Religiosity, Smoking and Other Risky Behaviors*

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Abstract

While under communism the identity-providing religion was suppressed, religiosity is strong today even among the youth in post-communist countries. This provides an appropriate background to investigate how external and internal religiosity relates to risky behaviors like smoking, drinking, and drugs among the young. This study shows that not religion as such or internal religiosity, but largely observable (external) religiosity prevents them from wallowing in those vices. While this is found strongly for both males and females, those females doubting or reflecting religion show a somewhat smaller risky activity.

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1. Introduction

While it has been established that religion associates negatively with risky health behaviors such as smoking, drinking, and drug use (Arani et al., 2019; Russell et al., 2020; Yonker et al., 2012; Brown et al., 2014), we study the role of religiosity, the intensive margin. Therefore, we focus on the two main facets of the multidimensional concept of religious behavior: external and internal religiosity (Minton et al., 2016), separated by intrinsic beliefs and external practices or experiences. "Internal religiosity or faith is defined as belief in God and a trusting acceptance of God's will. External religiosity refers to all observable activities that are undertaken in a religious context, most conspicuously when going to church." Frey (2018, p. 60). Is it religious denominations, internal or external religiosity? With non-believers as the reference group, we aim at decomposing the behavioral contributions of the diverse facets of religiosity.

Post-communist Orthodox Romania is a natural case for such an analysis. After several decades of forced secularization under an oppressive communist regime with a powerful persecution of external religiosity almost until its extinction (Stan and Turcescu, 2007), Romanians again freely expressed their religiosity. Romania reported the highest level of church construction in Europe (Andreescu, 2007), a sign of revival of visible religiosity, the strongest among all Orthodox countries in the region (Voicu, 2019; Gheorghe, 2018). The young Romanians show a very high Orthodox affiliation and are found to be highly spiritual (Vincett et al., 2014). Both types of religiosity play an essential role in Orthodoxy, being the core of a rich, sincere, and active religious life (Fontaine, 2017).

The transition induced substantial changes in young people's lifestyle and high pressures were also resulting in a strong rise of risky health behaviors (Roberts et al., 2012) including smoking, drinking, and drug misuse. The rise of both, religion and such behaviors, may be seen as a contradiction of the known negative relationship between religiosity and risky behavior. But it is in line with secularization theory[1] suggesting a strong positive relationship between human insecurity and religiosity (Inglehart, 1997; Barro and McCleary, 2003, 2005; Inglehart and Norris, 2012; Iyer, 2016). While over longer periods across countries globally a rise in human (economic and physical) security through economic and societal development, education, urbanization, and social institutions has caused a decline in religiosity, this trend was weaker under communist regimes and in particular very strong among countries under

[1] While classical secularization theory was predicting the end of the relevance of religion in social life, more recent developments of religious revival in many countries and global religious tensions have also caused a significant rise in academic research in the social sciences (see Smith, 2008; Gorski and Altinordu, 2008; Iyer, 2016; Zhirkov and Inglehart, 2019).

Orthodox Christianity (Zhirkov and Inglehart, 2019). This suggests that religiosity remained strong in Romania under communism and during transition, but its rising visibility during the transition was also supported by the then rising economic insecurity. This beneficial mechanism deals with what has been called the insurance effect of religion as a stress-absorbing buffer compensating adverse effects of life (see Popova and Otrachshenko, 2021, for a review of related literature), now applied to the transition challenges (Popova, 2014). However, religion is not the only way to respond to human insecurity, risky behavior being an alternative: in economic terms, both are substitutes. So, we should expect to confirm that in the Romanian context.

Therefore, the purpose of the paper is to investigate how the facets of a strong religiosity have dealt with the challenges of transition in Romania, using smoking as an important indicator of risky behaviors. Smoking among Romanian youth reached alarming levels and raises concerns among public health authorities. The degree of smoking exposure was higher, especially among 15 year old male teenagers (OECD, 2012), while more than three quarters of the smokers started by the age of 18, and all by 26 years old (Berrick, 2013). The Eurobarometer 2017, regarding the attitudes towards tobacco and electronic cigarettes, placed Romania as the 9th country in the European Union in terms of smoking prevalence among the population aged 15 and over. The Global Adult Tobacco Survey for Romania (GATS, 2011) emphasized that 26,7% of the Romanian population aged 15+ were current smokers at that time, while 24.3% were daily ones (almost 4.5 million persons). Moreover, this study revealed that 17.1% of Romanian daily smokers aged 15+ started this daily vice until they were 15 years old, mainly in the case of those belonging to rural communities. A more recent study (2017) conducted by the National Institute of Public Health (INSP) revealed that especially the male individuals aged 18 to 35 years from the rural areas indicated the episode related to the first smoking under 14 years of age, while the female ones from the urban regions started to smoke between 15 and 18 years old.

Increased participation in religious services or at least a regular church attendance has been considered a protective factor against tobacco use among high school students or other young adults (Atkins et al., 2002; Albert-Lorincz et al., 2019). Complementary research among US adolescents by Longest and Vaisey (2008) found that external religiosity has a safety effect on previous bad habits only when internal religiosity is high enough or sufficiently internalized. While we focus in the paper on the smoking-religiosity nexus studying the role of internal versus external religiosity, we also use data on other risky activities such as drinking and drug

use for robustness checks. To the best of our knowledge, this issue has not been studied before in our context.

