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DOES TRUST AFFECT LIFE SATISFACTION? STRUCTURAL EQUATION MODELS FOR EUROPEAN MIGRANTS AND NON-MIGRANTS

Abstract. *This article aims at identifying the effect of trust on life satisfaction and the potential differences between natives and third-country nationals (TCNs), by using Structural Equation Modelling (SEM). The analysis employs the 2018 round of the European Social Survey, which covers 30 countries, both EU and non-EU. The empirical research includes two key-concepts: life satisfaction and trust. The SEM model involves three latent variables: one for the dependent variable, life satisfaction, and two for the independent variables, which capture two dimensions of trust: interpersonal trust and political trust. The estimated models pass the criteria for validity and the models can be considered robust. Our results confirm the direct relationship between trust and life satisfaction for both natives and TCNs. At the same time, our findings highlight the fact that trust in politics and people is just as important for TCNs, while for natives, trust in people is more important than trust in politics.*

Keywords: *structural equation modelling, migration, natives, trust, life satisfaction*

JEL Classification : C30 ; C40 ; C83 ; F22

1. Introduction

Though usually perceived as an individual trait, trust is a dyadic characteristic of human beings (Yakovleva, 2010). Hardin (1993) sees trust as an encapsulated trust and most of our decisions are based on trust. The counterparty of trust is distrust, and having low trust may affect our relationship and how our lives develop (Olson, et al., 2007). Trust is something that we start learning from childhood when mainly through imitation (Bernath and Feshbach, 1995). DiYanni et al. (2012) observed that children tend to be reluctant if they were deceived from previous experiences. Also, people with various migration background may

interact differently with individual cultural dimensions such as trust (André, 2014), religion (Roman et al., 2020) or institutions (Guiraudon, 1998).

Increasing the individual life satisfaction is an overall goal and in various models and theories trust may act as an explanatory factor (Hudson, 2006). However, both trust and life satisfaction are multi-dimensional measures and this may lead to inconclusive results.

This paper explores the connection between trust and life satisfaction using structural equation modelling. Our study aims to meet the following research hypothesis:

Hypothesis 1: Does trust explain the life satisfaction in the case of European residents?

Hypothesis 2: Are there any differences between migrants (third-country nationals) and non-migrants in respect to life satisfaction and trust?

There are a number of researches that consider trust as a factor for life satisfaction. However, the results are mixed and most of the papers consider national population, as in the case of Russia (Mironova, 2015) or Serbia (Jovanovic, 2016). Our paper aims to make a contribution to the literature by examining a recent large multinational sample, such as the one consisting in more than 42000 European residents, from 30 countries. Moreover, we aim to verify if migration background makes a difference regarding the effect of trust on well-being.

Though trust has many facets, we included two dimensions of trust to respond our research questions: interpersonal trust and political trust. The empirical analysis is based on the most recent (ninth) round of European Social Survey from 2018 (henceforth ESS9), covering 30 European countries, from the inside and outside the European Union.

The paper continues with a brief literature review regarding the two key concepts, trust and life satisfaction, followed by a description of the method employed in the analysis and data used. After presenting the variables employed we describe the results from the structural equation models for the two different groups: third country nationals (TCNs) and natives. The last section covers the final remarks.

2. Literature review

Trust is a crucial psychological trait that starts from early childhood and through life determine how an individual will work and integrate in life and society (Erikson, 1963). Trust is a multifaceted concept depending on the aspects of a study, and there is no universally agreed definition of trust (McKnight and Chervany, 2001; Borum, 2010). Usually, the term *trust* refers to the confidence on others' collaborative behaviour (Simpson, 2012). The ability to trust starts from early childhood and as an adult, it is a fundamental function for social survival and efficiency of individuals (Bernath and Feshbach, 1995).

Trust generates comfort and acts as a binder in social relations, therefore people are much more open in interpersonal relationships if they trust one another (Bernath and Feshbach, 1995). McKnight and Chervany (2001) conceptualized four types of trust constructs: willingness to trust, institutional trust, trust beliefs, and intentions. Borum (2010) defines interpersonal trust as the willingness to accept a risk-based on beliefs and intentions of a person related to another person's behavior. Political trust sometimes is used when the institutions involved are in the analysis have a political nature (Băltăţescu, 2009; André, 2014).

