of GDP variation given the structure of our data and the availability of only 13 different values for GDP. Finally, we perform some robustness checks by running separate regressions by gender, nationality and age subgroups, with and without macro variables, for regressions in levels (Table 8a) and first differences (Table 8b). Tables 8a and 8b report for them only the magnitude and the t-statistics of the coefficient of the (change of) tolerance documenting that all the coefficients are significant and negative.[13]

When performing our analysis a problem of reverse causality arises, since tolerance and growth influence each other. We identify a significant nexus between the two variables of interest, net of the fixed effects, but cannot directly test whether this is determined by a direct causality link from changes in household income to changes in self declared tolerance. However, the characteristics of our variables and the first difference estimates lead us to conclude that the direct causality is the most likely interpretation of our findings. While it is plausible to assume from an aggregate point of view that higher tolerance creates an environment more favourable to economic prosperity, it is more difficult to imagine that short term increases in self declared tolerance of those interviewed have the power to generate immediate positive changes in their respective household earning capacities. Finally, reverse causality must definitely be excluded when we compare changes in aggregate economic indicators and changes in respondents' self declared tolerance. The results on inflation and unemployment go in the right direction in first difference estimates. It is difficult to

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interpretation of this finding is that higher unemployment increases the fear of being fired and also entails costs on workers in terms of higher taxes or support to unemployed family members.

[13] A final robustness check is performed by replacing our income measure with equivalised real household income using the OECD standard correction which divides actual income by the weighted sum of family members (the first adult is given a unit weight, additional adult members .5 and children .3). Results are substantially unchanged. They are omitted for reasons of space and available upon request.

imagine that a reduction in the worry about foreigners may be the cause of the improved performance of the above mentioned macroeconomic indicators. [14]

6. Conclusions

Large part of the public opinion tends to believe that economic activity is a zero sum game in which the gain of a given group of individuals is necessarily compensated by the loss of another group. Actually, in periods of stagnation in which the real GDP growth rate is non-positive, the economy is by definition a zero (or a negative) sum game. For this reason low growth and high unemployment and inflation rates (which create the conditions for economic stagnation) may contribute to reinforce the belief that economic wellbeing is a fixed size cake whose slices need to be conquered at the expense of the others. Such perception is expected to reduce the tolerance toward other participants to the race, even more if they are foreigners or belong to a cultural minority. This reasonable argument implies that economic prosperity may also increase the social capital and have positive moral consequences by relaxing people's fear of becoming a loser in the competitive race.

In our paper we take advantage from the existence of a wide panel dataset relating individual declarations of concern about foreigners with various socio-demographic variables. Our descriptive and econometric findings document the existence of a robust positive nexus between real household income and self declared tolerance, net of the impact of many control variables and of the effects of time invariant idiosyncratic inherited traits of individual personality. Even though we also observe a similar nexus when we consider inflation and unemployment rates, our findings are in this case more fragile since we can rely on only thirteen annual observations for the period 1992-2004. In this latter case, results from statistical inference are less stable and do not allow us to draw definite conclusions.

Overall, we cannot reject the hypothesis of the existence of a channel of positive influence of economic growth on moral values, even though our results qualify the assumption by showing that the effect crucially depends on the transmission of positive changes in prosperity from the aggregate to the individual level. This in turn implies that, for the determination of this specific effect, the distributional consequences of economic growth need to be carefully taken into account.

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[14] As a final robustness check on the causality nexus we estimate a two-equation panel VAR model where, in the first (second) equation, self declared tolerance (real household income) is regressed on its past values and on past values of real household income (self declared tolerance). The advantage of the panel VAR model is that it jointly tests for the existence of the two possible causality directions between the selected variables (Holtz-Eakin et al. 1988). A Granger causality test confirms the negative and significant effect from real household income to self declared tolerance. The problem of the panel VAR model is that we are forced to assume that the discrete dichotomous structure of self declared tolerance may be approximated by a continuous variable. Frey and Stutzer (2005) do something similar on the 1-10 scale self satisfaction variable and find that results of OLS and orderer probit models are not very different. However, since our variable is on a 1-3 scale, we believe that this assumption is stronger in our case (even though not necessarily implausible) and therefore prefer to omit results of the estimates (available upon request) from the paper.