We also suggest a new strategy to investigate the impact of religiosity: a cross-classification of young individuals by their responses to questions concerning their "believe in God" and "church attendance" allows identifying those with internal and external religiosity and to separate them from those doubting, reflecting or refusing religion. Faced with severe challenges of life those individuals with internal religiosity derive support and orientation only from their closeness and their belief in god. Those with external religiosity obtain strength also through their identification with and through the advise and moral support from the community of believers. Risky behaviors are not in line with religious rules and god's expectations. External religiosity makes such behavior more transparent to others who care or create additional misbehavior and guilt through attempts to hide behavior. Those who follow external religiosity value are to be seen and respected during and for their service for the belief. Misbehavior under internal religiosity has to be debated with god, who may be asked to forgive. The additional visibility to religious peers might be a more powerful monitoring force, and losing face much more painful for the soul. We consistently find that external religiosity is behind the negative association with smoking and not religion per se. This understanding is confirmed when we study drinking and drug openness as alternatives to smoking.

Risky behaviors have been investigated in other contexts than religion, e.g., as a health phenomenon or labor issue, also identifying "pressures" as potential causes, among others like societal norms, rules and traditions. For instance, Artz et al. (2021) show that those young workers in the US confronted with performance pay react with higher alcohol and drug use, revealing that stress and effort are higher with this payment mechanism. Baktash et al. (2021) confirm this for German workers aged 22-59 for various forms of alcohol use in a country with mandated health insurance. However, these studies do not explore the role of religion, possibly because it is less of a factor of life than in Romania.

The religion and risky behavior research fits well with the findings on the effects of religion on health in general. For instance, Chiswick and Mirtcheva (2013) confirmed previous research on the impact of religion on the health of adults for young people. They validated that religious beliefs (religiosity) and religious affiliation are positively connected to better overall health among children and adolescents (including their psychological health component), mainly due to the regulative effect of religion that discourages unhealthy traits and habits for both children and their parents. In line with this, Fruehwirth et al. (2019) reveal that, usually, religiosity is beneficial in establishing and maintaining the mental health status (e.g.,

depression). Quite striking, they concluded that, no matter how religious a person is, it seems religiosity is significant and much more useful among more depressed adolescents rather than among the least depressed.

Section 2 informs about religiosity after the Romanian revolution, and Section 3 reviews the literature on the association between religion and addictive behaviors. Section 4 explains the data and the concept to separate external from internal religiosity. Section 5 presents the core econometric analysis, and Section 6 contains robustness tests. Section 7 concludes.

2. The Rise of Religiosity in Post-communist Romania

The purpose of this paper is to study the association between religiosity and risky behavior among Romanian youth, three decades after the transition from a totalitarian regime to democracy in 1989.[2] This change has had a significant impact on Romanian society and the behavior of individuals, as the freedoms brought by democracy and market economy allowed to freely express religious beliefs and diversify consumption preferences, including those related to risky behaviors.

The relation to religious faith, rites, and practices in Romania under communism was very different compared to the current state in society when religious freedom is not a privilege but a natural fact and practiced formally and informally. Before 1989, external religiosity was brutally forbidden, therefore the validation and identification with God and His teachings and principles were done in the private sphere, especially in the family sphere, informally (Bucur, 2011). Before 1990, the same barrier was put in publicly practicing the religious faith in countries such as Hungary, Poland, or East Germany (Gautier, 1997). Especially in Romanian rural communities, formal religiosity and ritualism (e.g., related to the cult of the dead) received much more liberty, being accepted by the Marxist political leadership (Kligman, 1988). This previous thesis received other validations from scholars, demonstrating once again a kind of continuity of religious practices (e.g., ritualistic ones regarding the traditional wedding ceremony) in the countryside under communism (Verdery, 1999; Graur, 1976) and emphasizing a decoupling of this area from the struggle between religion and political power (Heintz, 2004). Further, to control and reduce to extinction of this sensible and powerful institution, the communist regime infiltrated secret police employees among the clergy and even ordered the demolition of churches, monasteries, and other worship places (Videnie, 2006).

[2] The communist regime ended with the Romanian Revolution in December 1989; a democratic constitution was adopted in 1991.

After the fall of communism, under the auspices of democracy and transition to market economy, empowered with a large set of civil rights and liberties, many of the post-communist societies from Central and Eastern Europe witnessed and experienced a revival and recrudescence of both formal and internal religiosity (Froese, 2003). Romania did not make the discordant note, recording a growing emergence of religion in social life (Rusitoru and Kallioniemi, 2018). According to Pollack (2001), despite the oppression and persecution exercised by the communist leadership, after 1989, Romania became one of the most religious countries in Europe. On the other hand, other countries like the Czech Republic and Estonia recorded a religious retrogression in social life (Andreescu and Andreescu, 2009), denoting a divergent pattern among post-communist countries and large variations of the levels of religiousness.

The number of Orthodox churches, an indicator of external religiosity, increased substantially after 1989. For instance, Andreescu (2007) documented that, in 2003, the number of worship places was 14.177, compared to 13.627 in 1999, while, using other sources, the number was 12.200 in 1990 and 12.500 in 1992. According to the State Secretariat for Cults, at the end of 2015, it became 16.403[3], denoting a significant rise of public places for worship.

3. Religion and Risky Behaviors

In general, religiosity, especially the internal one, together with acculturation, plays a protective role against risky sexual behaviors, while external religiosity has a potentiating effect (Smith, 2015). Fletcher and Kumar (2014) found that different forms to capture the degree of personal religiosity, both intrinsic and extrinsic, such as religious attendance, frequency of praying, and importance of religion, manifest certain roles in influencing risky health behaviors (e.g. the use of licit and illicit substances, from cigarettes and alcohol to heroin or cocaine). In this sense, they concluded that the most significant role in fighting and combating the dependence on addictive substances (e.g., binge drinking and marijuana) during adolescence is played by the intrinsic religiosity, while the extrinsic one loses its effect in the long run. Also, it was suggested that religiosity mitigates psychological stress and various types of external shocks (Popova, 2014), some of them being linked to childhood abuse or maltreatment that may have been affected the mental health among adults (Homan and Hollenberger, 2021). On the other hand, gender differences, especially due to genetic and biological factors, may influence the level of

[3] http://culte.gov.ro/?page_id=130.

personal religiousness and, therefore, if women are more religious, they consequently tend to be more risk averse (Collett and Lizardo, 2009).

