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Subjective Well-Being Model for Urban Mexico and Applications

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The purpose of this article is to contribute to the analysis of subjective well-being in the cities of Mexico through the theoretical formalization and empirical verification of a quantitative model. The variables come from the constructs of the self-reported well-being module (BIARE); and they are called: overall satisfaction with life, sense of fullness, affect balance, and satisfaction domains. The equations were constructed using ordinary least squares regression with the BIARE databases of 2014 and 2017. The analysis of the behavior pattern of variables conduced to findings of urban society's expectations of well-being and concerns in the period analyzed. Variables quality of life-and-self-realization and overall satisfaction with life have the greatest weight in the model equations. Besides, it was determined that emotional balance and citizen security condition the model. Finally, a relevant finding was that religion restricts the sense of fulness since it represents a well-being project with an opposite logic.

Keywords: sense of fullness, religion, quality of life-and-self-realization, overall life satisfaction, citizen security

Introduction

This article presents the construction of an explanatory model of subjective well-being for the main cities of Mexico and is tested with the databases of the self-reported well-being module (BIARE) which is part of the national survey of consumer confidence (ENCO) (National Institute of Statistics and Geography, 2016). The

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four conceptual categories or constructs that make up the BIARE module are used to build the model and these are: overall satisfaction with life (*OSL*), sense of fullness also called eudaimonia (*SF*), affect balance (*AB*), and satisfaction domains (*SD*). These constructs were designed to assess subjective well-being in accordance with the guidelines of the Organization for Economic Cooperation and Development (OECD, 2013), which, in turn, are based on the recommendations of Stiglitz, Sen, and Fitoussi (2009). In this way, it is intended to overcome limitations of gross domestic product to measure the progress of societies and also was incorporated the self-assessment of members of society on their well-being. The main difference between the proposed subjective well-being model and the OECD approach is that the former focuses on analysis and the latter on measurement. Another difference is related to the current in vogue of subjective well-being that emphasizes happiness and adaptation (Diener, 1984; Diener, Lucas, & Scollon, 2006), while the present proposal considers the main conceptual elements of the mainstreams in the last four decades. The scale used is that of Cantril (Campbell, Converse, & Rodgers, 1976) and not that of Bradburn (1969) which was developed to measure happiness. It should be clarified to the reader that this is not a theoretical article, but the first test of a subjective well-being function developed by the authors of this article. The model is expected to become a useful tool for the analysis of subjective well-being in urban societies and especially in OECD member countries that regularly apply a subjective well-being survey.

OECD-BIARE Subjective Well-Being

Objective well-being is measured by the researcher in the households of the study area through indicators with metric scales or is measured by a government institution with macroeconomic indicators, while subjective well-being is the result of the self-evaluation of the study subjects on their situation and context, normally using ordinal scales. The OECD (2013, p. 29) defined subjective well-being as "good mental states, including all the different evaluations, positive and negative, that people make of their lives, and people's affective reactions to their experiences". This definition is attributed to Diener (2006, pp. 399-402) and, in it, there are three types of evaluations whose content must be underlined according to the OCED (2013, pp. 30-32): Life evaluation that refers to a person's self-evaluation about his or her life or a specific aspect of it; the emotion that are emotional states referred to a point in time; and the eudaimonia that means sense of life and purpose in life. In Mexico, INEGI applied the OECD guidelines through a robust survey of 152 questions to assess subjective well-being in 2012. This survey covered 10,654 people aged 18 to 70 in urban and rural areas. As a result, the BIARE module was obtained, which is the Mexican version of the subjective well-being survey. It contains in three of its four constructs groups of at least 10 questions. A hierarchical ordinal scale of 11 points is used in all questions, being 0 totally dissatisfied and 10 fully satisfied. The exception is *OSL* which only includes two questions. Campbell et al. (1976) reported that this scale was originally proposed by Cantril (1965) and was extensively tested in the United States with good results; although it has been adopted to measure happiness worldwide and is also used to measure the general sense of well-being of individuals, it actually measures satisfaction with life. These authors note that the content of satisfaction is somewhat more cognitive and relativistic than the underlying reports of happiness, which refer to an experience of feelings or emotion. For readers interested in happiness studies carried out in Mexico, the works of Aduna Castillo (2014), Salazar Cantú, and Arenas Dreger (2016) are recommended.

The BIARE contains two versions of satisfaction with life assessment: One compact is *OSL* and the other developed that contains 12 domains of satisfaction. Emotional states appear as *AB* and eudaimonia as sense of

fullness. For this work, the databases of July were considered in accordance with the National Institute of Statistics and Geography (INEGI) recommendations, since, in this month, it is assumed that the national economy is stable.