In this article, we assess trust as “one is willing to depend, or intends to depend, on the other party with a feeling of relative security” (McKnight and Chervany, 2001, p. 34), where that other party refers to two significant compounds: politics and institutions and people and interpersonal relationships.

As in the case of trust, the way to measure subjective life satisfaction has been an intense study over time (Diender et al., 1985; Frisch, 2005). In their seminal work, Diender et al. (1985) proposed a scale of life satisfaction based on five items: (1) *In most ways, my life is close to my ideal.* (2) *The conditions of my life are excellent.* (3) *I am satisfied with my life.* (4) *So far I have gotten the important things I want in life.* (5) *If I could live my life over, I would change almost nothing.* Frisch (2005, p. 8) considers that life satisfaction is “achieved based on how well the needs, goals, and wishes of people are met in important areas of their life”.

Many authors have studied life satisfaction in association with trust (Hudson, 2006; Băltăţescu, 2009; Jovanovic, 2016; Li et al., 2019). Hudson (2006) obtained mixed results showing that the relationship between life satisfaction and institutional trust categories is direct; instead, it is a negative relationship for each category of institutional trust in relation to life improvement within the past five years. The same positive relationship between trust and life satisfaction was obtained by Jovanovic (2016) and Li et al. (2019). Băltăţescu (2006) analyzed comparatively for Eastern Europe and Western and Central Europe the relationship between life satisfaction and two different types of trust: interpersonal trust and political trust, using correlation analysis. His results showed that there is a direct relationship between trust and life satisfaction for all analyzed situations. On the other hand, Radcliff (2001) proves that the effects on life satisfaction are different on account of regimes attributes. Based on his results, the more socialist a state is, the more satisfied the people are with their lives, and the more liberal the state is, the less satisfied the people are with their lives.

3. Method and data

3.1. Structural equation model specification

As the variables of interest used in our research are multi-dimensional, we apply Structural equation modelling (SEM), as an adequate method to explain latent variables. SEM does not represent a single statistical technique, but rather it is a

framework that encompasses various statistical methods such as linear regression, factor analysis, path analysis, and simultaneous equations (Huber, 2019).

SEM allows testing the relationship between statistical variables by using two types of variables: observed variables and latent variables (which are also called factors) (Acock, 2013). In this respect, the SEM has two components: the measurement component, which refers to the construction of the latent variables, and the structural component, which refers to how the observed and latent variables relate to each other (Huber, 2019). The latent variables emphasize a social concept that is not directly observed but is inferred using various observed variables (Acock, 2013). Generally speaking, the specification of the structural equation model can be described by the following equation (Bollen, 1989; Schumacker and Lomax, 2014 p. 373):

$$\eta = B\eta + \Gamma\xi + \zeta, \quad (\text{eq. 1})$$

Where: η represents the m-dimensional vector of latent endogenous variables;

ξ represents the n-dimensional vector of latent exogenous variables;

ζ represents the m-dimensional vector of error term of the structural equation model;

B represents the m×m matrix of structure coefficients that show the relationship between the endogenous latent variables;

Γ represents the m×n matrix of structure coefficients that show the relationship between the endogenous latent variables and exogenous latent variables.

Due to the complex systems involved in structural equation modelling is important we differentiate two models for the latent variables involved in the analysis (Bollen, 1989; Schumacker and Lomax, 2014):

- If the latent variable is exogenous the measurement component is described by the following model: $X = \Lambda_x\eta + \varepsilon_x$, (eq. 2)

- If the latent variable is endogenous the measurement component is described by the following model: $Y = \Lambda_y\xi + \varepsilon_y$, (eq. 3)

Where: X represents the q-dimensional vector of exogenous observed variables;

Y represents the p-dimensional vector of endogenous observed variables;

η represents the latent endogenous variable;

ξ represents the latent exogenous variable;

Λ_x and Λ_y represent the matrix of factor loadings with q×n respectively p×m dimensions;

ε_x and ε_y represent q-dimensional and p-dimensional vectors of the measurement error terms which have the same properties as ζ .

Consequently, $q + p$ represents the total number of observed variables employed in the model and we will denoted with s in the following.