The etiology and epidemiological research of young adults' smoking behavior of previous literature have identified explanations related to the socio-economic status of parents (Droomers et al., 2005) and their level of education (Soteriades and DiFranza, 2003). Other research has placed particular emphasis on efficient inhibitors of the level of social cohesion, informal social norms, and social interaction with smoking behavior (Yamamura, 2010). The role of cultural beliefs can influence this dependence (Kemppainen et al., 2002). Also, the level of participation in organized activities could predict such behavior (Holloway et al., 2008).

Previous literature provides evidence that active religious behavior prevents risky behaviors that adversely affect people's health, such as smoking and alcoholism (Brown et al., 2014). The association of religion with smoking habits has been reflected in numerous studies (Karlsen and Nazroo 2010; Ford and Hill 2012; Garrusi and Nakhaee 2012; Anthony et al. 2013). Regardless of country of origin, culture or dominant religion, young people smoke less when religious (Alexander et al., 2016). Similarly, Hussain et al. (2019) found that non-religious young and adult people smoke more compared to religious individuals, regardless of whether they are Christians or Muslims. Higher levels of participation in religious services are considered one of the most important triggers for abstaining high school students or other young adults from tobacco use (Atkins et al., 2002). Arani et al. (2019) found that religion is a supportive factor in effectively fighting to smoke, especially in the case of young adults. Religious attitudes and activities prevent harmful behaviors to health, namely smoking, use of drugs, and alcohol dependence, while improving the quality of life and self-esteem (Turiano et al., 2012). A study published by Albert-Lorincz et al. (2019) on teenagers from three Romanian counties revealed that regular church attendance acts as a protective factor against smoking.

Mendolia et al. (2019) found that among English teenagers a high level of religiosity combined with a strong work ethic is less associated with risky health habits, such as alcohol, tobacco and cannabis consumption, sexual intercourse, and physical violence. Prior studies showed that religiosity acts as a protective factor for alcohol use and abuse (Brown, Parks, Zimmerman, & Phillips, 2001; Willis, Yaeger, & Sandy, 2003; Baena et al., 2019). In general, it is stressed that religiosity and self-control reduce the intention of binge drinking (McCullough and Willoughby, 2009), but this combination may seem to be valid only in the case of a majority of adolescent girls, not for all of them (Palm et al., 2021). Moreover, other scholars like Meyers et al. (2017) provided evidence according to which higher public religiosity has a powerful effect on health problems, lowering the likelihood to be affected by alcohol use disorders. Other

prior research has shed light on the positive and active role played by religiosity in preventing and/or delaying alcohol consumption (re)initiation and persistence (Hsien-Chang et al., 2020). Analyzing undergraduate religious and secular students, Isralowitz et al. (2018) found that religious female students consumed less tobacco, alcohol, cannabis, and non-medical prescription drugs compared to the secular ones who, moreover, were more prone to excessive alcohol drinking. Other scholars emphasized the aforementioned relationship between religiosity and alcohol use among adolescents, but find that only the presence of increased filial piety or parental obedience has a protective effect on alcohol drinking behavior (Tran et al., 2019).

Regarding substance use, a study conducted among college students demonstrated that those highly religious had the lowest degree of substance use (Dennis et al., 2009), especially with marijuana (Nguyen and Newhill, 2016). Thomson Jr. (2016) pointed out that religion is an effective social institution, since religiosity seems to have the power to reduce the consumption of substances, independently of other influences related to family and peers' attachment, religious affiliation, and socio-demographic and socio-economic variables. In the case of high-school students who had been victims of different forms of bullying, various scholars emphasized that the ones with lower religiosity levels are much more predisposed to substance consumption when feeling bullied (Afifi et al., 2020). The protective role of religiosity and spirituality against drug use disorder is also stressed in other studies (Rezende-Pinto et al., 2018; Van der Meer Sanchez et al., 2008), complemented with reasons based especially on the internalization of moral standards due to a religious upbringing during childhood (Regnerus and Burdette, 2006). Salas-Wright et al. (2017) indicated that private religiosity had a moderating effect on the relationship between key risk factors and substance use among adolescents. Other research underlined that those adolescents who exhibit religious salience experienced lower depression, fewer binge drinking, and less marijuana use, where these experiences were acting as a coping mechanism during crisis events (Theda et al., 2015). For young people of different ethnicities, Theda et al. (2016) documented a negative relationship between religious importance and religious attendance and substance use. In this context, Varma et al. (2017) emphasized that religiosity has a deterring effect in connection to initial and subsequent marijuana use through the intermediation of a perceived risk. The same relationship is documented by Livne et al. (2021), for the external manifestation of religiousness (frequency of religious service attendance) in connection to substance use and substance use disorders.

4. Data and Methodology

The data set used ("FES Youth Studies in East Europe"; Umbreș et al., 2014) provides a representative sample of 1,302 respondents from the Romanian population aged 15-29, mostly born, but all raised after the end of the communist regime in 1989. The rich questionnaire includes topics related to, among other things, youth leisure and lifestyle; religion and social affiliations; family and friends; concerns and aspirations; and education and employment. The data set contains detailed information about religious behavior and allows a distinct analysis of the two dimensions of religiosity: religious beliefs and religious practices.

The *religious denomination* of young Romanians is similar to that of the general population: they are mainly Orthodox (85.3%), followed by Catholics (7.1%), Protestants, and neo-Protestants (5.8%), and 0.3% other religions. Only a small share (1.5%) is atheist or without religion. *Religiosity* is measured using external and internal indicator variables counting for religious activity, as an engaged expression of respondents' beliefs. We use "frequency of going to church/mosque/synagogue to attend a religious service" with responses "regularly", "often", "sometimes" or "never" to measure *external religious activity (eRA)*. *Internal religious activity (iRA)* is captured by the belief of the respondents that "there is God" with alternatives "believe", "doubt" or "do not believe".[4] We do not follow a common approach to consider eRA and iRA as measures of *external religiosity (Re)* and *internal religiosity (Ri)*. In this paper, we suggest the interaction of both, eRA and iRA, to capture appropriate understandings of Re and Ri. This approach may provide a deeper and more detailed understanding of religiosity, based on the identification of more specific classes of respondents.