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Figure 1. The distribution of self declared concern about foreigners

% of observations for each level of concern

☐ Level of Concern=1 ☐ Level of Concern=2 ☐ Level of Concern=3
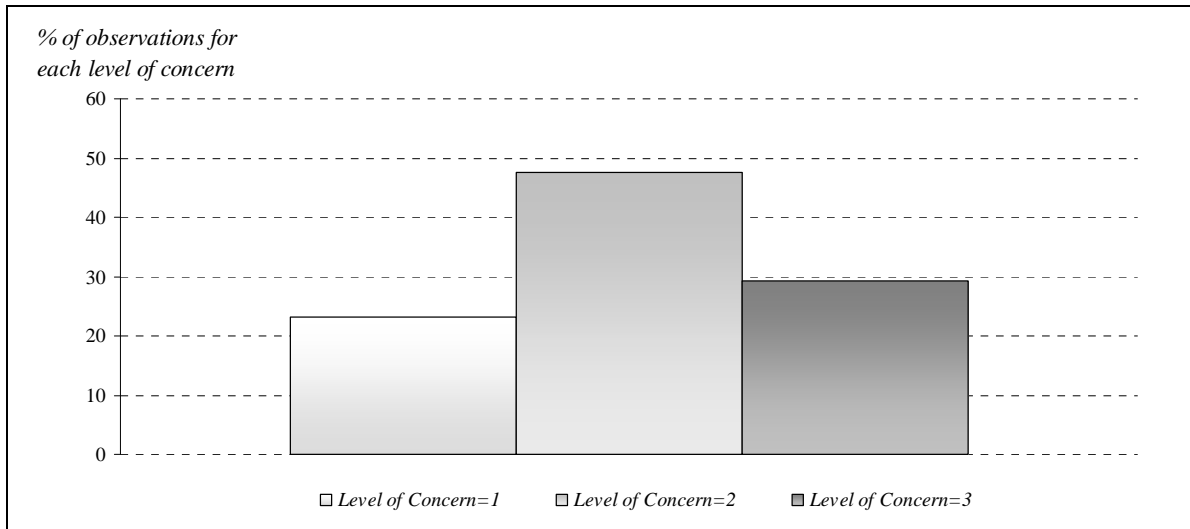
Figure 2. The distribution of changes in self declared concern about foreigners

% of observations for each level of yearly change in concern

☐ Level of Yearly Change in Concern=-2 ☐ Level of Yearly Change in Concern=-1 ☐ Level of Yearly Change in Concern=0

☐ Level of Yearly Change in Concern=1 ☐ Level of Yearly Change in Concern=2
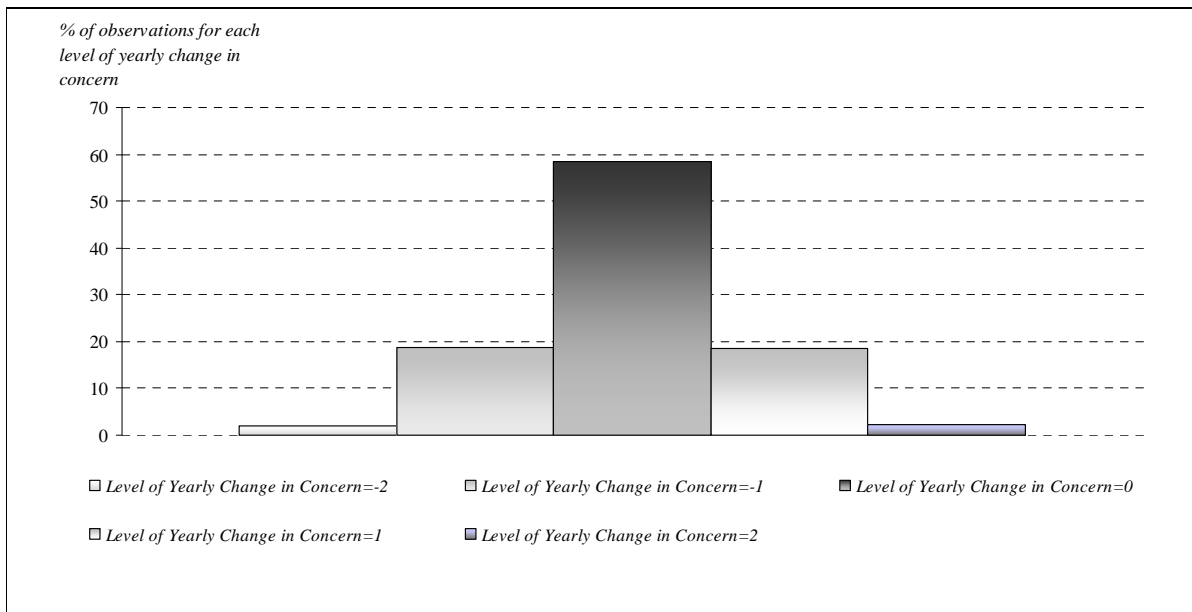
Figure 3. Dynamics of the share of respondents with the maximum level of concern about foreigners