According to Bollen (1989) it is assumed that the error term of the structural equation model ζ has $E(\zeta) = 0$ and is not correlated with the latent exogenous variables. Also, the observed variables have a multivariate-normal distribution $\begin{bmatrix} X \\ Y \end{bmatrix} \sim N_s(0, \Sigma)$, where Σ represents the population covariance matrix of the indicators and is a function of the models' parameters $\theta = (B, \Gamma, \Lambda_x, \Lambda_y, \Psi, \Theta_{\varepsilon_x}, \Theta_{\varepsilon_y}, \Phi)$, where the $\Psi, \Phi, \Theta_{\varepsilon_x}, \Theta_{\varepsilon_y}$ are the variance-covariance matrices of error terms from the structural equation models (Ψ is the covariance between exogenous latent variables and Φ is the covariance between the errors of endogenous latent variable) and from the measurement models (Θ_{ε_x} is the covariance between the errors of the observed exogenous variable, Θ_{ε_y} is the covariance between the errors of the observed endogenous variable) (Bollen, 1989):

$$\Sigma(\theta) = \begin{bmatrix} \Sigma_{yy}(\theta) & \Sigma_{yx}(\theta) \\ \Sigma_{xy}(\theta) & \Sigma_{xx}(\theta) \end{bmatrix} = \begin{bmatrix} \Lambda_y(I - B)^{-1}(\Gamma\Phi\Gamma' + \Psi)[(I - B)^{-1}]'\Lambda_y' + \Theta_{\varepsilon_y} & \Lambda_y(I - B)^{-1}\Gamma\Phi\Lambda_x' \\ \Lambda_x\Phi\Gamma'[(I - B)^{-1}]'\Lambda_y' & \Lambda_x\Phi\Lambda_x' + \Theta_{\varepsilon_x} \end{bmatrix} \quad (\text{eq. 4})$$

Several methods have been developed to estimate the parameters of a structural equation model (Bollen, 1989). Our results were estimated using Stata 16 which by default applies the Maximum Likelihood (ML). This method is the most used fitting function for structural equation modelling and has two important advantages. Firstly, provides one formal statistical test to assess the overall goodness of fit and, secondly, is scale invariant and scale free (Schermelleh-Engel et al., 2003).

The ML fitting function is based on minimizing the difference between the sample drawn variance-covariance matrix S and the implied variance-covariance matrix $\Sigma(\theta)$ and is expressed as:

$$F(S, \Sigma(\theta)) = \log |\Sigma(\theta)| + \text{tr}(S\Sigma(\theta)^{-1}) - \log |S| - s, \quad (\text{eq. 5})$$

where \log represents the natural logarithm and tr is the trace of the matrix.

The ML fit function follows a $\chi^2 = (N - 1) \cdot \min(F(S, \Sigma(\theta)))$ distribution with M degrees of freedom, where N is the sample size and M is the difference between the total number of non-redundant information in matrix S $\left(\frac{s(s+1)}{2}\right)$ and total number of free parameters (the number of path that need to be estimated) (Bollen, 1989; Schermelleh-Engel et al., 2003).

3.2. Model goodness of fit

The goodness of fit for the Structural Equation Modelling is an ongoing debate and there is no general fit statistic that encompasses a general level of statistical acceptance. One way to assess the goodness of fit for the structural equation model is to apply the χ^2 test which compares the original variance-covariance matrix with the sample variance-covariance matrix.

The χ^2 test usually should be non-significant to show that the reproduced matrix and the observed matrix are not statistically different (Fan et al., 2016). This aspect is not really necessary due to the fact that χ^2 test is sensitive to the sample size and for large samples it generally is significant (Schumacker and Lomax, 2014). However, we employ this method for assessing the goodness of fit, but we complement it with a number of additional techniques: the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker–Lewis index (TLI) (Fan et al., 2016).

Finally, we use the χ^2 obtained for the likelihood ratio tests to compute the Goodness of Fit statistics (GFI) (Diamond and Sztendur, 2014):

$$GFI = 1 - \frac{\chi^2_{model\ vs.\ saturated}}{\chi^2_{baseline\ vs.\ saturated}}$$

3.3. Data

For the empirical analysis, we used the most recent dataset from round nine of the European Social Survey. European Social Survey is a biennial “academically-driven multi-country survey” (European Social Survey[ESS], 2019 p.7).

The ESS9 covered 30 European Union and non-European Union countries (ESS, 2019): Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Montenegro, Netherlands, Norway, Poland, Portugal, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, and United Kingdom. It is important to notice that not all the items from the previous rounds were addressed in round nine (see ESS Codebook).

All the latent variables employed in the analysis are described in Table 1.