Formulation of the Subjective Well-Being Function

The *OSL* and *SF* constructs are initially proposed as measures of subjective well-being. Thus, *OSL* assesses life satisfaction today and last year by asking one question for each year. This strategy provides the interviewee to a short-term context to reflect on his or her life satisfaction. With respect to *SF*, the interviewee evaluates his or her sense of fullness or self-realization by means of 10 questions: (1) feeling good in general; (2) being optimistic in the future; (3) being free to decide one his or her life; (4) having strength in the face of adversity; (5) feeling worth living; (6) feeling lucky; (7) having confidence in oneself; (8) having a purpose in life; (9) feeling that religion is important in life; and (10) feel that most days something is accomplished. *AB* allows obtaining the balance of five pairs of bipolar moods that occurred the previous day: (1) good mood/bad mood; (2) tranquility/concern; (3) joy/sadness; (4) vitality/tiredness; and (5) concentration/lack of interest. It is about the interviewee being least influenced by today's emotional burdens to self-evaluate. For this reason, he or she self-evaluates with respect to the duration of his or her moods that experienced the previous day rather than measuring directly the intensity of them. In fact, the approach of this measurement criterion differs from that of constructs *OSL*, *SF*, and *SD* which measures directly intensity. BIARE avoids the endless discussion of comparing positive moods against negative moods through the intensity of their effects (Diener, 1984; Larsen & Prizmic, 2008). The duration criterion of moods is a smart strategy through which the interviewed uses a commonsense measurement of his or her moods intensity: duration. Thus, negative moods are assessed with the same ordinal scale as the other constructs and the academic discussion of opposite moods effects is solved by the interviewed. Bipolar scales were reported by Osgood et al. (1957) to measure the semantic differential as part of their mediational theory, but affect balance was proposed by Bradburn (1969) to measure psychological well-being (Campbell et al., 1976). In addition, the interviewee can also assess his or her level of life satisfaction through 12 domains (*SD*): (1) standard of life; (2) health; (3) achievements in life; (4) personal relationships; (5) future prospects; (6) time available to do what you like; (7) citizen security; (8) main activity; (9) housing; (10) neighborhood; (11) city; and (12) country. In this way, the concept of overall satisfaction with life was disaggregated. Conceptually, the constructs of BIARE were addressed in the sociology to measure and analyze subjective well-being in the second half of the 1970s by Andrews and Withey (1976), Campbell et al. (1976), Strumpel (1976), Morris and Winter (1978), among others. These authors, together with Diener and collaborators from the eighties, have incorporated the contributions of the psychological stream to the general approach of subjective well-being, giving it an interdisciplinary character nurtured by three disciplines: sociology, psychology, and economics. Suffice it to mention the contribution of the well-known economists Amartya Sen and Joseph Stiglitz to the OECD's guidelines on subjective well-being. The contribution of this model is to connect the four constructs together to assemble a machine for processing daily work, expectations, emotions and concerns of urban society, all orientated, to reach goals of subjective well-being.

In summary, the affect balance can be used to determine the influence of this construct—through the net balance of its five bipolar moods—on the ratings that the interviewee assigned to *OSL* and *SF*. Similarly, it is expected to be able to determine the satisfaction domains that have a significant influence on these two

variables. Under these assumptions, *AB* and *SD* will be used as explanatory variables of the subjective well-being model. Then, the *OSL* and *SF* equations can be determined by an additive linear combination of *AB*, *SD* and the dependent variable that does not participate as such in each equation. That is, *OSL* and *SF* will be tested as both dependent and independent variables:

$$OSL = a_0 + a_1 SF + a_2 AB + a_3 SD \tag{1}$$

$$SF = b_0 + b_1 OSL + b_2 AB + b_3 SD \tag{2}$$

Being a_j and b_j real scalars where a_0 and b_0 can be = 0 or ≠ 0. However, *OSL* and *SF* as dependent variables will always be > 0; instead, *OSL*, *SF*, *AB*, and *SD* as explanatory variables can take both positive and negative values and all of them are expected to be ≠ 0.

The BIARE databases provide the answers to the groups of questions of the constructs *OSL*, *SF*, *AB*, and *SD* since 2013. In a construct, the series of answers on a survey question is called an observable variable. To incorporate the constructs into Equations (1) and (2), they must be transformed into unobservable variables that are summary variables. The factor analysis method allows reducing a relatively large number of observable variables to a minimum number of latent variables (factors) that contain only those that are correlated with each other. This method uses a group of statistical techniques and imposes the following restrictions on the constructs: (1) The correlation matrix must not be an identity matrix; and (2) the partial correlations of the variables by pairs must be close to 0. In this regard, the first condition is evaluated using the approximate Chi-square statistic from the Bartlett sphericity test, which must be significant: $p < 0.05$ (Norusis, 1994; Kaiser, 1974) and the second condition is approached with the sample adequacy statistic (KMO) which must be ≥ 0.5. If these tests are passed, the factor analysis is carried out as follows (Norusis, 1994; Johnson & Wichern, 2007):

1. The latent variables (factors) of a construct are extracted by the principal components analysis and only those whose eigenvalues are ≥ 1 will be considered.

2. The factor matrix is rotated by the VARIMAX method with Keizer normalization when the number of latent variables extracted is > 1. All the factor loadings of this matrix must be > 0.5 when there are one or more latent variables.

3. The scores of latent variables are calculated by the regression method; in this way, the useful latent variables with metric scales will be available for the regression analysis.