"very concerned" about foreingners (overall sample)

"very concerned" about foreingners (Germans only)
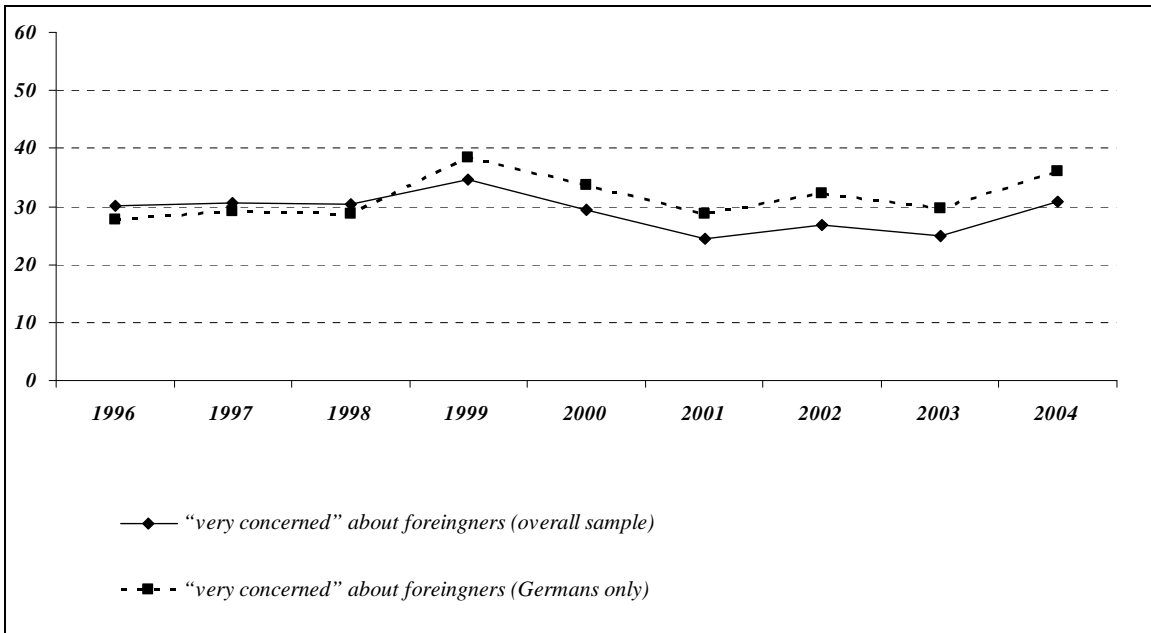
Figure 4. Dynamics of the share of respondents with the average level of concern about foreigners

"somewhat concerned" about foreingners (overall sample)

"somewhat concerned" about foreingners (Germans only)
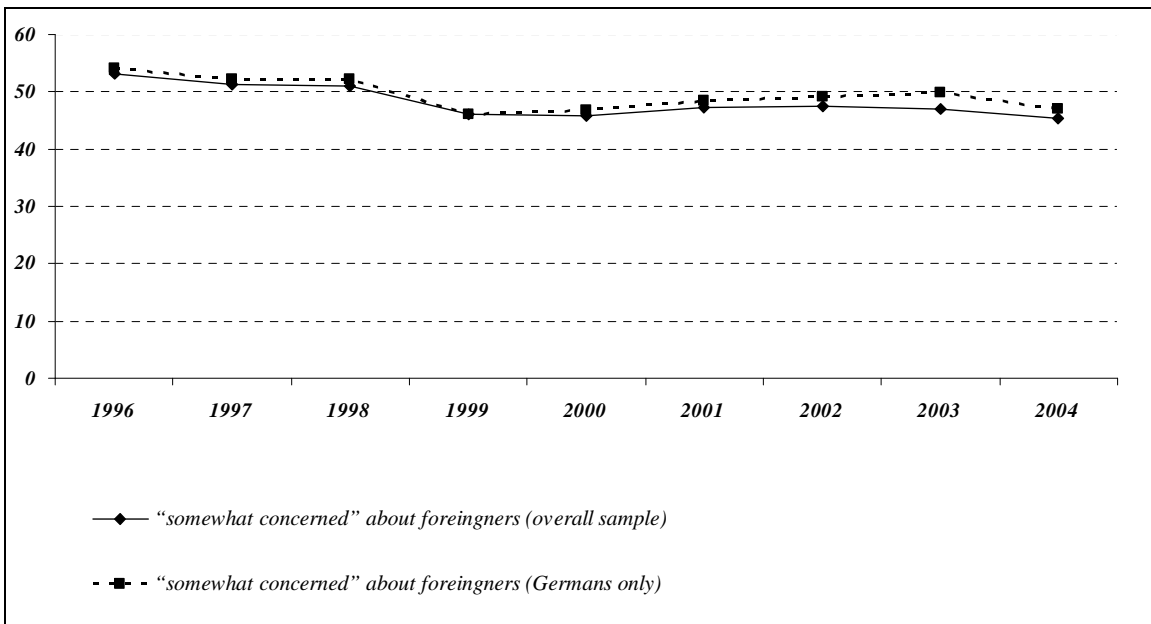
Figure 5. Dynamics of the share of respondents with the minimum level of concern about foreigners