Table 1. Description of latent variables

Latent variables	Item Code	Item	Scale
TrustPolitics	trstplt	“Trust in politicians”	0: No trust at all ... 10: Complete trust
	trstprt	“Trust in political parties”	0: No trust at all ... 10: Complete trust

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Latent variables	Item Code	Item	Scale
	trstprl	“Trust in country parliament”	0: No trust at all ... 10: Complete trust
TrustPeople	ppltrst	“Most people can be trusted or you cannot be too careful”	0: You can't be too careful ... 10: Most people can be trusted
	pplhlp	“Most of the time people are helpful or mostly looking out for themselves”	0: People mostly look out for themselves ... 10: People mostly try to be helpful
	inprdsc	“How many people with whom you can discuss intimate and personal matters”	0: None 1: 1 2: 2 3: 3 4: 4-6 5: 7-9 6: 10 or more
	pplfair	“Most people try to take advantage of you, or try to be fair”	0: Most people try to take advantage of me ... 10: Most people try to be fair
LifeSatisfaction	stflife	“How satisfied with life as a whole”	0: Extremely dissatisfied ... 10: Extremely satisfied
	happy	“How happy are you”	0: Extremely unhappy ... 10: Extremely happy

Source: ESS codebook

Further, in Table 2 we presented comparatively for TCNs vs. Non-migrants the descriptive statistics of all the observed variables employed in the model.

Table 2. Descriptive statistics of the observed variables

Migrants	TCNs		Non-migrants		Min	Max
Observations	2714		40116			
Variable	Mean	Std. Dev.	Mean	Std. Dev.		
trstplt	4.12	2.61	3.57	2.46	0	10

Migrants	TCNs		Non-migrants		Min	Max
Observations	2714		40116			
Variable	Mean	Std. Dev.	Mean	Std. Dev.		
trstprt	4.06	2.54	3.53	2.43	0	10
trstprl	5.18	2.71	4.41	2.65	0	10
ppltrst	5.05	2.44	5.00	2.48	0	10
inprdsc	2.67	1.52	2.72	1.45	0	6
pplfair	5.47	2.41	5.58	2.33	0	10
pplhlp	4.96	2.47	4.91	2.35	0	10
stflife	7.11	2.25	7.06	2.18	0	10
happy	7.57	1.94	7.38	1.92	0	10

Source: Authors' own computation based on ESS9 data

There are differences between the two groups regarding political trust, as natives seem to be slightly more reluctant to trust politics and people than the migrants. Also, migrants tend to consider that they are a little happier and more satisfied with their life than natives.

3.4 Conceptual model

Applying SEM usually involves a priori theoretical models (Tarka, 2018). Considering this, we have encompassed various studies that used structural equation modelling to investigate the relationship between trust and life satisfaction, focusing primarily on those using the European Social Survey dataset.

Allumn et al. (2010) used the 2002 round from ESS and applied a confirmatory factor analysis with six latent variables. They covered concepts like political trust (trust in parliament and politicians), legal trust (trust in police and legal system) and social trust (people are fair, are helpful and trusted), but also aspects related to career, involvement in social campaigns and participation in cultural activities.

Mironova (2015) used the 2012 round from ESS to study how life satisfaction and social trust related to each other for the Russian Federation, considering five latent variables: three referring to trust (institutional trust, social trust and general trust) and the others referring job satisfaction (as a mediator factor) and life satisfaction. Ciziceno and Travaglino (2019) studied the relationship between corruption and life satisfaction applying structural equation modelling on two sample groups: US citizens and MENA region. They also used the institutional trust as a mediator factor between corruption and life satisfaction. Their results showed that institutional trust directly influence the life satisfaction and also mediates the indirect relationship between corruption and life satisfaction.

Our analysis involves two latent independent variables, which capture aspects related to political trust (denoted as TrustPolitics), interpersonal trust

(denoted as TrustPeople) and one dependent latent variable referring to life satisfaction (denoted as LifeSatisfaction).

Figure 1 shows the conceptual model of the relationship between trust and life satisfaction we applied in our research. In selecting the measures for both endogenous and exogenous variables, the model relies on the results from previous researches (Mironova, 2015; Ciziceno and Travaglino, 2019, Băltăţescu, 2009), therefore employing a confirmatory factor analysis.