The factor analysis method initially normalizes the observed variables; as a result, they adopt a scale with mean 0 and standard deviation 1. The latent variables that are extracted from the *OSL*, *SF*, *AB*, and *SD* constructs have metric scales with scores for all the elements of the sample. The same construct symbol is used and in bold to represent latent variables; e.g., the latent variable for *OSL* is ***OSL***. However, in the process of converting the constructs into latent variables part of their variance is lost, and even observable variables can be lost whose correlation with other variables of the same construct is low. Thus, in 2014, the latent variables obtained from the *SD* construct did not include the question: How satisfied are you with the time you have to do what you like? Because its loading in the matrix of rotated factors was < 0.5. Likewise, it should be considered that when applying factor analysis to the *OSL* construct that contains only two observable variables, it is expected to extract a single factor. On the contrary, for constructs *AB*, *SF* and *SD*, that have at least 10 observable variables, number of factors must be > 1. In fact, two latent variables were considered for these constructs according to the final results of the factor analysis. For this reason, the number of variables in the

theoretical Equations (1) and (2) increased:

$$\boldsymbol{OSL}_i = \alpha_0 + \alpha_{i1}\boldsymbol{SF}_{i1} + \alpha_{i2}\boldsymbol{SF}_{i2} + \alpha_{i3}\boldsymbol{AB}_{i1} + \alpha_{i4}\boldsymbol{AB}_{i2} + \alpha_{i5}\boldsymbol{SD}_{i1} + \alpha_{i6}\boldsymbol{SD}_{i2} + \varepsilon \quad (3)$$

$$\boldsymbol{SF}_{1i} = \beta_0 + \beta_{i1}\boldsymbol{OSL}_i + \beta_{i2}\boldsymbol{AB}_{i1} + \beta_{i3}\boldsymbol{AB}_{i2} + \beta_{i4}\boldsymbol{SD}_{i1} + \beta_{i5}\boldsymbol{SD}_{i2} + \beta_{i6}\boldsymbol{SF}_{i2} + \varepsilon \quad (4)$$

$$\boldsymbol{SF}_{2i} = \gamma_0 + \gamma_{i1}\boldsymbol{OSL}_i + \gamma_{i2}\boldsymbol{AB}_{i1} + \gamma_{i3}\boldsymbol{AB}_{i2} + \gamma_{i4}\boldsymbol{SD}_{i1} + \gamma_{i5}\boldsymbol{SD}_{i2} + \gamma_{i6}\boldsymbol{SF}_{i1} + \varepsilon \quad (5)$$

The values of the coefficients α_{ij}, β_{ij}, and γ_{ij} of the above equations are estimated using the ordinary least squares (OLS) that uses a random minimum error ε. The subscript i takes values from 1 to n, where n is the sample size of the national survey of consumer confidence (ENCO) and the subscript j only takes the values 1 and 2. An advantage of the OLS technique over the others in the least squares family is that the first has greater tooling to detect and correct deviations from the basic hypotheses. The criteria for selecting the regression equations are (Norusis, 1993; Gujarati & Porter, 2009): (1) Both the multiple determination coefficient R^2 and the adjusted R^2, R^2_{ad}, must be > 0.5 and the corresponding degree of explanation (R^2_{ad}) × 100 must be > 50%. (2) The regression equation must satisfy the analysis of variance test (ANOVA), that is, the statistic F must be significant ($p < 0.01$). (3) All the regression coefficients, including the constant term (α_0, β_0, and γ_0) must be significant according to the t-test ($p < 0.05$). (4) The regression equation must not present multicollinearity problems, that is, the variance inflation factor (VIF) and the condition index (CI) must be < 10.

Constraints of the Model

It seems obvious that the *OSL* construct with two observable variables defines subjective well-being less precisely than *SF* which consists of 10. For this reason, it is expected that the R^2 and R^2_{aj} of the regression Equation (4) are superior to those of Equations (3). In addition, this assumption could be applied to Equation (5) because the results obtained of applying factor analysis to BIARE databases shows certain evidence in this sense; i.e., SF_2 captures less than 14% of the total variance explained (see Table 1).

$$R^2_{Eq.(4)} > R^2_{Eq.(3)} \text{ and } (R^2_{ad})_{Eq.(4)} > (R^2_{ad})_{Eq.(3)} \quad (6)$$

$$R^2_{Eq.(4)} > R^2_{Eq.(5)} \text{ and } (R^2_{ad})_{Eq.(4)} > (R^2_{ad})_{Eq.(5)} \quad (7)$$

If these two assumptions are verified and the restriction (R^2_{ad}) × 100 > 50% is also satisfied, then Equation (4) will be established as the equation of the subjective well-being model of urban Mexico.

Latent Variables

A longitudinal analysis was performed using the urban subjective well-being model, whose equations were constructed by regression of OLS with the databases of the BIARE module. The sample size in 2014 was 2,003 and in 2017 was 2,010 (INEGI, 2014; 2017). The latent variables were constructed by the factor analysis method which uses principal components analysis for extraction. These variables also represent the behavior patterns of the constructs. Suppose one latent variable was extracted from a construct and if in the following year or period, more than one latent variable is extracted from the same construct, then there will be several behavior patterns. On the contrary, a single latent variable was extracted from the two observable variables included in the *OSL* construct in 2010 and 2017, because they are correlated with each other. This means that

its behavior remained unchanged. The factor analysis allows confirming the latent variables proposed in the theoretical equations of the urban subjective well-being Function (3), (4) and (5), whereas the regression analysis will exclude those that do not contribute to explaining the dependent variable significantly.