The external/internal (eRA x iRA) cross-tabulation of activities has entries X_{ij} (see Table 1). Similar to Voicu and Constantin (2012), we find that Romanian youth is largely engaged in religion: the vast majority believes in God and Christian values and attend church services. Only 12.2% "doubt or do not believe" *and* "never go to church" ($X_{32}+X_{33}$), they are *refusing.* Differently than other approaches, external and internal religiosity are specifically expressed by those who believe in God, as one needs to clearly believe in God to express religiosity. About 79.7% "believe in God" ($X_{11}+X_{21}+X_{31}$), which we decompose in "never go to church *and* believe" as *internal religiosity* (X_{31}, 17.8%), "sometimes go to church *and* believe" as *reflecting* (weak external, X_{21}, 37.7%) and "often or very often go to church *and* believe" as *external religiosity* ($X_{11,}$ 24.2%). Those remaining ($X_{12}+X_{13}+X_{22}+X_{23}$, 8.0%) go to church, but are *doubting*.

[4] Our data set has three more variables for both external and internal religious activities, but these two selected are dominant. As a robustness check, we use all available data in Section 6 to confirm our analysis.

This classification enables us to decompose the association of those variants with the risky behaviors under study, in particular the conjecture that mainly external religiosity drives the reduction. The focus is on the first column X_{i1}, the group of those believing in God and with high iRA. Our central research hypothesis is that external religiosity is the one that is negatively associated with youth risky behaviors. It is driven by the social pressure experience from the peers for not following religious and social norms. We expect no effect from *internal religiosity* as well as from *doubting* and *refusing* individuals, a weak negative response from *reflecting* and a strong negative effect from *external religiosity* all concerning risky behaviors.

Risky behaviors: *Smoking* is measured with a dummy for regular or occasional smoking (with value 1) versus non-smoking (and value 0). 43.2 % of the respondents are smokers. Similarly, we use *alcohol consumption* ("alcohol") with those reporting "no, almost never" = 0 and 1 "else" or yes (65.5%), and *drug openness* (agreement on "it is fashionable to use drugs"), with "disagree" = 0 and "agree" or "partly agree" = 1 (55.8%). Figure 1 exhibits the raw data concerning risky behaviors (smoking, drinking and drug-openness) comparing the full sample with two important subgroups. Individuals with external religiosity are substantially less affected than those refusing religion supporting our major conjecture.

Control variables used are *gender* ("male"), *age*, *age squared*, *education* ("medium", "high", with reference "low"), *social class* ("working", "middle", "upper", with reference "low"), *family* (dummy variables for "married" and "child", if children), and *trust* (an index of the number of positive responses to respective questions, see below).

Descriptive statistics for all used variables are provided in Table 2 for the two distinct age groups *young adults* (18-29, our main data set) and *teenagers* (15-17, comparison group). *Trust* is a variable that sums the values of the responses to the following questions: How much trust do you have in the following: Parliament, Political Parties, Government, Mayor, General attorney, Police, Judges, Media, Trade Unions, NGOs, Church. The answers were coded from 1 (very much) to 4 (not at all). *Education* counts for the highest education level by the respondent. *Low education* level corresponds to primary education, *medium education* covers lower and upper secondary education, as well as vocational studies, while *higher education* level includes graduate and post graduate studies. *Social class* refers to the self-assessed parent's social class on a scale ranging from 1 (lower class) to 4 (upper class) and it may be regarded as a proxy for the financial status of the young individuals.

As Table 2 reveals, the religiosity structure between both age groups is not very different, and the same holds for drug openness. Young adults smoke and drink more, while

most of the other differences result implicitly from age: they are better educated, more married, with kids, and have a somewhat lower level of trust.

5. Results

We analyze variables smoking, alcohol and drugs through

$$y_i = \mu + \alpha R_i + \gamma X_i + \varepsilon_i, \qquad (1)$$

where y_i covers risky behaviors, R_i represents the religiosity variables, X_i denotes the controls, and ε_i is the error term. The estimation method is OLS with robust standard errors. We focus on smoking using the other addictive behaviors as robustness checks. We further include only those of age 18-29, employing the younger (15-17) as controls for a robustness test.

Table 3 measures religiosity association effects referring to those who clearly *refuse* a religious affiliation (reference group). Column 1 for smoking including only those variables finds that the *internal religiosity* effect is negative, but not statistically significant while *external religiosity* substantially is. Visibility together with true belief matters a lot in avoiding the vice. This is already the core observation the data reveal. Those *reflecting* have a marginally more negative association, also than those *doubting* (but attending church). All in all: *external religiosity* stands out negatively, while all other types of religiosity have a similar size and only a small effect in comparison with the *refusers*.

These findings remain robust when including variables male, age, age-squared and education (column 2), and respondent's social class (column 3). Alcohol and drug openness are the expected substitutes to smoking; hence the basic story prevails with those dependent variables in columns 4 and 5. However, the size of the coefficients is somewhat smaller for alcohol than for drugs. And all *religiosity* measures (external, internal, reflecting, doubting) have a much stronger and more equal negative association for drugs than the *refusers* in the reference group. External and internal religiosity have the same negative effect parameter for drugs, implying that taking drugs is not acceptable among those believing in God. The somewhat different results for drugs may have to do with the different respective survey questions or with differences in the visibility of actual drug use.