"Not concerned at all" about foreigners (overall sample)

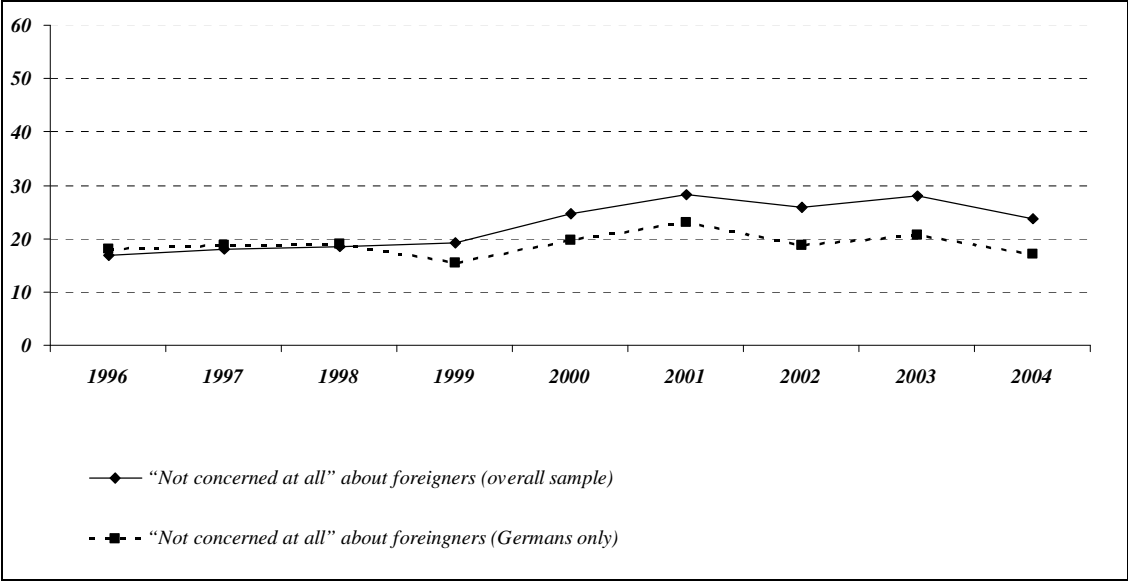*"Not concerned at all" about foreingners (Germans only)*

Table 1. Transition matrix of one-year changes in respondent's self declared concern about foreigners

	Year t Not Concerned At All	Somewhat Concerned	Very Concerned
Year t-1			
Not Concerned At All	55.02	35.06	9.92
Somewhat Concerned	17.83	60.89	21.28
Very Concerned	7.10	35.82	57.08

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Concern about foreigners	168,626	2.06	0.72	1	3
Yearly change in concern about foreigners	132,834	0.00	0.74	-2	2
German nationality	91,153	0.72	0.45	0	1
Age	168,623	45.31	17.14	17	99
Male	168,626	0.48	0.50	0	1
Education (in years)	164,268	11.55	2.60	7	18
Married	160,509	0.62	0.49	0	1
Separated	160,509	0.02	0.13	0	1
Single	160,509	0.24	0.43	0	1
Divorced	160,509	0.06	0.24	0	1
Widowed	160,509	0.06	0.24	0	1
Unemployed	167,983	0.07	0.26	0	1
Loss of job in the last year	145,047	0.03	0.18	0	1
Real Household Income	161,760	2,900	1,743	0	67,407
Δ % (Real Household Income)	144,691	-1.46	40.06	-100	1450
GDP growth (3-years moving average)	168,626	1.21	0.71	0.10	2.99
Inflation rate (3-years moving average)	168,626	1.51	0.51	0.99	3.87
Unemployment Rate (3-years moving average)	168,626	8.53	0.56	6.03	9.17