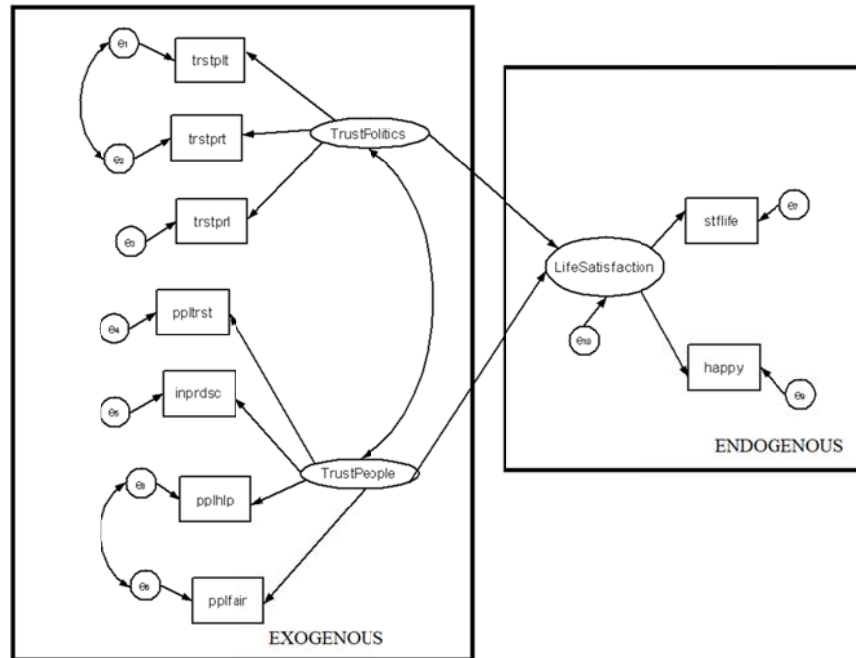


Figure 1. Conceptual model of trust and life satisfaction

We used a non-recursive structural equation model (Huber, 2019) by adding the covariance between the party trust and politicians trust, and between the measurement errors of items: people are helpful and people are fair, and political trust and people trust. The covariance between items **trstplt** and **trstprt**, and **pplhlp** and **pplfair** was added because these items express more or less the same idea.

4. Results and discussions

To tackle the research hypotheses H1 and H2, we estimated the model for two subsamples, the third-country nationals and non-migrants. For both estimations all the coefficients are statistically significant.

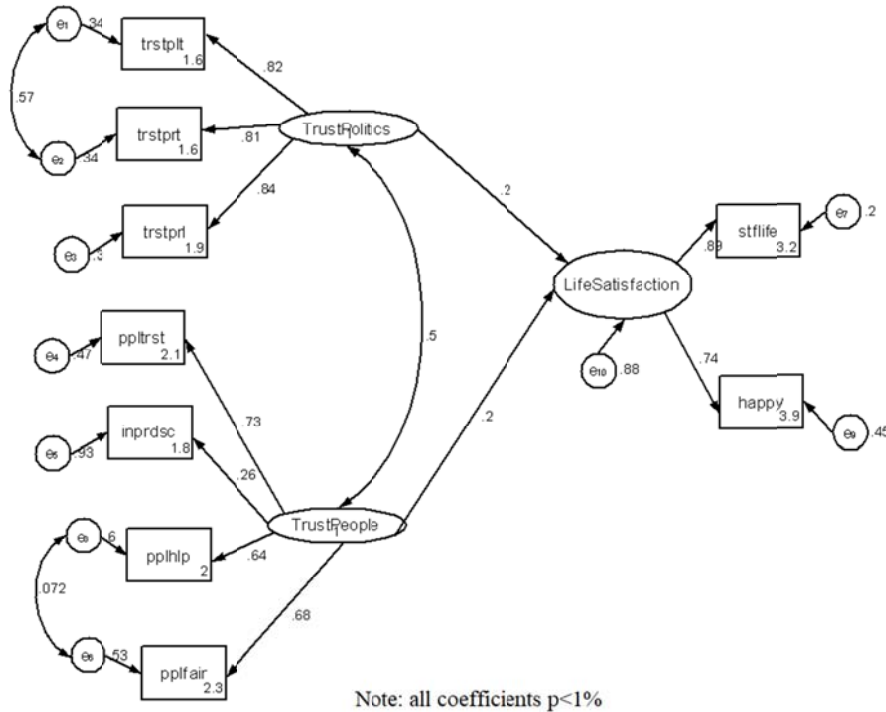


Figure 2. Structural equation model for TCNs

The results showed a direct relationship between life satisfaction and the two dimensions of trust: political trust and interpersonal trust. We confirm that in the case of European residents, irrespective of migration background, trust positively impacts life satisfaction through both components: political and personal.