Construction of Latent Variables

The statistic KMO and Bartlett's sphericity test that validate the application of factor analysis to the groups of observable variables of the *OSL*, *SF*, *AB*, and *SD* constructs were satisfied. This can be said especially of the second test, which is designed for large samples, such as those the BIARE, since the approximate Chi-square statistic was significant ($^{**}p < 0.01$) (Tobias & Carlson, 1969); the results for 2014 and 2017 databases were, respectively, for *OSL* are 1,084.656** and 1,038.197**; for *SF*, 8,766.024** and 7,394.632**; for *AB*, 17,854.424** and 16,341.639**; and for *SD*, 7,624.451** and 8,088.456**. The degrees of freedom were: 1 for *OSL*, 45 for *SF* and *AB*, and 65 for *SD*. The results of the KMO test according to Keizer (1974), and George and Mallery (2016) are acceptable and the grades by construct were in 2014 and 2017, respectively: poor for *OSL* (0.500 and 0.500); wonderful for *SF* (0.923 and 0.918); and meritorious for *AB* (0.856 and 839) and *SD* (0.867 and 862). However, the score obtained in the KMO test for *OSL* is located in the recommended lower limit. For this reason, another measure of sample adequacy test was used, which evaluates each of the observable variables of a group instead of considering them in pairs as the KMO test does. As criteria, the diagonal values of the anti-image matrix calculated in SPSS are used (Norusis, 1994, pp. 52-53). The results of this test coincided with those of KMO; thus, the application of the factor analysis to *OSL* is supported.

The latent variable ***OSL*** was extracted from the construct *OSL* in both 2014 and 2017, captured > 81% of the total variance explained (TVE) and its factor loadings were > 0.90 (see Tables 1). Thus, this variable provides a measure statistically consistent about overall life satisfaction with implicit contents on material well-being and self-realization. In 2014, the latent variable ***AB*** was extracted from the construct affect balance whose factor matrix containing the factor loadings of 10 different moods with their mathematical signs. These figures show that the moods are, in fact, bipolar pairs, i.e., good mood (0.813)/bad mood (-0.790), calm down (0.819)/worried (-0.832), vitality (0.815)/tiredness (0.796), concentration (0.824)/lack of interest (-0.814), and joy (0.767)/sadness (-0.791). Because factor loadings represent correlation measures, this outcome means that the elements of each pair of bipolar moods are inversely correlated. ***AB*** can be seen as a system whose elements are grouped into two sets containing each one the same number of elements but with opposite mathematical sign. Thus, this system resembles a system of forces in equilibrium, as in the field of physics, where the sum of the magnitudes of the positive forces is equal to sum of the magnitudes of the negative forces. Nevertheless, at this point, it is not still possible demonstrate the equivalence between a system of forces in equilibrium and a system of balanced bipolar moods (i.e., emotional balance), because the issue of mood magnitude has not been resolved. Then, it can be stated hypothetically that there is an emotional balance in the urban society. The approach of affect balance of this paper contrasts with that of emotional well-being (Larsen & Prizmic, 2008) which systematized the discussion of positive affect and negative affect (Diener, 1984) through a heuristic criterion to determine whether there is negative bias. These authors continued the discussion of Diener et al. (2006) on weaknesses of the adaptation theory of the hedonic treadmill (Brickman & Campbell, 1971) by means of bivariate statistical analysis. Conversely, in our multivariate model of subjective well-being, the affect balance represents the emotional side of the society and is one of the elements working together with the other cognitive and eudaimonistic elements (***OSL***, $\boldsymbol{SD}_1$, $\boldsymbol{SD}_2$, and $\boldsymbol{SF}_2$) of the machinery that is processing the daily

efforts and expectations carried out by the households under control of the state and market economy, with participation of civil society to reach the goals of urban society ($\boldsymbol{SF}_1$). In 2017 affect balance was divided into two latent variables whose moods have factor loadings with opposite mathematical sign in each one of its pair of bipolar moods. The explanation of this division into two behavior patterns corresponds to the field of positive psychology using tools, such as emotional intelligence, self-efficacy, self-esteem, among others (Snyder & Lopez, 2002). $\boldsymbol{AB}_1$ made of three bipolar moods whose factor loadings are: good mood (0.850)/bad mood (-0.846), tranquility (0.769)/concern (-0.766) and joy (0.699)/sadness (-0.541). This variable follows the same pattern as ***AB*** does; hence, it can be also stated provisionally that their positive and negative moods are in equilibrium. Then, $\boldsymbol{AB}_1$ could be referred to people who are self-realized, satisfied with his or her life, and happy if the effect of his or her positive moods is greater than that of their negative moods. On the contrary, if the negative moods have greater effect than the positive moods, there will be an emotional unbalance. Emotional balance can be expressed through the concept of emotional intelligence according to Salovey, Meyer, and Caruso (2002, p. 159):

> Emotional intelligence represents the ability to perceive, appraise, and express emotion accurately and adaptatively; the ability to understand emotion and emotional knowledge; the ability to access and/or generate feelings when they facilitate cognitive activities and adaptive action; and the ability to regulate emotions in oneself and others.