Table 3. Correlation of the Level of Concern and Yearly Changes in the concern about foreigners with selected variables

Variable	Concern about foreigners	Yearly change in concern about foreigners
Yearly change in concern about foreigners	0.5175***	1
German nationality	0.0417***	0.0163***
Age	0.0522***	0.0077***
Male	-0.0032	0.0043
Education (in years)	-0.1509***	-0.003
Married	0.0468***	0.005*
Separated	-0.0023	-0.0032
Single	-0.0684***	-0.0056**
Divorced	0.015***	0.0027
Widowed	0.013***	-0.0014
Unemployed	0.0299***	0.0025
Loss of job in the last year	0.0169***	0.0042
Real Household Income	-0.0477***	-0.0285***
Δ % (Real Household Income)	0.0016	-0.0214***
GDP growth (3 year average)	0.0118***	-0.0369***
Inflation rate (3 year average)	0.0666***	0.0216***
Unemployment Rate (3 year average)	-0.0053**	0.0223***

Legend: correlation coefficients significant at 10% (*), 5% (**) and 1% (***).

Table 4. Percent distribution of selected variables across levels of self declared concern

Control Variable	Concern About Foreigners In Germany		
	1	2	3
Male	24.06	45.81	30.13
German nationality	18.82	49.73	31.45
Married	21.69	48.79	29.52
Separated	25.70	44.70	29.60
Single	28.89	45.79	25.32
Divorced	22.56	45.53	31.91
Loss of jobin the last year	21.16	44.20	34.65
Real Household Income (average)	2999	2929	2773
Total Sample	**23.51**	**47.80**	**28.69**

Note: All numbers refer to the percent distribution of selected variables, apart from the Real Household Income for which we report the averages conditional to the level of concern.

Table 5. Percent distribution of selected variables across changes in self declared concern

Control Variable	Δ Concern About Foreigners In Germany				
	-2	-1	0	1	2
Male	2.09	18.61	58.35	18.42	2.53
German nationality	1.71	18.30	59.66	17.97	2.36
Married	1.86	18.63	58.83	18.46	2.23
Separated	2.14	20.10	57.43	17.81	2.52
Single	2.17	19.21	57.96	18.27	2.39
Divorced	2.22	18.45	58.22	18.32	2.79
Loss of job in the last year	2.52	18.52	56.62	19.07	3.27
Δ % (Real Household Income)	1.83	-1.38	-2.92	-3.81	-2.28
TOTAL SAMPLE	**2.01**	**18.80**	**58.42**	**18.46**	**2.31**

Note: All numbers refer to the percent distribution of selected variables, apart from the Δ % (Real Household Income) for which we report the average change.

Table 6. Determinants of levels of self declared concern

	L1	L2	L3	L4
German nationality		0.418345		0.41219
		(19.58)		(19.23)
Age	0.0037404	0.0004708	0.0038015	0.0004813
	(8.10)	(0.76)	(8.19)	(0.77)
Male	0.0357562	-0.0079964	0.035822	-0.0079654
	(2.75)	(-0.46)	(2.75)	(-0.46)
Education	-0.0834658	-0.0626314	-0.0831164	-0.0627287
	(-32.90)	(-17.53)	(-32.47)	(-17.49)
Married	0.1033214	0.0957589	0.1068075	0.0971186
	(6.45)	(4.41)	(6.64)	(4.46)
Separated	0.0201817	0.0003522	0.0199797	-0.0032189
	(0.61)	(0.01)	(0.60)	(-0.07)
Divorced	0.1207357	0.0616793	0.1210891	0.0624045
	(4.83)	(1.85)	(4.83)	(1.87)
Widowed	-0.0692768	-0.062852	-0.0677047	-0.0625348
	(-2.25)	(-1.62)	(-2.20)	(-1.60)
Unemployed	0.0467198	0.0379108	0.0412602	0.0342072
	(3.08)	(1.98)	(2.71)	(1.78)
Ln(Real household income)	-0.106838	-0.1075701	-0.108765	-0.1058542
	(-11.57)	(-8.52)	(-10.71)	(-7.53)
GDP growth (3 year average)			0.2728341	0.2543266
			(16.15)	(10.13)
Inflation rate (3 year average)			0.5063628	0.5038958
			(14.04)	(9.44)
Unemployment Rate (3 year average)			0.4142591	0.3864928
			(24.73)	(15.77)
_cut1	-65.37229	-55.92872	35.46754	46.16019
	(-19.42)	(-13.59)	(4.69)	(4.15)
_cut2	-63.62875	-54.22733	37.21807	47.86692
	(-18.90)	(-13.18)	(4.92)	(4.31)
Obs.	149,424	80,451	149,424	80,451
LR χ^2	1,910	846	2,726	1,205