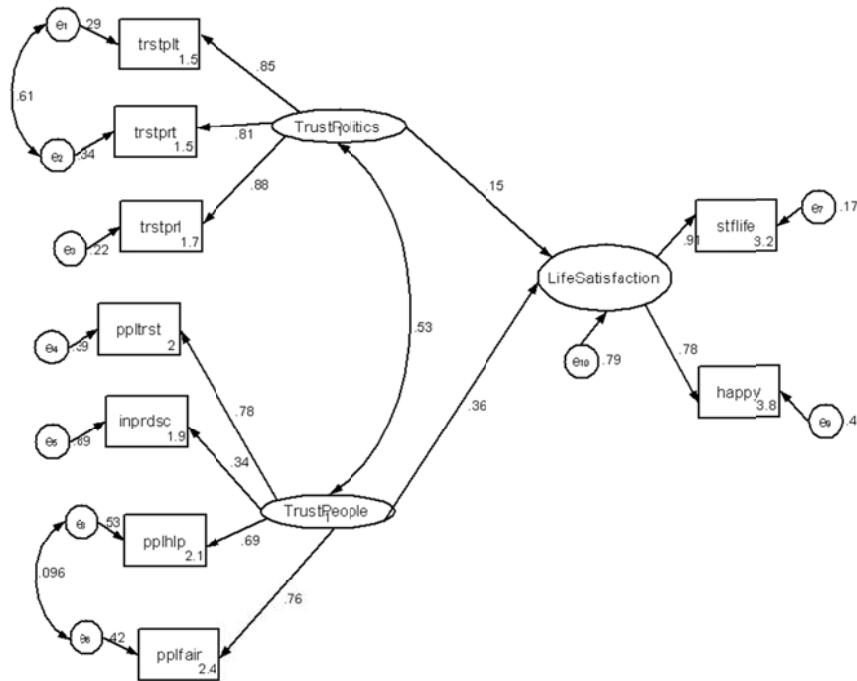
The results regarding the size of the coefficients are slightly different. It can be seen that the coefficients of the model for TCNs are lower than those of the model for non-migrants (see Figure 2 and Figure 3).

When comparing the two models, an interesting aspect is that for the TCNs model, we observe that interpersonal trust and political trust have the same intensity on influencing life satisfaction, while for the natives the interpersonal trust has higher importance than political trust. As Mironova (2015) observed in the Russian case, we also can say that in the case of natives, trust in the people you interact with daily is more important than trust in political institutions.

For TCNs, the interaction with the political institutions is as important as the one with the people from daily life. This aspect can probably be explained by the fact that most TCNs do not have a legal status (Guiraudon, 1998), which

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implies a higher frequency of interactions with political institutions. Also, the political environment in destination country may be related to migration reasons for many immigrants and a factor for the selection of their host country.



Note: all coefficients $p < 1\%$

Figure 3. Structural equation model for non-migrants

Our results on European data are consistent with most scholars' previous findings (Hudson, 2006; Băltătescu 2009; Allumn et al., 2010; Mironova, 2015; Jovanovic, 2016; Li et al., 2019), that confirm the positive impact of trust on life satisfaction in various contexts.

Finally, in table 3 we presented the goodness of fit statistics to observe if the model is properly specified.

Table 3. Goodness of fit statistics

Fit statistic	Value	Description	Model 1-TCNs	Model 2-Non-migrants
Likelihood ratio	chi2 ms(47)	model vs. saturated	155.077	1834.645
	p > chi2		0.000	0.000

Fit statistic	Value	Description	Model 1-TCNs	Model 2-Non-migrants
	chi2 bs(66)	baseline vs. saturated	9726.294	178691.654
	p > chi2		0.000	0.000
Population error	RMSEA	Root mean squared error of approximation	0.047	0.045
	90% CI, lower bound		0.040	0.044
	90% CI, upper bound		0.054	0.047
	pclose	Probability RMSEA <= 0.05	0.731	1.000
Information criteria	AIC	Akaike's information criterion	100241.662	1423429
	BIC	Bayesian information criterion	100430.660	1423704
Baseline comparison	CFI	Comparative fit index	0.986	0.990
	TLI	Tucker-Lewis index	0.978	0.983
Size of residuals	SRMR	Standardized root mean squared residual	0.035	0.033
	CD	Coefficient of determination	0.947	0.966