While age does not play a role in any of the regressions for the studied risky behaviors in columns 1-5, it drives external religiosity (see column 6) U-shaped together with gender (males are less religious) and education, whereas the educated youth exhibit it with higher probability. Social class has no role. The survey contains no parental information including their religiosity. Not accounting for the family's religious background may lead to an omitted

variable problem. Religious education and preference formation is proxied to some extend by age and education as revealed above. But the paper argues from this perspective that it studies associations and not necessarily causation. As expected, the issue of endogeneity is difficult to address for the case of religiosity. The paper nevertheless provides valuable information about the general direction of the effects and the framework of thinking and analyzing.

A further robustness check adds to the smoking regression of column 3 as controls alcohol and drug openness, and extra variables married, child and trust. This (see column 7) does not affect the basic story, although the religiosity coefficients are smaller in size. Alcohol and drug openness have positive and strongly significant associations, revealing that there are positive interactions between risky behaviors. The other extra variables do not matter. We further examine the smoking regression of column 3 for the younger (15-17 years) cohort, confirming again the basic story: *external religiosity* reduces smoking, while all other religiosity variants are not different from the *refusers*.

6. Robustness Analysis

Our data set provides a broader set of variables to measure *external* and *internal religiosity* next to the previously used variables. The complete set is now used for a robustness analysis, namely:

1. External religious activity (*eRA*) is captured by the following ordinal variables: (i) “frequency of going to church/mosque/synagogue to attend a religious service”, (ii) “frequency of praying”, (iii) “frequency of celebrating religious holidays”, and (iv) “frequency of fasting”. All these variables have responses “regularly”, “often”, “sometimes”, or “never”, which were categorized (1) “regularly” or “often”, (2) "sometimes" and (3) “never”.
2. Internal religious activity (*iRA*) is measured by the following ordinal set of beliefs of the respondents: (i) "there is God", (ii) "there is heaven and hell", (iii) "God created the world", and (iv) "God is the source of moral prescriptions and duties". These variables have the values (1) "true", (2) "doubt" or (3) "do not believe".

Firstly, we have calculated the sum of the four external and internal measures of religious activity, E_s and I_s, for each individual.[5] So far, we have used variables 1. (i) and 2. (i) to represent the affiliation with external and internal religious activities. Calculating the correlation coefficients between the two variables with the others in the respective groups and the overall sums (E_s and I_s) reveal: The correlation coefficient of "going to religious service" is

[5] Zhirkov and Inglehart (2019) construct their measure of religiosity as a simple mean of all available internal and external religious activity variables together.

0.600 for (1.ii) "praying", 0.486 for (1.iii) "religious holidays", 0.594 for (1.iv) "fasting", and 0.834 for E_s. The correlation coefficient of the "belief in God" is 0.752 for (2.ii) "there is heaven and hell", 0.816 for (2.iii) "God created the world", 0.559 for (2.iv) "God is the source of moral prescriptions and duties", and 0.882 for I_s. All variables show a substantial degree of correlation, particularly with the overall sum, implying that the original choice of variables is quite representative for the whole data, probably revealing similar or robust findings.

To examine whether this is actually the case, we classified each individual based on the maximum of answers given into the two-way typology with respect to external or internal activity suggested in Table 1 to obtain Table 4. Note that in cases of draws among the four observations for internal and external for each variable, the decision rule was: draw between "1" and "2": "1", "1" and "3": "2", and "2" and "3": "3". This makes the distribution a bit broader which likely reduces the observed association for external religiosity, which is an additional robustness check. The distribution in Table 4 is broadly similar to Table 1 with the major difference in X_{21} as expected.

A replication of the three core regressions in the paper table (see columns 3-5) is provided in Table 5. The results, in particular for the religiosity variables, are very similar. Only the (crucial) coefficient for the external religiosity group for smoking is less negative (-0.254 against -0.355), but still dominant and highly significant. We conclude that our findings are robust against other use of the available data.

A conjecture is that religiosity may show different associations with risky behavior dependent on the social status or the gender the individual has. To examine this suggestion for smoking behavior with equation (3) in Table 3 as the starting point. There in the linear case, males indeed had a much higher likelihood of smoking, while social class only provided a small contribution with a negative and slightly significant association for the category "working class". Column 1 in Table 6 explores the interactions of the religiosity parameters dummies for "male" and "low social class". The extra low social class specification appears to not matter at all, while the previous linear specification from Table 3 remains stable.

This is different for gender: The linear male dummy disappears, but the interactions are mostly sizeable and statistically significant and reveal important differences. The male effects are consistently less negative than for females. Besides for the very strong negative (and statistically significant) association of external religiosity, where the male effect is very close to the respective female), the overall male effects for internal, reflecting and doubting are still negative, but practically close to zero. In other words, while for females, religiosity in all forms shows some effect, it is by far strongest for external religiosity. The external religiosity

association is as sizable and even more dominant for the males, who exhibit no effect elsewhere. While these gender differences are very worthy to note, they do not change the core message section 5 provided that it is external religiosity that drives the moderating negative association with risky behavior.

A further valuable statistical critique is that the applied OLS regressions establishing what is called the Linear Probability Model (LPM) cannot be the true data-generating model (like Probit or Logit specifications), but only a simple approximation (Wooldrige, 2002, p. 454-455; Angrist and Pischke, 2009, p. 107; Greene, 2021). Given todays computer speed, why would one use LPM's? The philosophical answer is that when there are doubts about the true model, the choice of the most simple but valid approximation is a powerful principle. When correcting LPM's for the implied heteroscedasticity by using robust standard errors and avoiding predictions at the lower or upper end of the (0,1) data range, one typically finds practically identical marginal effects (parameters and standard errors).[6] This is also true in our case as columns (2) and (3) in Table 6 confirm; the former replicates the findings of column 3 in Table 3, while the latter confirms the results of column 1 of Table 6. An open issue is the interpretation of R^2 in the LPM, which is well defined. For the Probit model there is no uniquely accepted analogue; however, the McFadden Pseudo-R^2 typically supplied by programs like Stata and applied by most users has the known disadvantage of an upper bound lower than 1 (see Veall and Zimmermann, 1994; 2006). Stata now allows its users to calculate a number of competing statistics, including the McKelvey and Zavoina Pseudo-R^2, which mimics closely the OLS-R^2 one would obtain if one would use the (normally unobserved) latent continous variable assumed behind the Probit model. In our models, the Pseudo- R2 of McFadden is clearly smaller than the LPM-R^2, and the McKelvey and Zavoina Pseudo-R^2 is twice as large as the LPM-R^2.