These authors also summarized this definition as follows: "emotional intelligence refers to the ability to process emotion-laden information competently and to use it to guide cognitive activities like problem solving and to focus energy on required behaviors". Emotional balance coincides with emotional intelligence on managing and regulating positive and negative moods—or emotions and feelings—by ourselves to make decisions accurately and to perform well in daily activities orientated to attain goals of sense of fullness (SF_1). There is a certain empirical evidence that emotional intelligence is directly or indirectly correlated to concepts, such as affect balance, self-esteem, and self-efficacy; moreover, these concepts correlated with the performance at work and school (Nikolaou & Tsaousis, 2002; Locke, 2005; Dogan, Totan, & Sampmaz, 2013; Shipley, Jackson, & Segrest, 2010). However, the analysis of these relationships goes beyond this paper. $\boldsymbol{AB_2}$ contains the remaining bipolar moods—vitality (-0.830)/tiredness (0.846) and concentration (-0.765)/lack of interest (0.744)—whose pairs of bipolar moods could be in equilibrium. This variable represents a condition for a good performance at work and to study (Shipley et al., 2010; Goleman, 2018). Two latent variables were extracted from the constructs *SF* and *SD* in 2014 and 2017 and the factor loadings of their observable variables were all positive. $\boldsymbol{SF}_1$, extracted from *SF*, captured nine of 10 observable variables and retains the construct's name: sense of fullness, whereas $\boldsymbol{SF}_2$ only contains an observable variable about the importance of religion in life which, in turn, is called religion. In 2014, the observable variable that was removed from ***SD*** because the maximum value of its factor loadings was 0.498, but, in 2017, this question was included. $\boldsymbol{SD}_1$ includes two concepts built on the basis of its observable variables: quality of life (standard of living, health, and housing) and self-realization (achievements in life, future prospects, personal relationships, and main activity in daily life). $\boldsymbol{SD}_2$ can be named as citizen security due to the content of its five observable variables (time available to do what you like, citizen security, neighborhood, city, country) which deal with security beyond the urban areas. Through $\boldsymbol{SD}_1$ and $\boldsymbol{SD}_2$, the interviewee's perceptions about his or her satisfaction with life were identified more accurately than through the variable ***OSL***.

In the final step of the factor analysis, the scores for each element of the BIARE survey sample, contained

in the latent variables, were calculated by the regression method and the results, presented in an open interval format, are: In 2014 (n = 2,003), $\boldsymbol{OSL}$ = (-5.30636, 1.38139), $\boldsymbol{SF}_1$ = (-7.46536, 2.19429), $\boldsymbol{SF}_2$ = (-5.26271, 2.71334), $\boldsymbol{AB}$ = (-4.46771, 1.40651), $\boldsymbol{SD}_1$ = (-6.18674, 2.65019), and $\boldsymbol{SD}_2$ = (-4.14576, 2.26291); and in 2017 (n = 2,010): $\boldsymbol{OSL}$ = (-5.87111, 1,35929), $\boldsymbol{SF}_1$ = (-6.65268, 2.01487), $\boldsymbol{SF}_2$ = (-5.11688, 2.43405), $\boldsymbol{AB}_1$ = (-6.74991, 3.18265), $\boldsymbol{AB}_2$ = (-4.19086, 5.86496), $\boldsymbol{SD}_1$ = (-5.99169, 2.57018) and $\boldsymbol{SD}_2$ = (-4.35976, 3.09400). Thus, the original ordinal scale of the observable variables was transformed first into a normalized metric scale and finally into a continuous metric scale of the latent variables.

Table 1

Total Variance Explained and Rotated Factor Matrix of the Constructs, 2014 and 2017

Constructs	Factors	Total variance explained, TVE (Eigenvalues > 1)				Factor matrix	
		2014		2017		2014	2017
		Eigenvalue	% of TVE	Eigenvalue	% of TVE	Factor loadings [a] > 0.500	
Overall satisfaction with life, *OSL*	$\boldsymbol{OSL}$	1.647	82.35	1.635	81.77	(0.907, 0.907)	(0.904, 0.904)
Sense of fullness, *SF*	$\boldsymbol{SF}_1$	4.745	47.45	4.399	43.99	(0.656, 0.790)	(0.609, 0.782)
	$\boldsymbol{SF}_2$	1.378	13.78	1.331	13.31	(0.937, 0.937)	(0.922, 0.922)
Affect balance, *AB*	$\boldsymbol{AB}_1$	6.501	65.01	3.760	37.60	(0.767, 0.832)	(0.541, 0.850)
	$\boldsymbol{AB}_2$			3.311	33.11		(0.744, 0.830)
Satisfaction Domains, *SD*	$\boldsymbol{SD}_1$	3.851	32.09	3.717	30.98	(0.557, 0.788)	(0.561, 0.781)
	$\boldsymbol{SD}_2$	2.457	22.48	2.488	20.74	(0.520, 0.864)	(0.558, 0.860)

Note. [a] Two factor loading appear if there is a single factor with two observable variables and if there are two factors and multiple observable variables, then the extremes of the open interval corresponding to the factor loadings will appear.