In the two models, we have a significant χ^2 for both likelihood ratio statistics, but we do not consider this aspect a worrying problem since χ^2 test is sensitive for large samples (such as in this case) and will always be significant (Afthanorhan, 2013; Schumacker and Lomax, 2014). Some authors indicate to examine other fitting criteria such as the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker–Lewis index (TLI) (Diamond and Sztendur, 2014; Fan et al., 2016) and the Goodness of Fit statistics (GFI) (Marsh et al., 2005; Diamond and Sztendur, 2014).

The GIF for the TCNs model is 0.9841 and for the non-migrants is 0.9897, both are higher than 0.9 and suggest a good fit (Afthanorhan, 2013). GFI shows that more than 98% of the correlation among the latent variables and the observed variables are explained by both models.

Around the root mean square error of approximation (RMSEA) there is no general opinion regarding its cut off. Browne and Cudeck (1993) consider that a value below 0.05 indicates a good fit. Che et al. (2008) showed that a cut off of 0.05 for RMSEA rejects properly specified models. In this respect the level of

acceptance for RMSEA it is usually considered to be below 0.08 (Afthanorhan, 2013). Even though, our result show for both estimations the RMSEA is under 0.05. Also, the cut offs for the comparative fit index (CFI) and the Tucker–Lewis index (TLI) are debatable, but generally a value higher 0.95 is considered to show a good fit of the model (Afthanorhan, 2013).

Our results showed for both models that RMSEA is lower than 0.05 with a probably higher than 0.05, and the CFI and TLI are higher than 0.95. In this respect, we can conclude that the reliability of the estimations is achieved and the models are properly specified.

Therefore, the models passed the criteria for validity in both cases, and the results are robust.

5. Final remarks

This article analyzed the relationship between two dimensions of trust and life satisfaction separately for natives and third-country nationals. Our results showed that the relationship between trust and life satisfaction is direct and statistically significant. Political trust and interpersonal trust directly contribute to life satisfaction for both natives and third-country nationals. This result is according with most of the scholars (Allumn et al., 2010; Mironova, 2015; Jovanovic, 2016; Li et al., 2019) and confirm our research hypothesis. However, the effect of personal trust is larger in the case of natives compared to TCNs, being also larger than in the case of political trust, and therefore showing differences between the two groups.

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Appendix. Table 4. Path coefficients

Model type	Standardized	TCNs		Non-migrants	
		Coef.	P>z	Coef.	P>z
Structural	LifeSatisfaction				

Model type	Standardized	TCNs		Non-migrants	
		Coef.	P>z	Coef.	P>z
	TrustPolitics	0.145	0.000	0.198	0.000
	TrustPeople	0.360	0.000	0.200	0.00 0
Measurement	trstplt				
	TrustPolitics	0.845	0.000	0.815	0.000
	_cons	1.451	0.00 0	1.583	0.000
	trstprt				
	TrustPolitics	0.815	0.000	0.814	0.000
	_cons	1.454	0.000	1.598	0.00 0
	trstprl				
	TrustPolitics	0.884	0.000	0.839	0.000
	_cons	1.666	0.00 0	1.912	0.000
	ppltrst				
	TrustPeople	0.784	0.000	0.730	0.000
	_cons	2.017	0.000	2.069	0.00 0
	inprdsc				
	TrustPeople	0.338	0.000	0.258	0.000
	_cons	1.866	0.00 0	1.772	0.000
	pplfair				
	TrustPeople	0.761	0.000	0.682	0.000
	_cons	2.395	0.000	2.272	0.00 0
	pplhlp				
	TrustPeople	0.687	0.000	0.635	0.000
	_cons	2.085	0.00 0	2.012	0.000
	stflife				
	LifeSatisfaction	0.909	0.000	0.892	0.000
	_cons	3.239	0.000	3.164	0.00 0
	happy				
	LifeSatisfaction	0.777	0.000	0.742	0.000
	_cons	3.836	0.00 0	3.897	0.000
	cov(e.trstplt,e.trstprt)	0.607	0.000	0.570	0.000
	cov(e.pplfair,e.pplhlp)	0.096	0.000	0.072	0.039
	cov(TrustPolitics,TrustPeople)	0.529	0.000	.499	0.000