7. Conclusions

The transition of the political system in Romania from a totalitarian regime to democracy in 1989 created significant challenges for the lifestyle and behaviors of youngsters. The freedom brought by democracy and the market economy allows them to freely express their religious

[6] As Angrist and Pischke (2009), p. 107, write: ""...while a nonlinear model may fit the CEF (conditional expectation function) for LDVs (limited dependent variable models) more closely than a linear model, when it comes to marginal effects, this probably matters little. This optimistic conclusion is not a theorem, but as in the empirical example here, it seems to be fairly robustly true." See also Wooldrige (2002), p. 454. Greene (2021) makes the case for the true model, but admits that the LPM has increasingly become the workhorse of applied research with a rise of the use of the LPM documented by Google Scholar from over 500 articles in 2005 to nearly 3000 in 2015.

beliefs and diversify their consumption preferences, including those related to risky behaviors such as smoking, drinking, and taking drugs. Drawing on the insights of international research, the paper has focused on the question of how religiosity has moderated in particular smoking behavior. Unlike the perceived global trend towards secularization, Orthodox Christian religion has been persistent in Romania under communism and beyond, while transition allowed for a massive rise in visible religiosity. Therefore, the country is an ideal choice for studying the impact of deep-rooted religion on risky behaviors.

The transition has elaborated the distinction between internal and external religiosity, roughly understood as faith in God and engaging in observable religious activities, respectively. Our approach is to classify external religiosity as believing in God and going to church, while internal religiosity focuses on believe in God only. Those in between are reflecting, while others are doubting or even refusing religiosity. Further, it is suggested that these types of religious practices interact differently with risky behaviors as substitutes in the response to the challenges of life. We argue to expect no effect from internal religiosity as well as from doubting and refusing individuals, a weak negative response from reflecting, and a strong negative effect from external religiosity all concerning risky behaviors. The stronger and the more relevant religious peers are for monitoring behavior and the related social pressure and possible help during challenges of life, the more effective the underlying mechanism is.

Data for the deeply religious Orthodox country Romania reveal that, in fact, active and engaged (external) religiosity and not religion as such nor internal religiosity is what prevents Romanian youngsters from unhealthy, addictive risky behaviors. This can be clearly shown to be robust for smoking, and the findings also remain stable during various examinations including the study of drinking and openness towards drugs. Findings also remain valid for including other measures of internal and external religious activities. While the strong negative effect is found for external religiosity among both sexes, females also associate negatively among the groups of doubting and reflecting, although only by a smaller size.

Our analysis, based on micro data collected in 2014, has still various policy implications for our time. The findings underline the general high relevance of religiosity, in addition to various key economic, demographic and social features, for risky behaviors in a post-communist Orthodox country. The significant health issues resulting from risky behaviors have very long-run and costly implications. For instance, the smoking rate increased after 2014 among young Romanian adults, after a decade of relative success, due to the measures of the authorities to reduce advertising and sponsorship of tobacco products (Law no. 457/2004). To control this problematic development, the Romanian Parliament adopted in 2016 Law no. 15,

which banned smoking in any enclosed public spaces. Societal debates about public health policies could benefit from the inclusion of religious authorities.

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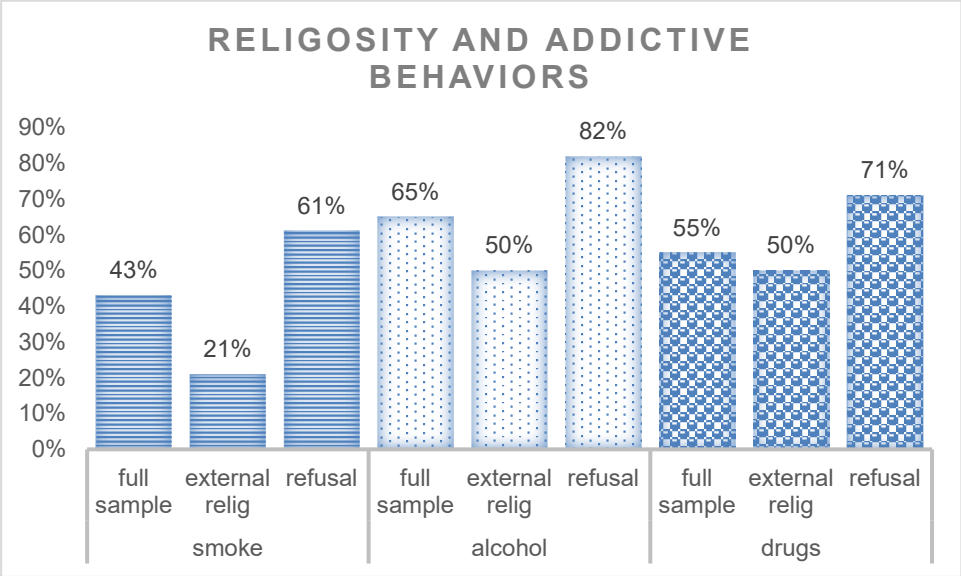
Figure 1: Religiosity and addictive behaviors in Romania



Source: Own calculations on the basis of a representative data set for Romania ("FES Youth Studies in East Europe"; Umbreș et al., 2014), see also section 4 of this paper.