Interpretation of Latent Variables

The decomposition of the constructs *SF*, *AB*, and *SD* into two latent variables, using 2014 and 2017 databases, are associated with the urbanites' concerns and motivations orientated to achieving their well-being goals. Citizen security has been deteriorating in the last three decades and has become one of the major concerns of the Mexican society. Quality of life-and-self-realization is part of the material and subjective expectations and constitutes, at the same time, incentives to allocate an extra effort at work, family business, and school. The separation of religion from the sense of fullness indicates that the former is losing ground in the life of urbanites and its space in the society is shrinking at the expense of Mexican state and lay values. Although the affect balance was divided in 2017 into two components ($\boldsymbol{AB}_1$, $\boldsymbol{AB}_2$), the elements of the pairs of bipolar moods remain with opposite mathematical sign. In addition, this outcome could be an inkling that the emotional balance is present in the affect balance as well as and its components. So far, there is no evidence $\boldsymbol{AB}$ or $\boldsymbol{AB}_1$ and $\boldsymbol{AB}_2$ are associated with severe social problems in urban areas and this may be confirmed as favorable conditions to carry out productive or academic activities through the model equations.

Religion and Sense of Fullness

According to Inglehart and Foa (2009), since the eighties, religion in the world showed a considerable and constant reduction in the number of followers, mainly in Western Europe, North America, Latin America (Brazil, Argentina, and Mexico), India, and Australia. However, this process did not occur in other parts, such as Eastern Europe, the Islamic countries, and rich countries of the Far East. Religion is losing ground as democracy progresses on the continents and conflicts with the demands of civil society regarding attention to

social problems, such as equity, human rights, freedom of choice in sexual matters and in the dissolution of marriage. In this scenario, secular states respond to these demands through laws, although they also face social movements against these reforms (Inglehart & Foa, 2009; De la Torre, 2008; Parker Gumucio, 2005). In Catholic Latin America and specifically in Mexico, the space that the Catholic Church is losing is being gained mainly by Protestant Christian groups—which include: historical and Reformed Protestants, Pentecostals, Evangelicals, and Christians—and to a lesser extent by the new sector of people "without religion" (Garma Navarro, 2018; Parker Gumucio, 2005; INEGI, 2011; Mora Duro, 2017). In the United States with a majority Protestant society, the conflict between the Catholic Church and its parishioners is expressed, in part, by questioning the prelate for the cover-up of those priests who commit sexual abuse (Formicola, 2016). The trend towards secularization and religious plurality in Latin America can be attributed to increased schooling, access to the media and communication, especially the Internet by the population, to social movements in which indigenism is taking relevance, all characteristics of democratic and globalized societies; in the southeast of Mexico, this process is related to the concentration of the indigenous population in rural areas and to the interaction with Protestant Christian denominations whose doctrine of abstention from alcohol consumption and promotion of Ethics at work represents a promising way of life (Parker Gumucio, 2005; Pérez Guadalupe & Grunberger, 2018; Gutiérrez Portillo, 2019). Thus, in a large part of the world, religion has lagged behind social changes and its moral leadership is being occupied by secular states that regulate social coexistence through laws. Despite the profound social changes that have occurred in half a millennium in Mexico through armed movements, those of emerging civil society that have allowed democracy, and those induced by the penetration of the market economy to the most isolated places, the Mexican Catholic Church has not lost its place as the national church. Mexican Catholicism that is a product of the process of miscegenation of Mesoamerican and European cultures from the 16th century on has enriched Christianity with values and social practices. Consequently, if the Catholic Church no longer represents the values and expectations of an increasingly individualized, consumerist, and globalized urban society (De la Torre, 2008; Parker Gamucio, 2008; Gutiérrez Portillo, 2019), this institution still remains a vital element of national identity, family, and community coexistence.

Citizen Security

Towards the end of the first decade of the new millennium, the murder rate began to skyrocket in Mexico as a result of President Felipe Calderón's war against drug trafficking, and public insecurity appeared on the political agenda (Melone 2013, pp. 18-19). Currently, insecurity covers up to two-thirds of the population and overcomes other severe national problems, such as unemployment, price increases, health, poverty, and corruption; in 2018, the crime rate per 100,000 inhabitants was 43,333 in urban areas and 17,350 rural areas (Jasso López, 2013, pp. 20-21; ENVIPE, 2019, pp. 16, 38; Loría, 2020, p. 153). However, academics, national, and international institutions that ensure economic growth and national security seem to be more concerned with the effects of insecurity on the performance of the economy and viability of democracy in Mexico than on its direct effects on the population (Loría 2020, p. 153; Malone, 2013; UNODC, 2019). The United Nations, from its vision focused on organized crime and homicides in prisons, places Mexico in seventh position in the general homicide rate and in a comparatively low position in the rate of prison homicides in Latin America (UNODC, 2019, pp. 3, 4). The Mexican government is addressing these burning issues through public insecurity since the homicide figures do not reflect the magnitude of the problem; as a result, the national

perception victimization survey on public safety (ENVIPE, 2019) was implemented to measure public insecurity. President López Obrador's strategy to fight organized crime is rather nationalist and is being incorporated into the agenda of democracy; at the same time, there are programs injecting money to attack insecurity from roots, i.e., poverty, corruption, and health (Centro Nacional de Control de Energía, 2019). In this context, current insecurity in the urban environment can help explain partially the results of the 2018 elections in Mexico in which civil society—and especially urban society—severely punished the Institutional Revolutionary Party (PRI) with its vote, which lost the elections for the third time and the National Action Party (PAN) that used to represent the only political alternation. The National Regeneration Movement (MORENA) successfully used the flags of civil society—which are a mirror of the results of the ENVIPE survey—to win the elections and take control of the national state for the first time. At this stage, the urban subjective well-being model has shown efficacy in identifying social problems, but above all to weigh up them within a wide framework.