Legend: the dependent variable is the self-declared level of concern about foreigners, the value 3 being the maximum and 1 the minimum. Regressions are run by use of random effects ordered probit with time trend.

Table 7. Determinants of the changes in the level of self declared concern

	D1	D2	D3	D4
Age	0.0005871	0.0004486	0.000496	0.0002665
	(3.13)	(2.25)	(2.64)	(1.33)
Separated	-0.0315256	-0.0370762	-0.0375394	-0.0423656
	(-1.28)	(-1.39)	(-1.53)	(-1.59)
Δ % (Real Household Inc.)	-0.0640617	-0.0609623	-0.0770799	-0.0880567
	(-7.88)	(-6.88)	(-9.10)	(-9.45)
Loss of job in the last year	0.033971	0.0380809	0.0263016	0.0303214
	(1.92)	(1.95)	(1.48)	(1.55)
GDP growth (3 year)			-0.7413222	0.8754212
			(-1.11)	(1.19)
Inflation rate (3 year)			0.1519849	0.1322912
			(7.40)	(5.45)
Unemployment Rate (3 year)			0.1222583	0.1628867
			(13.17)	(16.24)
_cut1	-2.007969	-2.070311	-0.7545282	-0.4706481
	(-165.94)	(-156.36)	(-7.34)	(-4.16)
_cut2	-0.7549865	-0.7980824	0.5032755	0.8059779
	(-78.26)	(-76.73)	(4.91)	(7.14)
_cut3	0.8886012	0.8711034	2.155982	2.485061
	(91.69)	(83.52)	(21.02)	(21.98)
_cut4	2.078249	2.063497	3.350964	3.684308
	(174.34)	(160.81)	(32.53)	(32.44)
Obs.	119,749	104,682	119,749	104,682
LR χ^2	94.32	61.1	396.01	371.97

Legend: the dependent variable is the one-year change in self-declared level of concern about foreigners. Regressions are run by use of random effects ordered probit.

Table 8. Robustness checks on the relationship between real household income and self declared tolerance Sensitivity Analysis.

8a. Concern About Foreigners In Germany

Coefficient of the ln of real household income

Male	-.088207	-.102644
	(-6.58)	(-6.96)
Female	-.1258096	-.1158054
	(-9.87)	(-8.26)
German	-.0539165	-.1220635
	(-3.67)	(-7.37)
Not German	-.2603877	-.0805345
	(-10.40)	(-3.00)
Age < = 43	-.110712	-.1036904
	(-8.28)	(-7.07)
Age > 43	-.1143805	-.1336803
	(-8.77)	(-9.27)
Macro Variables	No	Yes

8b. Δ Concern About Foreigners In Germany

Coefficient of the one year log difference of real household income

Male	-.0505615	-.0673059
	(-4.37)	(-5.60)
Female	-.077682	-.0867719
	(-6.80)	(-7.27)
German	-.065591	-.0984528
	(-4.91)	(-7.06)
Not German	-.0716945	-.0324494
	(-3.52)	(-1.57)
Age < = 43	-.0424949	-.0526402
	(-3.68)	(-4.39)
Age > 43	-.0859836	-.1004478
	(-7.51)	(-8.37)
Macro Variables	No	Yes

LEGEND: The tables report coefficients and t-stats of the level of concern (Table 8a) and change of level of concern (Table 8b) from regressions run by gender, nationality and age subsamples. The reference specifications for Table 8a are regression L1 (without macro variables) and L3 (with macro variables) in Table 6 and those for Table 8b are regressions D1 (without macro variables) and D3 (with macro variables) in Table 7.