Table 1. Religiosity: Cross-tabulation of internal and external religious activities

Go to church/ Believe in God	I believe	I doubt	I do not believe	Total
Often or very often	310	10	0	320
Sometimes	485	84	9	578
Never	229	101	57	387
Total	1,024	195	66	1,285

Note: Activity indicators are "believe in God" (internal) and "go to church" (external) to define internal and external religiosity through the classification below:

External	Doubting	Doubting
Reflecting	Doubting	Doubting
Internal	Refusing	Refusing

We expect no effect from *internal religiosity* as well as from *doubting* and *refusing* individuals, a weak negative from *reflecting* and a strong negative effect from *external religiosity*.

Table 2. Descriptive statistics

	Young adults (18-29)					Teenagers (15-17)				
Variable	Obs.	Mean	Std. Dev.	Min.	Max.	Obs.	Mean	Std. Dev.	Min.	Max.
Smoke	964	0.501	0.500	0	1	318	0.223	0.417	0	1
Alcohol	978	0.707	0.456	0	1	318	0.497	0.501	0	1
Drugs	878	0.563	0.496	0	1	288	0.545	0.499	0	1
RELIGIOSITY										
External	983	0.228	0.420	0	1	319	0.270	0.444	0	1
Internal	983	0.183	0.387	0	1	319	0.154	0.361	0	1
Reflecting	983	0.354	0.478	0	1	319	0.429	0.496	0	1
Doubting	983	0.086	0.281	0	1	319	0.056	0.231	0	1
Male	983	0.505	0.500	0	1	319	0.476	0.500	0	1
Age	983	23.308	3.386	18	29	319	16.03	0.837	15	17
EDUCATION										
Low Education	982	0.152	0.359	0	1	318	0.884	0.321	0	1
Medium Education	982	0.624	0.485	0	1	318	0.116	0.321	0	1
Higher Education	982	0.224	0.417	0	1	318	0	0	0	0
SOCIAL CLASS										
Low social class	954	0.063	0.243	0	1	306	0.092	0.289	0	1
Working class	954	0.494	0.500	0	1	306	0.503	0.501	0	1
Medium Social class	954	0.345	0.476	0	1	306	0.301	0.459	0	1
Upper social class	954	0.099	0.298	0	1	306	0.105	0.307	0	1
Married	978	0.422	0.494	0	1	319	0.056	0.231	0	1
Child	981	0.173	0.379	0	1	319	0.003	0.056	0	1
Trust	983	48.141	13.90	23	135	319	51.90	23.841	24	135

Table 3. Religiosity and smoking

VARIABLES	(1) Smoking	(2) Smoking	(3) Smoking	(4) Alcohol	(5) Drugs	(6) Religiosity	(7) Smoking	(8) Smoking <18
External religiosity	-0.406***	-0.346***	-0.355***	-0.184***	-0.252***		-0.262***	-0.205**
	(0.0493)	(0.0514)	(0.0523)	(0.0456)	(0.0554)		(0.0786)	(0.0920)
Internal religiosity	-0.0668	-0.0789	-0.0891	-0.0582	-0.259***		-0.00217	-0.154
	(0.0539)	(0.0543)	(0.0547)	(0.0437)	(0.0582)		(0.0746)	(0.104)
Reflecting	-0.152***	-0.129***	-0.137***	-0.109***	-0.189***		-0.117*	-0.0624
	(0.0479)	(0.0487)	(0.0496)	(0.0389)	(0.0504)		(0.0705)	(0.0941)
Doubt	-0.129*	-0.101	-0.142**	-0.0596	-0.191***		-0.0240	-0.0746
	(0.0675)	(0.0668)	(0.0683)	(0.0551)	(0.0692)		(0.0920)	(0.137)
Male		0.171***	0.174***	0.252***	-0.0188	-0.152***	0.122**	0.169***
		(0.0320)	(0.0324)	(0.0289)	(0.0349)	(0.0268)	(0.0544)	(0.0461)
Age		0.0310	0.0237	-0.0200	0.0445	-0.142**	0.0216	-0.767
		(0.0709)	(0.0725)	(0.0662)	(0.0820)	(0.0626)	(0.123)	(1.616)
Age-squared		-0.000309	-0.000198	0.000414	-0.000990	0.00293**	-7.27e-05	0.0284
		(0.00150)	(0.00153)	(0.00140)	(0.00173)	(0.00133)	(0.00255)	(0.0507)
Medium education		-0.0887**	-0.0585	0.103**	0.0546	0.0988***	-0.192***	0.0840
		(0.0450)	(0.0478)	(0.0463)	(0.0536)	(0.0378)	(0.0706)	(0.0856)
Higher education		-0.147***	-0.0949	0.169***	0.0154	0.105**	-0.251***	
		(0.0549)	(0.0596)	(0.0547)	(0.0667)	(0.0486)	(0.0841)	
Working class			-0.112*	0.0369	-0.0193	-0.00476	-0.160*	0.0195
			(0.0631)	(0.0630)	(0.0658)	(0.0599)	(0.0868)	(0.0807)
Medium class			-0.0437	0.0584	-0.0386	-0.0481	-0.119	-0.0625
			(0.0649)	(0.0642)	(0.0684)	(0.0609)	(0.0908)	(0.0829)
Upper class			0.0345	0.00420	0.130	0.0390	0.0320	0.0568
			(0.0796)	(0.0778)	(0.0828)	(0.0728)	(0.107)	(0.102)
Alcohol							0.198***	
							(0.0566)	
Drugs							0.111**	
							(0.0465)	
Married							-0.0707	
							(0.0530)	
Child							-0.0555	
							(0.0631)	
Trust							0.00175	
							(0.00186)	
Constant	0.671***	0.102	0.251	0.773	0.246	1.923***	0.179	5.238
	(0.0394)	(0.814)	(0.828)	(0.760)	(0.936)	(0.717)	(1.455)	(12.84)
Observations	964	963	935	948	850	953	425	304
R^2	0.077	0.119	0.129	0.124	0.034	0.049	0.207	0.189

Notes: Column (1)-(7): 18-29 years old; (8):15-17 years old. Robust standard errors in parentheses. Statistical significance at level 10% (*), 5% (**), and 1% (***). Reference groups in parentheses: The four religiosity variables as explained in the text (those who never go to church and doubt or do not believe in God); education (low); parents' social class (lower) are all 0,1 dummies like smoking, alcohol, drugs=drug openness, married, and child. Trust is an index of the size of trust measured according to 11 variables as explained in the text.