Construction of the Empirical Equations of the Subjective Well-Being Model

In 2014, the regression Equations (8) and (10) were obtained without constant term and as it can be seen from the values of R^2 and R^2_{ad} in (9) and (11), only the second equation has a degree of explanation > 50%. In addition, it should be noted that the latent variable $\boldsymbol{SF}_2$ is absent in (8). The factor analysis provides normalized values; therefore, the regression coefficients measure the weights of the independent variables in the equations (Knoke, Bohrnstedt, & Mee, 2002, pp. 194-195) and are in fact standardized regression coefficients (β). The independent variables appear in the equations in descending order from left to right according to the values of their coefficients β. The significance value of the t statistic appears below each term of the equations in parentheses. The statistic F of the analysis of variance (ANOVA) in the two equations was significant ($^{**}p < 0.01$): $F_{(8)} = 288.054^{**}$ and $F_{(10)} = 510.786^{**}$. The values of VIF and IC ensure that there are no multicollinearity problems (see Table 2). This is due to the fact that latent variables were extracted by the principal components analysis, so they are not correlated with each other (Norusis, 1994).

$$\boldsymbol{OSL} = \underset{(0.000)}{0.326\boldsymbol{SD}_1} + \underset{(0.000)}{0.267\boldsymbol{SF}_1} + \underset{(0.000)}{0.165\boldsymbol{SD}_2} + \underset{(0.041)}{0.043\boldsymbol{AB}} \tag{8}$$

$$R^2 = 0.366 \ and \ R^2{}_{ad} = 0.364 \tag{9}$$

$$\boldsymbol{SF}_1 = \underset{(0.000)}{0.566\boldsymbol{SD}_1} + \underset{(0.000)}{0.184\boldsymbol{OSL}} + \underset{(0.000)}{0.112\boldsymbol{AB}} + \underset{(0.000)}{0.065\boldsymbol{SD}_2} - \underset{(0.000)}{0.096\boldsymbol{SF}_2} \tag{10}$$

$$R^2 = 0.561 \ and \ R^2{}_{ad} = 0.560 \tag{11}$$

The regression equations corresponding to the theoretical Equation (5) were discarded. Although these equations passed the ANOVA, t, and multicollinearity tests, the maximum value of R^2 was just 0.105. This means that this equation is not a relevant element of the urban subjective well-being model. Likewise, a preliminary conclusion is that the theoretical Equation (4) is fulfilled, considering that Equation (10) satisfy the selection criteria, assumptions (6), and (7), and also their R^2 and R^2_{aj} are greater than 0.5. In 2017, the results obtained in 2014 were confirmed, that is, the empirical Equations (12) and (14) corresponding to (3) and (4)

were obtained; again Equation (5) was discarded because a statistically acceptable regression equation was not found. Equations (12) and (14) lack a constant term and satisfy the selection criteria: The regression coefficients are significant according to the statistic *t*; the statistic *F* of the ANOVA test was significant ($^{**}p < 0.01$): $F_{(12)} = 178.772^{**}$ and $F_{(14)} = 360.233^{**}$; and multicollinearity tests were also passed (see Table 2). The values of R^2 and R^2_{ad} that appear in (13) and (15) show that the regression Equation (14) is the only one that meets both assumptions (6) and (7) and the restriction of the degree of explanation; therefore, it is confirmed that Equation (4) represents the model of urban subjective well-being, using the BIARE databases of 2014 and 2017.

$$\boldsymbol{OSL} = \underset{(0.000)}{0.296\boldsymbol{SD}_1} + \underset{(0.000)}{0.236\boldsymbol{SF}_1} + \underset{(0.000)}{0.095\boldsymbol{SD}_2} + \underset{(0.000)}{0.086\boldsymbol{AB}_1} + \underset{(0.001)}{0.066\boldsymbol{SF}_2} \tag{12}$$

$$R^2 = 0.308 \ \ and \ R^2{}_{\text{ad}} = 0.307 \tag{13}$$

$$\boldsymbol{SF}_1 = \underset{(0.000)}{0.592\boldsymbol{SD}_1} + \underset{(0.000)}{0.164\boldsymbol{OSL}} + \underset{(0.000)}{0.125\boldsymbol{SD}_2} + \underset{(0.000)}{0.061\boldsymbol{AB}_2} + \underset{(0.010)}{0.044\boldsymbol{AB}_1} - \underset{(0.000)}{0.193\boldsymbol{SF}_2} \tag{14}$$

$$R^2 = 0.519 \ \ and \ \ R^2{}_{\text{ad}} = 0.517 \tag{15}$$

Thus, the variable ***OSL*** exclusively represents an independent variable in the model along with the variables $\boldsymbol{AB}_1$, $\boldsymbol{AB}_2$, $\boldsymbol{SD}_1$, and $\boldsymbol{SD}_2$, which are the product of the decomposition of the constructs: affect balance and satisfaction domains. In addition, it must be considered the variable $\boldsymbol{SF}_2$ (*religion*) that due to its negative sign restricts the dependent variable $\boldsymbol{SF}_1$. The interpretation of the empirical results has already been partially carried out through the analysis of the behavior of the latent variables; and the analysis of Equations (10) and (14) is still pending.

The sense of fullness is a measure of the sense of life and purpose of life in a country where people have freedom of choice, except for being born in a poor household. The sense of life is evaluated in the current context in which people become aware of their achievements and the social recognition gained in the current stage of their life. The purpose of life takes into account the implicit goals that people have: First of all, for themselves according to the design of the BIARE module whose sampling unit is the household, but it is centered in the individual; second, for their household including the couple; and, third, the ability to contribute to the well-being of others. Only the first point corresponds strictly to the model of urban subjective well-being which is individual-centered, whereas the other two are identified with Christian doctrine. Nevertheless, this study was carried out in a mostly Catholic country with half a millennium of tradition. For this reason, it should not be expected that four decades of neoliberal governments are enough to erase the mestizo Catholic culture that is the essential element of the national identity and the family values.

The model has up to five explanatory variables with a positive sign and, also, the religion ($\boldsymbol{SF}_2$) that represents a constraint due to its negative sign. Quality of life-and-self-realization ($\boldsymbol{SD}_1$) and overall satisfaction with life (***OSL***) constitute the factors determining the goals of the sense of fullness ($\boldsymbol{SF}_1$). They have the greatest weight in the equations (10) and (14) in 2014 and 2017 and, in turn, the greatest explanatory power. In other words, people that are more satisfied with their life, material well-being, and self-fulfillment; therefore, they also have a greater $\boldsymbol{SF}_1$. Affect balance (***AB***)—or its components $\boldsymbol{AB}_1$ and $\boldsymbol{AB}_2$—and citizen security ($\boldsymbol{SD}_2$)

are the conditions that may ease the process to achieve such goals if they have a positive sign. Although the urbanites will not always have full control over these variables, in the subjective well-being model tested with BIARE databases they had consistently a positive sign, i.e., they represent resources rather than constraints.

Table 2

OLS Multiple Regression: t and Multicollinearity Statistics, 2014 and 2017

Dependent variables	Independent variables	2014				2017			
		Statistic *t*	Multicollinearity statistics			Statistic *t*	Multicollinearity statistics		
			VIF < 10	Eigenvalue[1]	CI < 10		VIF < 10	Eigenvalue[1]	CI < 10
OSL	$\boldsymbol{SD}_1$	12.197	2.246	2.157	1.000	10.777	2.182	2.015	1.000
	$\boldsymbol{SF}_1$	10.289	2.121	1.000	1.469	9.025	1.984	1.161	1.308
	$\boldsymbol{SD}_2$	9.139	1.025	0.564	1.956	4.851	1.120	0.860	1.519
	AB	2.041	1.430	0.279	2.781	4.229	1.190	0.726	1.653
	$\boldsymbol{SF}_2$					3.255	1.186	0.266	2.732
$\boldsymbol{SF}_1$	$\boldsymbol{SD}_1$	28.492	1.794	1.994	1.000	29.027	1.733	2.015	1.000
	OSF	10.158	1.499	1.114	1.338	9.000	1.390	1.170	1.313
	$\boldsymbol{SD}_2$	4.229	1.089	0.630	1.779	7.677	1.101	0.962	1.447
	$\boldsymbol{AB}_2$					3.625	1.180	0.815	1.573
	$\boldsymbol{AB}_1$	6.384	1.411	0.898	1.490	2.567	1.228	0.653	1.756
	$\boldsymbol{SF}_2$	-6.316	1.049	0.365	2.338	-11.803	1.118	0.384	2.290

Note. [1] There is no correspondence between eigenvalues and independent variables, but there is between eigenvalues and CI.

Conclusions

The tested model does not have a monetary scale; instead, the regression coefficients are used to measure the effect of the independent variables on the sense of fullness. Likewise, the model can detect relevant social problems and concerns, evaluate their effects on the sense of fullness. This can be said of insecurity, which is an indicator of the negative impacts of organized crime. However, international statistics do not place Mexican society in the worst positions in the world and Latin America (UNODC, 2019). This can be confirmed indirectly through the model's variables of citizen security and affect balance. As the two variables have a positive sign, this outcome can be interpreted that the effects of insecurity have not yet caused severe damage in the urbanites' mental health as to cause mental illness, i.e., for instance, high suicide rates (Keyes & Lopez, 2002). Conversely, the same cannot be said about the effects of ruthless competition on the labor market, such as high rates of suicides which are around three to five times those of Mexico in five of the seven most industrialized rich countries, i.e., Japan, France, Germany, United States, and Canada (WHO, 2016). The gap between the Catholic Church and the well-being expectations of urban society is a recent phenomenon in a mostly Catholic country. This is one more of the challenges in half a millennium of history as they were the establishment of the first secular state in the Americas a century and a half ago and the Cristero War in the twenties and thirties in the 20th century. In this context, civil society and the Catholic Church in Mexico must reach an agreement by which a new social pact shall be reached. Meanwhile, it remains the question: Is politically viable in Mexico the renovation of the Christian doctrine to respond to the social problems and to face the claims about the abolition of certain moral dogmas? Finally, the model equations prove that in fact, there is emotional balance since the ***AB*** and its components $\boldsymbol{AB}_1$ and $\boldsymbol{AB}_2$ have positive signs.

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