Table 4. Extended religiosity

ERS	IRS			
	1	2	3	Total
1	573	36	6	615
2	269	81	18	368
3	144	100	75	319
Total	986	217	99	1302

Note: Follows the concept of Table 1, but entries are based on the majority "votes" of the four respective variables each for both *internal religious activities* (IRS, row) and *external religious activities* (ERS, column). Again, element (1,1) is *external religiosity*, (2,1) is *reflecting*, and (3,1) is *internal religiosity*.

Table 5. Risky health behaviors with extended religiosity based on Table 4

VARIABLES	(1) Smoking	(2) Alcohol	(3) Drugs
External religiosity extended	-0.254***	-0.165***	-0.252***
	(0.0482)	(0.0386)	(0.0479)
Internal religiosity extended	-0.0686	-0.0413	-0.294***
	(0.0614)	(0.0503)	(0.0658)
Reflecting extended	-0.114**	-0.0637	-0.212***
	(0.0534)	(0.0414)	(0.0543)
Doubting extended	-0.155**	-0.101**	-0.240***
	(0.0620)	(0.0506)	(0.0635)
Male	0.185***	0.254***	-0.0187
	(0.0326)	(0.0288)	(0.0348)
Age	0.0535	-0.0106	0.0657
	(0.0733)	(0.0653)	(0.0817)
Age-squared	-0.000796	0.000228	-0.00143
	(0.00155)	(0.00138)	(0.00172)
Education (Low education as reference)			
Medium education	-0.0663	0.106**	0.0422
	(0.0484)	(0.0460)	(0.0536)
Higher education	-0.107*	0.172***	0.00709
	(0.0602)	(0.0544)	(0.0664)
Social Class (Low class as reference)			
Working class	-0.109	0.0329	-0.0352
	(0.0671)	(0.0645)	(0.0685)
Medium social class	-0.0429	0.0524	-0.0529
	(0.0687)	(0.0658)	(0.0708)
Upper social class	0.0135	-0.00924	0.106
	(0.0820)	(0.0789)	(0.0852)
Constant	-0.111	0.659	0.0457
	(0.838)	(0.749)	(0.934)
Observations	935	948	850
R^2	0.112	0.126	0.039

Table 6. Smoking. Religiosity interacted with gender and low social class

VARIABLES	(1) LPM	(2) Probit	(3) Probit
Religiosity			
External	-0.473***	-0.349***	-0.463***
	(0.0829)	(0.0502)	(0.0816)
External x male	0.149	-	0.157
	(0.111)		(0.110)
External x low class	0.139	-	0.154
	(0.265)		(0.278)
Internal	-0.223**	-0.0866	-0.210**
	(0.0969)	(0.0542)	(0.0914)
Internal x male	0.176	-	0.165
	(0.115)		(0.111)
Internal x low class	0.154	-	0.170
	(0.258)		(0.279)
Reflecting	-0.267***	-0.131***	-0.244***
	(0.0846)	(0.0481)	(0.0797)
Reflecting x male	0.199*	-	0.178*
	(0.103)		(0.0990)
Reflecting x low class	0.0539	-	0.0540
	(0.260)		(0.274)
Doubting	-0.308***	-0.137**	-0.283***
	(0.112)	(0.0650)	(0.105)
Doubting x male	0.288**	-	0.261*
	(0.141)		(0.135)
Doubting x low class	-0.119	-	-0.103
	(0.309)		(0.316)
Male	0.00796	0.169***	0.0124
	(0.0883)	(0.0297)	(0.0861)
Age	0.0292	0.0182	0.0234
	(0.0730)	(0.0724)	(0.0725)
Age-squared	-0.000305	-7.29e-05	-0.000178
	(0.00154)	(0.00153)	(0.00153)
Education (Low education as reference)			
Medium education	-0.00539	-0.0573	-0.0542
	(0.0481)	(0.0470)	(0.0468)
Higher education	-0.0943	-0.0943	-0.0946
	(0.0598)	(0.0585)	(0.0582)
Social Class (Low class as reference)			
Working class	-0.120*	-0.115*	-0.119*
	(0.0641)	(0.0629)	(0.0628)
Medium social class	-0.0527	-0.0471	-0.0525
	(0.0660)	(0.0646)	(0.0644)
Upper social class	-0.0641	-0.0343	-0.0685
	(0.246)	(0.0786)	(0.264)
Constant	0.307	marginals	marginals
	(0.832)		
R^2; Pseudo-R^2: MF/MZ	0.136	0.099/0.198	0.104/0.207

Note: Number of observations: 935. Column 1 employs the Linear Probability Model = OLS; columns 2 and 3 are Binary Probit models. Robust standard errors in parentheses; *** p<0.01, ** p<0.05,* p<0.1. R^2: OLS. Pseudo-R^2's are MF=McFadden & MZ=McKelvey and Zavoina. While MF is the standard output in Stata, Veall and Zimmermann (1994, 2006) have shown that MF is structurally limited below 1 and MZ mimics well the OLS - R^2 calculated for the underlying continuous latent variable.